FORM-14159 R000*

Periodic Safety Review - Final Document Review Traveler

Bruce Power Document #:	Revision:	Information Classification	Usage Classification
NK21-SFR-09701-00011	R000	Internal Use Only	Information

Bruce Power Document Title:
Safety Factor 11 – Procedures

Bruce Power Contract/Purchase Order:	Bruce Power Project #:
00193829	38180

Supplier's Name:	Supplier Document #:	Revision:
CANDESCO	K-421231-00021	R00

Supplier Document Title:
Safety Factor 11 – Procedures

Accepted for use at Bruce Power by:	Signature:	Date
Name: Frank Saunders Title: Vice President, NORA		26 AUG 2015

Acceptance of this document does not relieve the Supplier of responsibility for any errors or omissions

*Associated with BP-PROC-01024, Periodic Safety Reviews

Periodic Safety Review - Final Document Review Traveler

Sheet # 2 of 4

Bruce Power Document #:	NK21-SFR-09701-00011	Rev #: R000	**Information Classification:** Internal Use Only	**Usage Classification:** Information
Bruce Power Document Title:	Safety Factor 11 – Procedures	Suppliers Name:	CANDESCO	
Bruce Power Contract/ Purchase Order:	00193829	Supplier Document Title:	Safety Factor 11 – Procedures	
Bruce Power Project #:	38180	Supplier Document:	K-421231-00021	Rev #: R00

Reviewed By:

Name	Title	Department	Signature	Date
David Miller	Department Manager	Safety Programs		17 AUG 2015

Recommended for Use By:

Name	Title	Department	Signature	Date
Rob McLennan	Division Manager	Nuclear Programs		18 Aug 2015

Periodic Safety Review - Final Document Review Traveler

Sheet # 3 of 4

Bruce Power Document #:	NK21-SFR-09701-00011	Rev #: R000	**Information Classification:** Internal Use Only	**Usage Classification:** Information
Bruce Power Document Title:	Safety Factor 11 – Procedures	Suppliers Name:	CANDESCO	
Bruce Power Contract/ Purchase Order:	00193829	Supplier Document Title:	Safety Factor 11 – Procedures	
Bruce Power Project #:	38180	Supplier Document:	K-421231-00021	Rev #: R00

Reviewed By:

Name	Title	Department	Signature	Date
Susan Brissette	Dept. Manager	Management Systems	SBrissette	31 JULY 15

Recommended for Use By:

Name	Title	Department	Signature	Date
Susan Brissette	Dept. Manager	Management Systems	SBrissette	31 JULY 15

Periodic Safety Review - Final Document Review Traveler

Sheet # 4 of 4

Bruce Power Document #:	NK21-SFR-09701-00011	Rev #: R000	**Information Classification:** Internal Use Only	**Usage Classification:** Information
Bruce Power Document Title:	Safety Factor 11 – Procedures	Suppliers Name:	CANDESCO	
Bruce Power Contract/ Purchase Order:	00193829	Supplier Document Title:	Safety Factor 11 – Procedures	
Bruce Power Project #:	38180	Supplier Document:	K-421231-00021	Rev #: R000

Reviewed By:

Name	Title	Department	Signature	Date
Cheryl Smith	Sr. Technical Officer	Environment Programs	Cheryl Smith	28 Jul 2015

Recommended for Use By:

Name	Title	Department	Signature	Date
Francis Chua	Department Manager	Environment Management	F. Chua	18 Aug 2015

Periodic Safety Review - Final Document Review Traveler

Sheet # ________ of ________

Bruce Power Document #:		Rev #:	**Information Classification:** Internal Use Only	**Usage Classification:** Information
Bruce Power Document Title:		Suppliers Name:		
Bruce Power Contract/ Purchase Order:		Supplier Document Title:		
Bruce Power Project #:		Supplier Document:		Rev #:

Reviewed By:

Name	Title	Department	Signature	Date

Recommended for Use By:

Name	Title	Department	Signature	Date

Periodic Safety Review - Final Document Review Traveler

Sheet # ________ of ________

Bruce Power Document #:		Rev #:	**Information Classification:** Internal Use Only	**Usage Classification:** Information
Bruce Power Document Title:		Suppliers Name:		
Bruce Power Contract/ Purchase Order:		Supplier Document Title:		
Bruce Power Project #:		Supplier Document:		Rev #:

Reviewed By:

Name	Title	Department	Signature	Date

Recommended for Use by:

Name	Title	Department	Signature	Date

Periodic Safety Review - Final Document Review Traveler

Sheet # ________ of ________

Bruce Power Document #:		Rev #:	**Information Classification:** Internal Use Only	**Usage Classification:** Information
Bruce Power Document Title:		Suppliers Name:		
Bruce Power Contract/ Purchase Order:		Supplier Document Title:		
Bruce Power Project #:		Supplier Document:		Rev #:

Reviewed By:

Name	**Title**	**Department**	**Signature**	**Date**

Recommended for Use By:

Name	**Title**	**Department**	**Signature**	**Date**

candesco
Division of Kinectrics Inc.

Title: Safety Factor 11 - Procedures

File: K-421231-00021-R00

NK21-SFR-09701-00011

A Report Submitted to Bruce Power

June 30, 2015

Issue	Reason for Issue:				
R00D0	For first internal Candesco review				
	Author: T. Mellors Y. Dadashi S. McGee P. West	Verifier:	Reviewer: G. Archinoff T. Kapaklili	Approver:	Date: Jan 6, 2015
Issue	**Reason for Issue:**				
R00D1	For harmonization, which incorporates internal Candesco review comments				
	Author: J. Sobolewski Y. Dadashi	Verifier:	Reviewer: G. Archinoff T. Kapaklili	Approver:	Date: Feb 23, 2015
Issue	**Reason for Issue:**				
R00D2	For final internal Candesco review				
	Author: J. Sobolewski Y. Dadashi	Verifier:	Reviewer: G. Archinoff L. Watt	Approver:	Date: Mar 3, 2015
Issue	**Reason for Issue:**				
R00D3	Issued to Bruce Power for review				
	Author: J. Sobolewski Y. Dadashi	Verifier: G. Buckley	Reviewer: G. Archinoff L. Watt	Approver:	Date: Mar 17, 2015

Issue	Reason for Issue:				
R00D4	Incorporates changes from Bruce Power review				
	Author: J. Sobolewski	Verifier: G. Aldev	Reviewer: G. Archinoff L. Watt	Approver:	Date: June 19, 2015
Issue R00	**Reason for Issue:** For use				
	Author: J. Sobolewski	Verifier: G. Aldev C. Stallman	Reviewer: G. Archinoff L. Watt	Approver: L. Watt	Date: June 30, 2015

Document Classification:	Security Classification:
Report	Client Proprietary

Table of Contents

List of Tables

Acronyms and Abbreviations

AI	Action Item
AIM	Abnormal Incidents Manual
ALARA	As Low As Reasonably Achievable
ARM	Alarm Response Manual
BP	Bruce Power
BPMS	Bruce Power Management System
CANDU	Canada Deuterium Uranium
CM	Configuration Management
CMLF	Central Maintenance and Laundry Facility
CNSC	Canadian Nuclear Safety Commission
CSA	Canadian Standards Association
DECs	Design Extension Condition
DFC	Diagnostic Flow Chart
DTE	Deferral Technical Evaluation
EA	Environmental Assessment
ECC	Engineering Change Control
ECNs	Engineering Change Notice
EFPH	Equivalent Full Power Hours
EM	Emergent Work
EMS	Environmental Management System
EPS	Emergency Protective Services
FASA	Focus Area Self-Assessment
GOSP	Governance-Oversight-Support-Perform
HREs	High Risk Evolutions
IAEA	International Atomic Energy Agency
INPO	Institute of Nuclear Power Operations
ISO	International Organization for Standardization
ISR	Integrated Safety Review
ITP	Inspection and Test Plan

LCH	Licence Conditions Handbook
LTEP	Long Term Energy Plan
M&TE	Maintenance & Test Equipment
MCR	Major Component Replacement
MSM	Management System Manual
NORA	Nuclear Oversight and Regulatory Affairs
NPP	Nuclear Power Plant
NSCA	Nuclear Safety and Control Act
NuSCI	Nuclear Subject Classification Index
OFI	Opportunities for Improvement
OHSA	Occupational Health and Safety Act (and Regulations)
OM	Operating Manual
OPPs or OP&Ps	Operating Policies and Principles
OPEX	Operating Experience
PAC	Position Assured Component
PDEP	Process and Document Enhancement Project
PM	Preventative Maintenance
PMOG	Preventative Maintenance Oversight Group
PMWO	Preventative Maintenance Work Orders
PO&C	Performance Objectives and Criteria
PROL	Power Reactor Operating Licence
PSR	Periodic Safety Review
RP	Radiation Protection
SACRG	Severe Accident Control Room Guide
SAEG	Severe Accident Exit Guide
SAG	Severe Accident Guide
SAM	Severe Accident Management
SBR	Safety Basis Report
SCA	Safety Control Area
SCR	Station Condition Record
SCST	Severe Challenge Status Tree
SFR	Safety Factor Report

SOE	Safe Operating Envelope
SOFA	State of the Functional Area Assessments
SSCs	Structures, Systems and Components
SSCTs	Structures, Systems, Components and Significant Tools
SST	Safety System Testing
WANO	World Association of Nuclear Operators

1. Objective and Description

Bruce Power (BP), as an essential part of its operating strategy, is planning to continue operation of Units 3 and 4 as part of its contribution to the Long Term Energy Plan (LTEP) (http://www.energy.gov.on.ca/en/ltep/). Bruce Power has developed plant life integration management plans in support of operation to 247,000 Equivalent Full Power Hours (EFPH). A more intensive Asset Management program is under development, which includes a Major Component Replacement (MCR) approach to replace pressure tubes, feeders and steam generators, so that the units are maintained in a fit for service state over their lifetime. However, due to the unusually long outage and de-fuelled state during pressure tube replacement, there is an opportunity to conduct other work, and some component replacements that could not be done reasonably in a maintenance outage will be scheduled concurrently.

To support the definition and timing of practicable opportunities for enhancing the safety of Units 3 and 4, and the ongoing operation of Units 1 and 2, which have already been refurbished, Bruce Power is conducting a station-wide review of safety for Units 0A and 1-4, to be termed an Integrated Safety Review (ISR) [1]. This ISR supersedes the Bruce A portion of the interim Periodic Safety Review (PSR) that was conducted for the ongoing operation of the Bruce A and B units until 2019 [2]. This ISR is conducted in accordance with the Bruce A ISR Basis Document [1], which states that the ISR will meet or exceed the international guidelines given in International Atomic Energy Agency (IAEA) Guide SSG-25, Periodic Safety Review for Nuclear Power Plants [3]. The ISR envelops the guidelines in Canadian Nuclear Safety Commission (CNSC) Regulatory Document RD-360 [4], Life Extension for Nuclear Power Plants, with the exception of those related to the Environmental Assessment (EA), which has already been completed for Bruce A [5][1].

1.1. Objective

The overall objective of the Bruce A ISR is to conduct a review of Bruce A against modern codes and standards and international safety expectations and provide input to a practicable set of improvements to be conducted during the Major Component Replacement in Units 3 and 4, and during asset management activities to support ongoing operation of all four units, including U0A, that will enhance safety to support long term operation. The look-ahead period will be longer than that in the interim PSR performed for Units 1-8 [2]. It will cover a 10-year period, since there is an expectation that a PSR will be performed on approximately a 10-year cycle, given that all units are expected to be operated well into the future. Nuclear Safety is a primary consideration for Bruce Power and the management system must support the enhancement

[1] RD-360 [4] was superseded by CNSC REGDOC-2.3.3 [6] in April 2015. CNSC REGDOC-2.3.3 was in draft at the time that the ISR Basis Document [1] was prepared. The draft version of CNSC REGDOC-2.3.3 stated that it was consistent with SSG-25, and the assessments in the Safety Factor Reports were performed on that basis. The issued version of CNSC REGDOC-2.3.3 also states that it is consistent with SSG-25, and therefore it is considered that the ISR envelops the guidelines in CNSC REGDOC-2.3.3.

and improvement of safety culture and the achievement of high levels of safety, as well as reliable and economic performance.

The specific objective of the review of this Safety Factor is to determine whether the operating organization's processes for managing, implementing and adhering to operating and working procedures and for maintaining compliance with operational limits and conditions and regulatory requirements are adequate and effective and ensure plant safety.

1.2. Description

The review is conducted in accordance with the Bruce A ISR Basis Document [1], which states that the review tasks are as follows:

1. Operating procedures for normal and abnormal conditions (including anticipated operational occurrences, design basis accident conditions and post-accident conditions);
2. Procedures for the management of design extension conditions, including accidents with significant core degradation (for example, symptom based emergency operating procedures);
3. Maintenance, testing and inspection procedures;
4. Procedures for issuing work permits;
5. Procedures for controlling modifications to the plant design, procedures and hardware, including the updating of documentation;
6. Procedures for controlling the operating configuration;
7. Procedures for radiation protection, including procedures for on-site transport of radioactive material; and
8. Procedures for management of radioactive effluents and waste.

2. Methodology of Review

As discussed in the Bruce A ISR Basis Document [1], the methodology for an ISR should include making use of safety reviews that have already been performed for other reasons. Accordingly, the Bruce A ISR makes use of previous reviews that were conducted for the following purposes:

- Return to service of Bruce Units 3 and 4 (circa 2001) [7];
- Life extension of Bruce Units 1 and 2 (circa 2006) [8] [9];
- Proposed refurbishments of Bruce Units 3 and 4 (circa 2008) [10] [11] [12]; and
- Safety Basis Report (SBR) and Periodic Safety Review (PSR) for Bruce Units 1 to 8 (2013) [2].

These reviews covered many, if not all, of the same Safety Factors that are reviewed in the current ISR. A full chronology of Bruce Power safety reviews is provided in Appendix F of [13].

The Bruce A ISR Safety Factor review process comprises the following steps:

1. **Interpret and confirm review tasks:** As a first step in the Safety Factor review, the Safety Factor Report author(s) confirm the review tasks identified in the ISR Basis and repeated in Section 1.2 to ensure a common understanding of the intent and scope of each task. In some cases, this may lead to elaboration of the review tasks to ensure that the focus is precise and specific. Any changes to the review tasks are identified in Section 5 of the Safety Factor Report (SFR) and a rationale provided.
2. **Confirm the codes and standards to be considered for assessment:** The Safety Factor Report author(s) validates the list of codes and standards presented in the ISR Basis Document against the defined review tasks to ensure that the assessment of each standard will yield sufficient information to complete the review tasks. Additional codes and standards are added if deemed necessary. If no standard can be found that covers the review task, the assessor may have to identify criteria on which the assessment of the review task will be based. The final list of codes and standards considered for this Safety Factor is provided in Section 3.
3. **Determine the type and scope of assessment to be performed:** This step involves confirming or modifying the assessment type for each of the codes and standards and guidance documents identified for consideration. The ISR Basis Document provides an initial assignment for the assessment type, selecting one of the following review types:
    - Programmatic Clause-by-Clause Assessments;
    - Plant Clause-by-Clause Assessments;
    - High-Level Programmatic Assessments;
    - High-Level Plant Assessments;
    - Code-to-Code Assessments; or
    - Confirm Validity of Previous Assessment.

   The final assessment types are identified in Section 3, along with the rationale for any changes relative to the assignment types listed in the ISR Basis Document.
4. **Perform gap assessment against codes and standards:** This step comprises the actual assessment of the Bruce Power programs and the Bruce A plant against the identified codes and standards. In general, this involves determining from available design or programmatic documentation whether the plant's design or programs meet the provisions of the specific clause of the standard or of some other criterion, such as a summary of related clauses. Each individual deviation from the provisions of codes and standards is referred to as a Safety Factor "micro-gap". The assessments, performed in Appendix A and Appendix B, include assessor's arguments conveying reasons why the clause is considered to be met or not met, while citing appropriate references that support this contention.
5. **Assess alignment with the provisions of the review tasks:** The results of the gap assessment against codes and standards are interpreted in the context of the review tasks of the Safety Factor. To this end, each assessment, whether clause-by-clause, high-level or code-to-code, is assigned to one or more of the review tasks (Section 5). Assessment

against the provision of the review task involves formulating a summary assessment of the degree to which the plant or program meets the objective and provisions of the particular review task. This assessment may involve consolidation and interpretation of the various compliance assessments to arrive at a single compliance indicator for the objective of the review task as a whole.

6. **Perform program assessments:** The most pertinent self-assessments, audits and regulatory evaluations are assessed, and performance indicators relevant to the Safety Factor identified. The former illustrates that Bruce Power has a comprehensive process of reviewing compliance with Bruce Power processes, identifying gaps, committing to corrective actions, and following up to confirm completion and effectiveness of these actions. The latter demonstrates that there is a metric by which Bruce Power assesses the effectiveness of the programs relevant to the Safety Factor in Section 7. Taken as a whole, these provide a cross section, intended to demonstrate that the processes associated with this Safety Factor are implemented effectively (individual findings notwithstanding). Thus, program effectiveness, if not demonstrated explicitly in the review task assessments in Step 5, can be inferred if Step 5 shows that Bruce Power processes meet the Safety Factor requirements and if this step shows there are ongoing processes to ensure compliance with Bruce Power processes.
7. **Perform program assessments:** The most pertinent self-assessments, audits and regulatory evaluations are assessed, and performance indicators relevant to the Safety Factor identified. The former illustrates that Bruce Power and the CNSC have a comprehensive process of reviewing compliance with Bruce Power processes, identifying gaps, committing to corrective actions, and following up to confirm completion and effectiveness of these actions. The latter demonstrates that there is a metric by which Bruce Power assesses the effectiveness of the programs relevant to the Safety Factor. Taken as a whole, these provide a cross section, intended to demonstrate that the processes associated with this Safety Factor are implemented effectively (individual findings notwithstanding). Thus, program effectiveness, if not demonstrated explicitly in the review task assessments in Step 5, can be inferred if Step 5 shows that Bruce Power processes meet the Safety Factor requirements and if this step shows there are ongoing processes to ensure compliance with Bruce Power processes.
8. **Identification of findings:** This step involves the consolidation of the findings of the assessment against codes and standards and the results of executing the review tasks into a number of definitive statements regarding positive and negative findings of the assessment of the Safety Factor. Positive findings or strengths are only identified if there is clear evidence that the Bruce A plant or programs exceed compliance with the provision of codes and standards or review task objectives. Each individual negative finding or deviation is designated as a Safety Factor micro-gap for tracking purposes. Identical or similar micro-gaps are consolidated into comprehensive statements that describe the deviation known as Safety Factor macro-gaps, which are listed in Section 8 of the Safety Factor Reports, as applicable.

3. Applicable Codes and Standards

This section lists the applicable regulatory requirements, codes and standards considered in the review of this Safety Factor. The list also includes any new codes or standards that came into effect after the completion of the 2013 PSR, as well as those that supersede codes or standards previously assessed. Regulatory codes and standards issued after the code effective date of August 31, 2014 were not part of the detailed review.

3.1. Acts and Regulations

The *Nuclear Safety and Control Act* (NSCA) [14] establishes the Canadian Nuclear Safety Commission and its authority to regulate nuclear activities in Canada. The NSCA has been amended on July 3, 2013 to provide the CNSC with the authority to establish an administrative monetary penalty system. The Administrative Monetary Penalties Regulations were introduced in 2013, and set out the list of violations that are subject to administrative monetary penalties, as well as the method and criteria for penalties administration. However, these changes do not impact this Safety Factor. Furthermore, following the Fukushima nuclear events of March 2011, the Fukushima Omnibus Amendment Project was undertaken and completed in 2012, and resulted in amendments to regulatory documents to reflect lessons learned from these events. Bruce Power has a process to ensure compliance with the NSCA [14] and its Regulations. Therefore, the NSCA and Regulations were not considered further in this review.

3.2. Power Reactor Operating Licence

The list of codes and standards related to procedures that are referenced in the Bruce Power Reactor Operating Licence (PROL) [15] and Licence Condition Handbook (LCH) [16] noted in Table C-1 of the ISR Basis document [1] are identified in Table 1.[2] The edition dates referenced in the third column of the table are the modern versions used for comparison.

The following licence conditions have been re-affirmed as applicable for SF11 on Procedures based on a review of the ISR Basis document [1] and past Integrated Safety Reviews[3]:

- Licence Condition 1.6: Land Use and Occupation;
- Licence Condition 3.1: Maintaining Operating Policies and Principles (OP&Ps);
- Licence Condition 3.3: Reactor Power Limits;
- Licence Condition 3.4: Unit Restart after a Serious Process Failure;
- Licence Condition 4.1: Maintenance Program;

[2] PROL 18.00/2020 [17] and LCH-BNGS-R000 [18] came into effect on June 1, 2015. However, PROL 15.00/2015 [15] and LCH-BNGSA-R8 [16] are the versions referred to in this ISR, as these were in force when the assessments in the Safety Factor Reports were performed.

[3] At a high level, Licence Conditions 1.4 and 1.5 apply to all programs, as they are pertinent to CSA N286 and the BP-MSM-1, Management System, but they do not provide detailed technical requirements applicable to this Safety Factor.

- Licence Condition 4.2: Planned Maintenance Outage;
- Licence Condition 4.3: Periodic Inspection and Testing Program;
- Licence Condition 5.2: Changes to Facility, Facility Operation, Equipment or Procedure;
- Licence Condition 8.1: Environmental Protection Program;
- Licence Condition 8.2: Derived Release Limits;
- LIcence Condition 8.3: Environmental Protection Action Levels;
- Licence Condition 9.1: Radiation Protection Program; and
- Licence Condition 9.2: Radiation Protection Action Levels.

Table 1: Codes, Standards, and Regulatory Documents Referenced in Bruce A PROL and LCH

Document Number	Document Title	Modern Version Used for ISR Comparison	Type of Review
CNSC S-99 (2003) [19]	Reporting Requirements for Operating Nuclear Power Plants	CNSC REGDOC-3.1.1 (2014) [20]	NR
CNSC RD/GD-99.3 (2012)	Public Information and Disclosure	CNSC RD/GD-99.3 (2012) [21]	NR
CNSC S-296 (2006) [22]	Environmental Protection, Policies, Programs And Procedures At Class I Nuclear Facilities And Uranium Mines And Mills	CNSC REGDOC-2.9.1 (2013) [23]	CTC
CNSC RD-360 (2008)	Life Extension of Nuclear Power Plants	CNSC RD-360 [4]	NR
CSA N286-05 [24]	Management System Requirements for Nuclear Power Plants	CSA N286-12 [25]	NR
CSA N292.3-08	Management of low- and intermediate-level radioactive waste	N292.3-14 [26]	CBC
Assessment type: Clause-by-Clause (CBC); Code-to-Code (CTC); High Level (HL); No Assessment Required (NR); Confirm Validity of Previous Assessments (CV)			

CNSC REGDOC-3.1.1: Table C-1 of the ISR Basis Document [1] calls for a code-to-code assessment of CNSC REGDOC-3.1.1 to CNSC S-99. CNSC S-99 (2003) [19], "Reporting Requirements for Operating Nuclear Power Plants", was included in PROL 15.00/2015 and was the basis document the CNSC used to assess past refurbishments at Bruce A, as Bruce Power has had an obligation to meet this Regulatory Document since before 2008. CNSC REGDOC-3.1.1 [20], Reporting Requirements for Nuclear Power Plants, which replaced S-99 [19] in May 2014, is listed as condition 1.7 in PROL 18.00/2020 [17] and sets reporting requirements for nuclear power plants. Bruce Power switched over to CNSC REGDOC-3.1.1 at the beginning of 2015[4], as committed in a letter submitted to the CNSC [27]. Line-by-line compliance with this regulatory document is verified on an ongoing basis to ensure compliance with the PROL, and therefore it was not assessed as part of this Safety Factor.

CNSC RD/GD-99.3: Table C-1 of the ISR Basis Document [1] calls for a clause-by-clause assessment of CNSC RD/GD-99.3 [21], which establishes regulatory requirements for public information and disclosure for licensees. This regulatory document is included in the current licence and accordingly no further assessment of RD/GD-99.3 requirements is performed for this ISR.

CNSC REGDOC-2.9.1: Table C-1 of the ISR Basis Document [1] calls for a code-to-code comparison of CNSC REGDOC-2.9.1 [23] to its predecessor documents S-296 [22] and G-296. While the ISR Basis Document does not identify S-296 as part of the current licence, compliance with S-296 is identified in Licence Condition 8.1. The code-to-code comparison showed no significant changes regarding routine releases to the environment. The results of the comparison and a high level assessment of this Regulatory Guide are presented in Safety Factor Report 14.

CNSC RD-360: This ISR is being conducted as part of ongoing operation for Units 1 and 2 and to support Major Component Replacement of Units 3 and 4, so it also envelops the guidelines in RD-360, Life Extension for Nuclear Power Plants, issued February 2008. Therefore, RD-360 [4] *de facto* continues to provide guidance on how this review should be conducted. However, RD-360 [4] was superseded by CNSC REGDOC-2.3.3 [6] in April 2015, which was in draft at the time that the ISR Basis Document [1] was prepared. The draft version of CNSC REGDOC-2.3.3 stated that it was consistent with SSG-25, and the assessments in the Safety Factor Reports were performed on that basis. The issued version of CNSC REGDOC-2.3.3 also states that it is consistent with SSG-25, and therefore it is considered that the ISR envelops the guidelines in CNSC REGDOC-2.3.3.

CSA N286-05: Table C-1 of the ISR Basis Document [1] calls for a code-to-code review against Canadian Standards Association (CSA) standard CSA N286-05. CNSC staff have stated that in their view the CSA N286-12 version of CSA N286 "does not represent a fundamental change to the current Bruce Power Management System" and have acknowledged that "the new requirements in CSA N286-12 are already addressed in Bruce Power's program and procedure documentation" [28].

Bruce Power had agreed to perform a Gap Analysis and to prepare a detailed Transition Plan, and to subsequently implement the necessary changes in moving from the CSA N286-05

[4]Reporting is performed under S-99 up to the end of 2014, and under CNSC REGDOC-3.1.1 for periods thereafter.

version of the code to the CSA N286-12 version, during the next licensing period [27]. This timeframe will facilitate the implementation of N286 changes to the management system, and enable the gap analysis results from the large number of new or revised Regulatory Documents or Standards committed in the 2015 operating licence renewal. Bruce Power has also proposed that in the interim, CSA N286-05 be retained in the PROL to enable it to plan the transition to CSA N286-12, and committed to develop the transition plan and communicate the plan to the CNSC by January 30, 2016 [29]. Bruce Power further stated CSA N286-12 does not establish any significant or immediate new safety requirements that would merit a more accelerated implementation. This Safety Factor therefore has not performed a code-to-code assessment between CSA N286-05 and CSA N286-12 and will not be performing a clause-by-clause assessment of CSA N286-05, since it is in the current licence.

CSA N292.3-14: CSA N292.3-14 [26] provides specific requirements for the management of low- and intermediate-level radioactive waste to protect the health and safety of people, physical security, and the environment for the life cycle of radioactive waste. A clause-by-clause assessment is provided in Appendix B (B.2).

3.3. Regulatory Documents

There were no additional Regulatory Documents identified in Table C-1 of the ISR Basis document [1] considered for application to review tasks of this Safety Factor beyond those identified in the PROL [15] and LCH [16].

3.4. CSA Standards

There were no additional CSA standards which are considered for application to review tasks of this Safety Factor identified in Table C-1 of the ISR Basis document [1], beyond those identified in the PROL [15] and LCH [16].

3.5. International Standards

As applicable international guidance considered for application to review tasks of this Safety Factor are included in Table 2.

Table 2: International Standards

Document Number	Document Title	Reference	Type of Review
IAEA SSG-25 (2013)	Periodic Safety Review for Nuclear Power Plants	[3]	NR
IAEA SSR-2/2 (2011)	Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements	[30]	CBC
Assessment type: Clause-by-Clause (CBC); Code-to-Code (CTC); High Level (HL); No Assessment Required (NR); Confirm Validity of Previous Assessments (CV)			

IAEA SSG-25: IAEA SSG-25 [3] addresses the periodic safety review of nuclear power plants and is the governing document for the review of the ISR, as identified in the Bruce A ISR Basis Document [1]. It defines the review tasks that should be considered for this Safety Factor. However, no assessment is performed specifically on IAEA SSG-25.

IAEA SSR-2/2: IAEA SSR-2/2 [30] describes the requirements to ensure the safe operation of nuclear power plants including commissioning. Recent developments in areas such as long-term operation, plant ageing, periodic safety review, probabilistic safety analysis and risk informed decision making processes, required revisions to this IAEA Safety Standards Series to correct and/or improve the publication and apply the safety objective and safety principles that are established in the Fundamental Safety Principles. A clause-by-clause assessment of IAEA SSR-2/2 is provided in Appendix B (B.1).

3.6. Other Applicable Codes and Standards

The codes and standards discussed in the previous sub-sections have been determined to be sufficient for the completion of the review tasks of this Safety Factor. Accordingly, additional codes and standards are not considered in this Safety Factor Report. Bruce Power routinely considers external industry standards such as those from the International Atomic Energy Agency (IAEA), Institute of Nuclear Power Operations (INPO) and World Association of Nuclear Operators (WANO) when developing their procedures.

4. Overview of Applicable Bruce A Station Programs and Processes

Section 4.1 provides an overview of Bruce Power programs, procedures, and practices related to this Safety Factor.

4.1. Key Implementing Documents

CSA N286-05 [24] Sections 5 and 6 (similarly N286-12 [25] Sections 4, 7.3 through 7.11) and Appendix A, C, D, and E identify specific requirements that must be met relating to the Procedures of a nuclear power plant. The key Bruce Power documents associated with implementation of the elements related to Procedures are indicated in Table 3.[5]

Table 3: Key Implementing Documents

<table>
<tr><th>First Tier Documents</th><th>Second Tier Documents</th><th>Third Tier Documents</th><th>Fourth Tier Documents</th></tr>
<tr><td rowspan="6">BP-MSM-1: Management System Manual [31]
BP-MSM-1 Sheet 0001: MSM – Bruce Power Program Matrix [32]
BP-MSM-1 Sheet 0002: MSM - Approved Reference Chart Authorities and Responsibilities [33]
BP-MSM-1 Sheet 0003: MSM - List of Applicable Governing Acts, Regulations, Codes & Standards [34]
BP-MSM-1 Sheet 0004: MSM - Program Summaries [35]</td><td>BP-OPP-00002: Operating Policies and Principles – Bruce A [36]</td><td></td><td></td></tr>
<tr><td>BP-PROG-00.02: Environmental Safety Management [37]</td><td>BP-PROC-00080: Effluent Monitoring Program [55]</td><td></td></tr>
<tr><td>BP-PROG-00.06, Health and Safety Management [38]</td><td>BP-PROC-00389: Conventional Safety Programs [56]</td><td>BP-SM-00070: Bruce Power Safety Rules [119]</td></tr>
<tr><td rowspan="3">BP-PROG-01.02: Bruce Power Management System Management [39]</td><td>BP-PROC-00016: Business Assessment Process [57]</td><td></td></tr>
<tr><td>BP-PROC-00166: General Procedure and Process Requirements [58]</td><td></td></tr>
<tr><td>B-HBK-08130-00001: GOSP Implementation Handbook [59]</td><td></td></tr>
</table>

[5] Table 3 lists the key governance documents used to support the assessments of the review tasks for this Safety Factor Report. There is a continual process to update the governance documents; document versions may differ amongst individual Safety Factor Reports depending on the actual assessment review date. A full set of current sub-tier documents is provided within each current PROG document.

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		BP-PROC-00703: Change Management Guidance [60]	
		BP-PROC-00774: Program Requirements [61]	
	BP-PROG-01.07: Corrective Action [40]	BP-PROC-00060: Station Condition Record [62]	
	BP-PROG-03.01: Document Management [41]	BP-PROC-00068: Controlled Document Life Cycle Management [63]	
	BP-PROG-08.01: Emergency Management Program [42]	BP-PLAN-00001: Bruce Power Nuclear Emergency Response Plan [64]	BP-ERP Suite of Nuclear Emergency Response Procedures
		BP-PLAN-00002: Winter Storm Transportation Plan [65]	
		BP-PLAN-00003: Bruce Power Electricity Emergency Plan [66]	
		BP-PLAN-00004: Business Continuity Management [67]	
		BP-PLAN-00005: Rad Materials Transportation Emergency Response Plan [68]	
		BP-PLAN-00006: Conventional Emergency Management [69]	BP-EST Suite of Procedures

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		BP-PLAN-00008: Fire Safety Management [70]	
		BP-PROC-00127: Radioactive Liquid Emissions Response Procedure [71]	
		BP-PROC-00317: Crisis Management [72]	
		BP-PROC-00659: Severe Accident Management [73]	
		BP-PROC-00722: Staff Shortage – Health Related [74]	
	BP-PROG-10.01: Plant Design Basis Management [43]	BP-PROC-00335: Design Management [75]	
		BP-PROC-00363: Nuclear Safety Assessment [76]	DPT-NSAS-00011: Configuration Management of Safety Analysis Software [120]
			DPT-NSAS-00012: Preparation and Maintenance of Operational Safety Requirements [121]
			DPT-NSAS-00015: Planning and Execution of Nuclear Safety Analysis [122]

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
			DPT-NSAS-00016: Integrated Aging Management for Safety Assessment [123]
		BP-PROC-00582: Engineering Fundamentals [77]	
	BP-PROG-10.02: Engineering Change Control [45]	BP-PROC-00542: Configuration Information Change [78]	
		BP-PROC-00539: Design Change Package [79]	
		BP-PROC-00615: Commissioning Modifications and Projects [80]	
		BP-PROC-00743: Site Services Engineering Change Control [81]	
		BP-PROC-00877: Modification Installation Quality Assurance [82]	
	BP-PROG-10.03: Configuration Management [46]	BP-PROC-00470 Configuration Management Program Oversight and Trending [83]	
		BP-PROC-00584: PASSPORT Equipment Data Management [84]	

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		BP-PROC-00638: Temporary Configuration Change Management [85]	
		BP-PROC-00786: Margin Management [86]	
		BP-PROC-00898: Equipment Codes [87]	
		SEC-DO-00001: Drafting Office Work Management [88]	
		SEC-DSS-00001: Statusing and Dispositioning of Legacy ECNs [89]	
	BP-PROG-11.01: Equipment Reliability [47]	BP-PROC-00268: Safety System Testing (SST) Program Procedures [90]	
		BP-PROC-00498:[6] Condition Assessment of Generating Units in Support of Life Extension [91]	
		BP-PROC-00778: Scoping and Identification of Critical Components [92]	
		BP-PROC-00779: Continuing Equipment Reliability Improvement [93]	

[6] BP-PROC-00498 Section 5.2 says it is affiliated with BP-Policy-14, which no longer exists, so it would have naturally fallen within BP-PROG-14.01: Project Management and Construction [53]; however it was transferred to BP-PROG-11.01 per Figure 1 of that program document.

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		BP-PROC-00780: Preventative Maintenance Implementation [94]	
		BP-PROC-00781: Performance Monitoring [95]	
		BP-PROC-00782: Equipment Reliability Program Identification and Resolution [96]	
	BP-PROG-11.02: On-Line Work Management [48]	BP-PROC-00328: Work Prioritization and Approval [97]	
	BP-PROG-11.03: Outage Work Management [49]	BP-PROC-00470: Configuration Management Program Oversight and Trending [83]	
		BP-PROC-00584: PASSPORT Equipment Data Management [84]	
		BP-PROC-00638: Temporary Configuration Change Management [85]	
		BP-PROC-00786: Margin Management [86]	
		BP-PROC-00898: Equipment Codes [87]	
		SEC-DO-00001: Drafting Office Work Management [88]	

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		SEC-DSS-00001: Statusing and Dispositioning of Legacy ECNs [89]	
	BP-PROG-11.04: Plant Maintenance [50]	BP-PROC-00695: Maintenance Program and Activities [98]	
		BP-PROC-00696: Maintenance Organization [99]	
		BP-PROC-00699: Maintenance Work [100]	
	BP-PROG-12.01: Conduct of Plant Operations [51]	BP-WPP-00003: Work Protection Program [101] and BP-WPP Series of documents	
		BP-PROC-00250: Writer’s Guide for Station Systems Procedures [102]	
		BP-PROC-00474: High Risk and Infrequently Performed Tests and Evolutions [103]	
		BP-PROC-00734: Plant Status Control [104]	
		BP-PROC-00777: Work Protection Performance Management Process [105]	

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		BP-PROC-00907: Protected Equipment Program [106]	
		GRP-OPS-00016: Position Assured Components [107]	
		GRP-OPS-00022: Operator Aids [108]	
		GRP-OPS-00028: Administration of Reactor Guaranteed Shutdown State [109]	
		GRP-OPS-00031: Conduct of Shift Turnovers [110]	
		GRP-OPS-00042: Equipment Alignment Checks [111]	
		GRP-OPS-00046: Station Key Controls and Locking Requirements [112]	
		GRP-OPS-00050: Requirements for Station Operating Procedure Development and Revision [113]	
		DIV-OPA-00003: Response to Transients – Bruce A [114]	

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
	BP-PROG-12.05: Radiation Protection Program [52]	BP-PROC-00188: Radioactive Material Transportation [115]	BP-RPP-00033: Unconditional Releases and Conditional Transfers of Material [124]
		BP-PROC-00878: Radioactive Waste Management [116]	BP-PROC-00107: OPG Waste Acceptance Criteria for Radioactive Waste [125] BP-RPP-00010: Segregation and Handling of Radioactive Waste [126] BP-PROC-00711: Energy Solutions Waste Acceptance Guidelines for Radioactive Waste [127] BP-PROC-00714: Low Level Radioactive Waste Minimization [128]
		BP-RPP-00044: ALARA Program [117]	BP-RPP-00011: Requirements for Planning Radiological Work [129] SEC-RPR-00015: Radiation Exposure Permits [130] SEC-RPR-00019: Dose Estimation for HP Permit Request Processing [131]

First Tier Documents	Second Tier Documents	Third Tier Documents	Fourth Tier Documents
		SEC-RPP-00012: Radiation Protection Performance Indicators [118]	
	BP-PROG-14.01: Project Management and Construction [53]	BP-PROC-00498 Condition Assessment of Generating Units in Support of Life Extension [91]	
	BP-PROG-15.01: Nuclear Oversight Management [54]		

BP-MSM-1, Management System Manual [31] defines and documents Bruce Power's Management System.

The Management System Manual (MSM) [31] contains the company's vision, mission, values, behaviours, policies, key results areas, summary of the Board structure and a statement of commitment from the Chief Executive to the management system. It includes Sheets covering a summary of the complete list of Programs, a listing of Program owners and approvers, as well as functional area (process) groupings, the responsibilities and authorities of all section managers and above positions at Bruce Power and a summary of regulatory, legal and business requirements. The sheets include:

- BP-MSM-1 Sheet 0001 [32], MSM - Bruce Power Program Matrix;
- BP-MSM-1 Sheet 0002 [33], MSM - Approved Reference Chart Authorities and Responsibilities;
- BP-MSM-1 Sheet 0003 [34], MSM - List of Applicable Governing Acts, Regulations, Codes & Standards; and
- BP-MSM-1 Sheet 0004 [35], MSM - Program Summaries.

The BP-MSM-1 provides a high level description of the way the business is managed including the leadership direction defining how it is integrated. Nuclear safety is a primary consideration and the Bruce Power Management System (BPMS) supports the enhancement and improvement of safety culture and the achievement of high levels of safety as well as business performance, and is designed to ensure the leadership team can consistently deliver expected results and satisfy its stakeholders such as the regulator, the public, its shareholders and employees. It ensures that Bruce Power meets the stipulations of its operating licences, other applicable codes, standards, legal and business requirements.

The BPMS covers five components and applies to the entire business at all locations managed by the organization. The components which form the basis of the structure are:

- Strategic Direction;
- Plan - Policy, Program and Process Controls;
- Do - Process Management;
- Check - Monitoring for Results;
- Act - Continuous Learning; and
- Leadership and Organizational Accountability.

4.1.1. Environment – Environmental Safety Management

BP-PROG-00.02 [37], Environmental Safety Management Program provides the overall framework to manage the environmental aspects of the Station operations, consistent with its Management System Manual, safety, environment, quality, economic and other requirements putting safety as the overriding priority. Bruce Power's nuclear safety incorporates the four pillars of; reactor safety, industrial safety, radiological safety and environmental safety.

The Bruce Power Environmental Safety Management Program is structured to address the Environmental Management System (EMS) requirements of the International Organization for Standardization (ISO) 14001 standard. The Program defines the requirements and elements of environmental protection and oversees the planning, implementation and control of activities to minimize potential adverse impacts of operations on the natural environment. It conforms to CNSC S-296, CSA N286-05 clauses 6.28 and 6.29, as well as the ISO 14001. Programs, processes, and procedures, at a minimum, assure compliance with regulatory and statutory requirements and facilitate continual improvement in environmental performance, and provide a system based approach to managing environmental aspects.

4.1.2. BPMS – Bruce Power Management System (BPMS) Management

BP-PROG-01.02 [39], the Bruce Power Management System (BPMS) Management Program coordinates the business framework needed to satisfy corporate governance and regulatory licence requirements at a level and to an extent that will ensure commitment to reactor safety, radiological safety, industrial safety and environmental safety. It implements the management system and it controls changes to the interdependent processes, organization and document structures that are essential to managing business.

BP-PROG-01.02 establishes the governance, provides oversight, supports and enables the maintenance of an integrated management system framework for Bruce Power and establishes the framework for the planning, implementation, maintenance, and continual improvement of business processes, activities, and human behaviours which contribute to the achievement of Bruce Power's objectives. This Program supports the implementation of the BPMS in such a way that it is known, understood and followed. The BPMS serves as the overall quality assurance program, which complies with CSA N286 the standard required by PROL. Nuclear

Safety is a primary consideration of the management system including the enhancement and improvement of safety culture and the achievement of high levels of safety as well as business performance.

BP-PROC-00016 [57], Business Assessment Process, identifies the process to evaluate the effectiveness of the BPMS and foster continuous improvement. Business Assessment includes a periodic review bringing together the summary of the State of the Functional Area Assessments (SOFA) for the period together with insights derived from a review of nuclear oversight trends and themes and monitoring and assessment of Safety Culture. The process provides insights to senior management for consideration as part of the ongoing Plan-Do-Check-Act cycle.

BP-PROC-00166 [58], General Procedure and Process Requirements provides instruction on how to create, review and/or revise Bruce Power procedures and processes. It establishes standards, methodology and processes necessary to ensure Bruce Power practices reflect a strong commitment to nuclear safety and a consistent approach to procedure quality. Well written procedures that use consistent structures, styles and language help reduce human error and promote consistent results.

4.1.3. Performance Improvement – Corrective Action

BP-PROG-01.07 [40], Corrective Action program identifies and eliminates or mitigates adverse conditions that could negatively impact nuclear safety (including reactor safety, radiation safety, industrial safety and environmental safety), business loss or corporate reputation. Adverse conditions and non-conformances are to be promptly identified, documented and reported. For most events, significant events and significant conditions adverse to quality, the causes are determined and corrective action is taken to correct, and where appropriate, prevent their recurrence. Corrective actions taken to address identified causes are tracked to completion. Effectiveness is verified for actions taken to prevent recurrence. Adverse conditions are trended and periodically analyzed for adverse trends. Corrective actions are implemented to address adverse trends where warranted. Periodic assessment of the effectiveness of the program is done based on the results and recommendations obtained from verifications and audits.

4.1.4. Records Management – Document Management

BP-PROG-03.01 [41], Document Management program defines a Controlled Document as a document that has a defined revision control process for its entire life cycle and is officially assigned a unique controlled document number by the Document Custodian. Controlled Documents are subject to formal procedural control of their preparation, review, validation, approval, issue and change control. Controlled Documents are reviewed for accuracy and approved by authorized personnel prior to release. Controlled Documents are indexed and distributed using the Controlled Document Module in PassPort. A Record is defined as information in any format that has been authenticated (i.e., initialed, stamped or signed, dated, clearly identified) and is retained to meet business or regulatory requirements, by authorized personnel.

The preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality are controlled to assure that correct documents are being employed. Such documents, including changes thereto are reviewed for adequacy and approved for release by authorized personnel. Documentation which may cause loss, disadvantage or harm to Bruce Power or any of its partners, customers, employees, suppliers or other third parties are not disclosed to external parties without the written consent of Bruce Power. Documentation entrusted to Bruce Power is treated with the same rigor as that created and owned by Bruce Power. The implementing procedures consider the impacts of Nuclear Safety as they apply to decision making and risk management of Industrial Safety, Environmental Safety, and Radiological Safety in support of overall Reactor Safety.

4.1.5. Emergency Protective Services – Emergency Measures Program

BP-PROG-08.01 [42], Emergency Management Program ensures that the consequences of unplanned events that have the potential to impact on employee, public and environmental safety and the continuity of Bruce Power's business operations are managed. Nuclear safety is the paramount consideration guiding decisions and actions.

Threats to employee and public health and safety, environmental safety and to the continuity of business are identified through activities, which include but are not limited to the review by staff of internal and external operating experience reports. As a result of this process, those threats that have been assessed as requiring some degree of preparedness, response and recovery are identified and addressed. The process for preparing, implementing instructions to manage the response to an event, recovering from the consequences of that event and assessing the adequacy of plans and procedures to achieve the purpose of this program are described. The plans must address the following objectives where applicable:

- Identification and classification of hazardous conditions and events;
- Development of procedures describing the response to hazardous conditions and events and recovery from the consequences of those events;
- Establishment of response organizations;
- Establishment of response facilities and equipment;
- Establishment of Recovery Organization;
- Communication to the applicable stakeholders (employees, public, regulatory agencies) as appropriate; and
- Evaluation of program effectiveness.

4.1.6. Configuration Management Engineering – Plant Design Basis Management, Engineering Change Control, Configuration Management

BP-PROG-10.01 [43], Plant Design Basis Management program ensures that the plant design meets safety, reliability, and regulatory requirements, including pressure boundary quality assurance requirements described in BP-PROG-00.04, Pressure Boundary Quality Assurance Program [44]. This program sets out requirements for engineering analysis and documentation so the adequacy of the design can be demonstrated.

BP-PROG-10.02 [45], Engineering Change Control program specifies the manner that design changes and modifications are defined, planned, implemented, and controlled to ensure design changes and modifications are controlled so the design requirements are met and the station is operated safely consistent with the design basis for the full duration of design life. The program applies a graded approach based on risk. The assessment of risk includes elements of safety (industrial safety, reactor safety, environmental safety, radiation safety) and business needs. This program fosters a strong nuclear safety culture by defining relevant accountabilities and responsibilities, appropriate management and supervisory oversight, support interfaces, and ensuring that decision-making with respect to design changes and modifications is systematic and rigorous.

BP-PROG-10.03 [46], Configuration Management program ensures that modifications to the plant, operation, maintenance and testing of the physical plant configuration is in accordance with the design requirements as expressed in the facility configuration information and defines the processes to maintain this consistency, which is maintained throughout the operational life-cycle phase, particularly recognizing changes are being made. Configuration Management (CM) establishes guidance to promote the consistent application of the following CM objectives across the site:

- Clearly define and communicate CM scope, responsibilities, authorities, principles, and interfaces;
- Design basis and licensing basis requirements, which apply to the plant are accurately identified, documented, maintained, and accessible;
- The plant's physical structures, systems and components, and process computer controls conform to design basis and licence basis requirements;
- Design basis and licence basis requirements are accurately reflected in plant documentation and in processes and procedures for altering, maintaining, testing, and operating the plant;
- Consistency is maintained among sources of plant information (documents and electronic data), as well as between plant information and the plant's physical and functional characteristics; and
- Continuous improvement of CM is achieved by monitoring and assessing CM-related activities and by incorporating feedback of lessons learned from in-house and industry best practices and experience.

This Program is implemented by the following procedures:

- BP-PROC-00470 [83], Configuration Management Program Oversight and Trending;
- BP-PROC-00584 [84], PASSPORT Equipment Data Management;
- BP-PROC-00638 [85], Temporary Configuration Change Management;

- BP-PROC-00647, PASSPORT Permit Request Processing
- BP-PROC-00786 [86], Margin Management;
- BP-PROC-00898 [87], Equipment Codes; and
- SEC-DO-00001 [88], Drafting Office Work Management.

4.1.7. Equipment Reliability – Equipment Reliability

BP-PROG-11.01 [47], Equipment Reliability program defines the fundamental engineering operational performance needs, requirements, implementing approaches, and responsibilities of the plant equipment reliability integration process. The objective of plant reliability integration is to develop, implement and revise the approaches required for anticipating, identifying, preventing and resolving performance and condition problems with Structures, Systems and Components (SSCs) on the basis of risk, to support safe, reliable plant operation at optimum cost. This is accomplished by:

- Ensuring the safe operation of risk significant plant SSCs, and
- Maintaining a culture that has intolerance for unanticipated equipment failures and drives continuous improvement based on industry leading practices.

4.1.8. Work Management – On-Line Work Management

BP-PROG-11.02 [48], the On-Line Work Management Program, defines the performance needs, requirements, implementing approaches and responsibilities of On-Line Work. Its objective is to provide timely identification, selection, prioritization, approval, scheduling and coordination to allow execution of work necessary to ensure safety and to maximize the availability and reliability of SSCs. It accounts for the risks associated with conducting work and identifies the impact of work to the station and to work groups; protects the station from unanticipated transients due to the execution of work; and supports nuclear safety and fosters a nuclear safety culture through the incorporation of the following guiding principles and values:

- Provide timely identification, screening, scoping, planning, scheduling, preparation and execution of work necessary to maximize the availability and reliability of station equipment and systems;
- Manage the risk associated with work through the proactive identification of situations or activities that could jeopardize or adversely impact safety margins and enable the development of mitigation strategies;
- Identify the impact of work to the station and work groups, and protect the station from unanticipated transients that result from work; and
- Maximize the efficiency and effectiveness of station staff and material resources while sustaining safe, reliable and competitive plant operation at optimum cost to Bruce Power.

4.1.9. Outage Management – Outage Work Management

BP-PROG-11.03 [49], Outage Work Management program defines the performance needs, requirements, implementing approaches, and responsibilities of Outage Work Management. It identifies the controls associated with planning, implementation, and control of work performed on a reactor unit when the unit is shut down so maintenance, inspections, and modifications are performed safely and on the basis of value to maintaining safe, reliable and cost effective operation. This includes selecting and controlling the scope of work, planning, scheduling, coordinating work execution, and completing the outage.

4.1.10. Maintenance – Plant Maintenance

BP-PROG-11.04 [50], Plant Maintenance Program defines the performance needs, requirements, implementing approaches and responsibilities of the management of the plant maintenance process. It covers the hands-on maintenance of plant SSCs based on the approved maintenance strategies, schedules, procedures and practices in a cost effective manner that maximizes the availability and reliability of safety related and production sensitive equipment while maintaining the commitment to Nuclear Safety: reactor safety, industrial safety, radiological safety and environmental safety. Predictive and preventive maintenance supports enhanced equipment reliability and improved safety operational performance. Maintenance strategies are continually refined using improved technologies, Operating Experience (OPEX) and plant reliability integration feedback. Work selection, prioritization and response are guided by risk informed decision making.

4.1.11. Operations – Conduct of Operations

BP-PROG-12.01 [51], Conduct of Plant Operations program defines the fundamental business need, functional requirements, constituent elements and key responsibilities associated with the conduct of operations at Bruce A. The objective is to safely and reliably operate the station systems within the design basis for which the plants are licensed. Operations conducted in accordance with the standards and expectations defined in this program provide strong support for the four pillars of nuclear safety: reactor safety, industrial safety, radiological safety and environmental safety.

The four operational areas implemented by the Conduct of Plant Operations program are:

- Operations Documentation - Controls the development, review, approval of all procedures, flowsheets, and other documents used by Operations personnel;
- Operator Staffing - Controls the activities to ensure qualified Operations staff complements are acceptable for the safe operation of the reactor units and for the performance of routine and outage activities;
- Plant Operation - Controls the execution of Operator activities in the plants to start-up, operate and shut down the reactor units, to refuel the reactors on an on-going basis, to perform routine operations in support of maintenance activities, and to perform routine surveillance of systems and to respond to unanticipated events; and

- Work Protection - Controls the development and approval of Work Protection related procedures and oversees the execution of Work Protection related activities to ensure an isolated and de-energized condition exists for the execution of work.

4.1.12. Radiation Protection – Radiation Protection Program

BP-PROG-12.05 [52], Radiation Protection Program document defines the requirements and implementing approaches of the Radiation Protection Management Policy as defined in the Management System Manual (BP-MSM-1, Appendix A).

4.1.13. Nuclear Oversight – Nuclear Oversight Management

BP-PROG-15.01 [54], Nuclear Oversight Management program identifies the processes required to independently oversee the functioning of Bruce Power's Management System. This program contributes to the development and growth of Nuclear Safety Culture by communicating the Nuclear Safety message, setting the example for nuclear safety, and demonstrating this commitment through words and actions. The Program serves to meet the embedded PROL requirements for oversight of Pressure Boundaries and Environmental Protection. These are accomplished by the Planning, Scheduling, Conducting, Reporting, and Overall Evaluation of Audits and Assessments.

5. Results of the Review Tasks

The following sub-section is an overview of Procedures at Bruce Power, and is provided to establish further context for the review task assessments. The results of the review of this Safety Factor are subsequently documented under headings that correspond to the review tasks listed in Section 1.2 of this document. The review tasks assessed in this section have not changed from those listed in Section 1.2.

5.1. Overview of Procedures

The Policies and Programs defining Bruce Power's use of procedures are defined in BP-MSM-1, Management System Manual [31], by way of the Management System assessed in Safety Factor 10.

Work is accomplished through adherence to the Management System documents that detail requirements and acceptability of work, and there is objective evidence of successful completion of the work ([25] Section 0.1). As per N286-05 Section 2 [24] and N286-12 Section 4.7.1, Management is to define, document, control, and maintain processes that comprise the management system, as well as objective evidence to demonstrate effective implementation of the management system.

Section 4.1.4 of Bruce Power's BP-MSM-1 [31] defines the purpose of procedures and processes at Bruce power and states: Bruce Power Procedures and Processes define how the work gets done. A procedure falls below the Program level in the document hierarchy and consists of a structured set of activities designed to produce an output or it may be an informational document that establishes a standard, expectation or other requirement. Standardization of procedures/processes is being driven across Bruce Power, to the extent practicable.

In addition to general procedures, Bruce Power uses station system procedures that require application of a Nuclear Subject Classification Index (NuSCI). Station system procedures, which are principally technical in nature, are intended to facilitate the creation of operating, maintenance and engineering type procedures requiring alignment to plant structures, systems and components.

As discussed in Section 4.1, BP-PROG-01.02, Bruce Power Management System (BPMS) Management [39] provides the governing processes to control and maintain the Management System. The Approved Reference Chart Authorities and Responsibilities, BP-MSM-1 Sheet 0002 [33], identifies responsibilities upon the Nuclear Operations Vice-President to:

- Champion, lead and implement initiatives; and
- To ingrain best industry standards, proven nuclear safety principles, world class organizational behaviours, and professional individual accountability into corporate culture, policies and programs.

Industry guidelines and best practices from WANO, INPO and the IAEA are frequently identified as reference sources for operating document under BP-PROG-12.01 [51] and under design management under BP-PROG-10.1 [43], -10.2 [45] and -10.3 [46].

There have been multiple improvements in the Management System documentation since the last Safety Factor 11 review of Procedures was completed in 2008 [10]. The earliest review was conducted in accordance with the Bruce 3&4 Integrated Safety Review (ISR) Basis [132], which was based on the guidelines contained in CNSC RD-360. This CNSC Regulatory Document invoked and augmented the guidance contained in IAEA Safety Guide NS-G-2.10 [133] on the Periodic Safety Review of NPPs (Nuclear Power Plants). Since then, the BP-MSM-1 has undergone further significant changes to improve and to address the results of audits, and to accommodate incorporation of new or changing national and international standards. The BP-MSM-1 and BP-PROG-01.02 and their lower tier procedures now reflect completion of the Process and Document Enhancement Project (PDEP) in reaction to CNSC reviews. Improved operational accountability has been introduced through the Governance-Oversight-Support-Perform (GOSP) organizational model. B-HBK-08013-00001 GOSP Implementation Handbook [59] provides detailed information on how the management system is to be executed and includes roles and responsibilities for the programs. The GOSP model clarifies the accountability of the central program owner in terms of establishing the program expectations and standards. It clarifies the accountability of the station performers in terms of executing the agreed upon program to deliver the desired results. Other lower tier documents from this program lay out responsibilities in greater detail and consistency amongst programs. They are enforced via BP-PROC-00774 Program Requirements [61] and changes to the Management System are controlled via BP-PROC-00703 Change Management Guidance [60].

Many of the program documents and the process for making changes are reviewed by the CNSC before they are implemented, as per the LCH.

From an operational perspective, a key Operational Policy document is the high level set of Operating Policies and Principles [36] referenced in the PROL. The OPPs are governed by BP-MSM-1 [31]. The OPPs, which provide direction for operating the Station safely, reflect the design and safety analysis submitted to the CNSC. Operating limits, as well as procedural and administrative limitations for safety systems and safety-related systems are specified and further enhanced by the more detailed Operational Safety Requirements, which document the basis for key OPP items. Operating procedures and Operator Training has been established to ensure that Operation in states not considered in, or bounded by, the safety analysis is not permitted.

The key program is BP-PROG-12.01, Conduct of Plant Operations [51]. As discussed in Section 4.1.11, there are four operational areas covering Operations Documentation, Operator Staffing, Plant Operation, and Work Protection – Controls. These are discussed further in the subsections of Section 5.

Procedures important to safety of the plant are comprehensive, validated, formally approved, distributed to those whose work activities need to know them and controlled via the management system, as was discussed in Safety Factor 10 Sections 5.1 and 5.2. Section 5.1 discussed the extensive annual and licensing reviews performed by Bruce Power against such standards as CSA N286 and the licensing documents. Similarly, the CNSC has conducted annual assessments which have found no major shortcomings with Bruce Power Procedures.

The review that follows provides further evidence extensive efforts are made to ensure that the procedures are unambiguous and relevant to the plant operation, including maintenance, testing and inspection activities. The operating procedures reflect the design including human factors aspects of the design and operational activities.

5.2. Operating Procedures for Normal and Abnormal Conditions

Review task 1 examines operating procedures for normal and abnormal conditions, including anticipated operational occurrences, design basis accident conditions and post-accident conditions.

Licence Conditions 1.4, 3.1, 3.3, and 5.2 are relevant and drive station oversight activities ensuring the operating procedures exist covering normal and abnormal conditions. Clauses in CSA N286-05 in Sections 6.3, 6.11, 6.16, 6.17 and 6.19 relating to the operating procedures identify specific requirements that must be met consistent with this review task[7].

BP-OPP-00002, Operating Policies and Principles - Bruce A [36] identifies the policies and principles agreed with the CNSC that drive the programs and processes to comply with these aforementioned requirements. The OPP is subdivided into general and specific subjects. The front end covers multiple SSCs, records, reporting, while from Section 21 onwards it covers requirements for specific SSCs. For example, Section 10.2 of the OPP mentions that abnormal or emergency condition procedures are written to protect the public and station personnel in emergencies involving the release of radioactive material, emergency procedures shall be implemented specifying staff responsibilities, available equipment, prerequisite training, and

[7] Other clauses relevant to operation are identified in Section 5.3 of BP-PROG-12.01 [51].

procedures to be followed. Duties of responsible individuals during normal and abnormal operation are defined in Section 01.

BP-PROG-12.01 [51], Conduct of Plant Operations covers Operations Documentation and Plant Operation for normal and abnormal operation. Operations[8] Documentation procedures include Operating Manuals, Operating Memos, Alarm Response, Manuals, and Safety System tests. Procedures for the safe and reliable operation of plant equipment are prepared, approved, controlled and readily available to the operating staff. These procedures are prepared for anticipated normal, abnormal and emergency conditions.

Operating procedures are created as controlled documents, in accordance with the requirements of BP-PROG-03.01 [41], Document Management to ensure that document lifecycle management requirements are met (BP-PROC-00068, Controlled Document Life Cycle Management [63]) ([51] Section 4.1).

Sub-tier Operations Documents of BP-PROG-12.01 include: BP-PROC-00250 [102], Writer's Guide for Station Systems Procedures and GRP-OPS-00050 [113], Requirements for Station Operating Procedure Development and Revision, and under Plant Operation they include: GRP-OPS-00022 [108], Operator Aids and DIV-OPA-00003 [114], Response to Transients – Bruce A.

- BP-PROC-00250 [102] is a guide provided to specify standardized styles, formats, and writing methodologies which are based on recognized human factors analysis, to offer procedure users a consistent document appearance which minimizes procedure use errors.
- GRP-OPS-00050 [113] defines the process and requirements for developing, reviewing, verifying, and approving plant operating procedures. Changes from past revisions are marked and a revision summary is provided to alert users to the changes made since the previous revision. Preparer, reviewer/verifier and approver names are identified. Activities driven by modification changes are covered in Section 5.6 via the Engineering Change Control program.
- GRP-OPS-00022 [108], Operator Aids ensures that copies of approved controlled document/portion of document, flowsheet, or information, are posted in the main control room or field as an aid to assist Operators in performing their duties. These aids are tracked and controlled, and quarterly reviews are performed to ensure all aids are current and undamaged.
- DIV-OPA-00003 [114] defines roles and responsibilities for operating personnel during transients and emergencies.

Normal operating procedures are written for a wide range of Systems and Situations. Examples of Operating Procedures include [113]:

- Abnormal Incidents Manual (AIM);
- Alarm Response Manual (ARM);
- Operating Manual (OM);

[8] Operations, Operating and Operational are used interchangeably in BP-PROG-12.01.

- Overall Unit Operating Manual (09110);
- Operating Memo; and
- Safety System Testing (SST).

Each Operating Procedure is reviewed, verified and validated before being approved and distributed for use [113]. Procedures are continually verified and validated as part of Operator Training exercise and have been confirmed during Simulator Testing and as part of routine use, Maintenance, Testing and Operating personnel stop to ask questions if a procedure is unclear or cannot be executed as written and Station Condition Records are raised against procedures found to need improvement. Due to their importance in post-accident scenarios, the AIMs were validated and reviewed by the Human Factors group [134][135][136]. This confirmed that they can be performed as input to the Probabilistic Safety Assessments, and confirmed that the Operator actions credited in the Safety Report Analysis are such that the operator has time to perform the activities. ([137] Section 1.0 Table 1.1).

Sample procedures covering abnormal or design basis events include: NK21-OM-09110 [138], Overall Unit Operating Manual, NK21-OM-03674 [139], Outage Heat Sinks and the NK21-OM-09034 [140], Abnormal Incidents Manuals. The AIMs include a series of abnormal situations including:

- Loss of Both Computers;
- Loss of Heat Transport Feed;
- Heat Transport Leak;
- HT Liquid Relief Valve(s) failed open;
- Leaks from the top of the Pressurizer;
- LOCA - LOCA Unit Actions;
- Boiler / Preheater Tube Rupture;
- Steam Line Break;
- Loss of High Pressure Feedwater;
- Maintenance Cooling as an Emergency Heat Sink;
- Loss of Moderator Flow;
- Moderator Pipe Break in Containment;
- Loss of Instrument Air to a Generator Unit;
- Loss of Low Pressure Service Water;
- Loss of Class IV and Class III Power to a unit;
- Main Control Room Uninhabitable or unusable;
- Post-Seismic Response - Units 1234; and

- Loss of Spent Fuel Bay Heat Sinks.

Other abnormal operating event procedures are covered in the NK21-OM-03672 [141] series under the Safety Related System Impairments Manual. The subsections cover the following events:

- 2.0 Loss of Special Safety Systems;
- 2.1 Shutdown System Number 1 and 2 Impairments;
- 2.2 Emergency Coolant Injection Impairments;
- 2.3 Negative Pressure Containment Impairment;
- 2.4 Conservative Unit Operating Modes;
- 2.5 Auto Heat Transport Pump Trip Impairment;
- 3.0 Loss of Standby Support Systems;
- 3.1 Standby Class III Generation System Impairment;
- 3.2 Auxiliary Boiler Feedwater System Impairment;
- 3.3 Inter-Unit Feedwater Tie Impairment;
- 3.4 Emergency Boiler Cooling System Impairment;
- 3.5 Fire Protection System Impairment;
- 3.6 Reactor Regulating System Impairment;
- 3.7 Class III Service Water System Impairment;
- 3.8 Moderator and Auxiliary Circuit Impairment;
- 3.9 Steam Protection Barriers Impairment;
- 3.10 Annulus Gas System Impairment;
- 3.11 Post Accident Radiation Monitoring Impairment;
- 3.12 Qualified Power Supply System Impairment;
- 3.13 Harsh Environment Ventilation Equipment Impairment;
- 3.14 Powerhouse Emergency Venting System Impairment;
- 3.15 Maintenance and Shutdown Cooling Systems Impairments;
- 3.16 Class I and II Electrical System Impairments;
- 3.17 Secondary Control Area Impairments; and
- 3.18 Fire Protection Impairments.

In addition to these procedures covering nuclear operating concerns, Standard Operating Guidelines (SOGs) cover a standard set of other hazards, including bio-hazards, emergency vehicle response safety, fire pumpers, site emergency vehicles. These fall under the

BP-EST-series from BP-EST-00101 to BP-EST-02005, which are the responsibility of the Emergency Protective Services. Examples include:

- BP-EST- 00101, Standard Operating Guideline – Statement of Intent;
- BP-EST-01421, Standard Operating Guideline – Emergency Lighting Unit Checks;
- BP-EST-01508, Standard Operating Guideline – Emergency Protective Services (EPS) Fire Response Guidelines – Hazmat Emergency;
- BP-EST-01511, Standard Operating Guideline – Fire Watch; and
- BP-EST-02003, Standard Operating Guideline – In-Plant Coordinator – Emergency Actions Guide.

External standards and lessons learned / Operating Experience for the Conduct of Plant Operations come from documents, such as WANO GL 2001-02, Guidelines for the Conduct of Plant Operations at Nuclear Power Plants, and WANO GL 2001-04, Guidelines for Plant Status and Configuration Control at Nuclear Power Plant ([51], Section 5.6).

Section 5.3 provides further information applicable to this review task, as it discusses BP-PROG-08.01 on the Emergency Management Program as it overlaps with this sub-section.

The WANO Performance Objectives and Criteria (PO&C) on Operations Fundamentals OP.1, Conduct of Operations OP.2, Maintenance Fundamentals MA.1, Chemistry Fundamentals CY.1, Chemistry Controls CY.2, and Operational Configuration Control CM.2, address the need to ensure the effectiveness of the Bruce Power Management System and its documentation of Procedures, which is this review item. A review of the Station Condition Record (SCR) database shows that no adverse condition applicable to this review task have been identified against these PO&Cs following the 2014 WANO station and 2013 corporate reviews. SCR 28348216 was raised to identify improvements in Maintenance Procedures Use and Adherence Practices. SCRs 28373864, 283383741, 28377502, 28399248, 28394204, and 28381515 were raised to improve the use of the Operator Fundamentals Procedure as part of a monthly review process to improve performance and reduce the number of alarms spuriously alarming in the main control room. SCR 28393911 was raised consistent with OP.2, but this was on strengthening Supervisor engagement, so not relevant to this review item. Corrective Actions have been taken as a result of these SCRs. However, these shortcomings did not identify a weakness in the procedures themselves, but rather an improvement opportunity in their use.

A review of the assessments and audits, and CNSC inspections in Section 7.3 confirmed that there were no adverse conditions applicable to this review item. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular, Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task. No gaps against this review task were identified.

As part of follow-up to the CNSC review of the Probabilistic Safety Assessment update project, Bruce Power has agreed to review the AIM procedures to ensure that those credited in the Probabilistic Risk Assessment reports continue to appropriately capture human interactions quantifications. This is an update of the previous validation exercise against the AIM procedures.

Bruce Power programs and procedures meet the requirements of the review task, as operating procedures for normal and abnormal conditions, including anticipated operational occurrences, design basis accident conditions and post-accident conditions are available and consistent with the Canadian standard N286 with respect to being defined, documented, controlled, and maintained. Objective evidence was provided to demonstrate effective implementation of these procedures consistent with industry best practices.

5.3. Procedures for Management of Design Extension Conditions

Review task 2 examines procedures for the management of Design Extension Conditions (DECs), including accidents with significant core degradation (for example, symptom-based emergency operating procedures).

Design Extension Conditions have been defined in CNSC REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants, as a subset of beyond-design-basis accidents that are considered in the design process of the facility in accordance with best-estimate methodology to keep releases of radioactive material within acceptable limits. Design Extension Conditions could include severe accident conditions. Currently, there is no formally agreed upon and recognized means for identifying DECs. The CNSC has a discussion paper on the topic: DIS-14-01: Design Extension Conditions for Nuclear Power Plants.

Much of the discussion, with respect to Licence Conditions and clauses in CSA N286-05 in the previous review task, relates to this review task. Furthermore, Section 10.4 of the OPP mentions emergency procedures and a design extension condition can be considered an emergency condition. In addition, Licence Condition 7.1 is applicable.

In addition to the discussion in Section 5.2, BP-PROG-08.01 [42], Emergency Management Program describes how risks that have the potential to impact reactor safety, public safety, employee and responder safety, environmental safety and corporate reputation through a risk-based program of prevention, mitigation, preparedness, response, and recovery are managed [42]. The program identifies several procedures and plans detailing different aspects of operations in emergency situations which can be classified as anticipated operational occurrences, design basis accidents or design extension condition depending on the extent of condition. These include plans and procedures such as:

- BP-PLAN-00001 [64], Bruce Power Nuclear Emergency Response Plan;
- BP-PLAN-00002 [65], Winter Storm Transportation Plan;
- BP-PLAN-00003 [66], Bruce Power Electricity Emergency Plan;
- BP-PLAN-00004 [67], Business Continuity Management;
- BP-PLAN-00005 [68], Rad Materials Transportation Emergency Response Plan;
- BP-PLAN-00006 [69], Conventional Emergency Management;
- BP-PROC-00659 [73], Severe Accident Management;
- BP-PLAN-00008 [70], Fire Safety Management;

- BP-PROC-00722 [74], Staff Shortage - Health Related;
- BP-PROC-00317 [72], Crisis Management; and
- BP-PROC-00127 [71], Radioactive Liquid Emissions Response Procedure.

The key one for design extension conditions is BP-PROC-00659 [73], Severe Accident Management (SAM), which defines a Severe Accident as a beyond design basis event that results in widespread physical damage to fuel and core structures accompanied by a large release of fission products. The procedure develops actions for use by the Shift Organization to respond to accident conditions that are outside of the established accident design basis response. The procedure uses the structures, roles, and processes established in BP-PLAN-00001: Bruce Power Nuclear Emergency Response Plan [64] to activate the technical support group responsible for developing those actions and to communicate those actions to the Shift Response Organization.

Table 4 lists the suite of severe accident guides which are sub-tier documents to BP-PROC-00659, Severe Accident Management (SAM) [73].

Table 4: Documents Listed in BP-PROC-00659: Severe Accident Management

BP-SAM #	Procedure Name
BP-SAM-00001	Technical Support Group User's Guide
BP-SAM-10001	Bruce A - Severe Accident Control Room Guide 1 (SACRG-1): Initial Response
BP-SAM-10002	Bruce A - Severe Accident Control Room Guide 2 (SACRG-2): Technical Support Group Functional
BP-SAM-10003	Bruce A - Diagnostic Flow Chart (DFC)
BP-SAM-10004	Bruce A - Severe Challenge Status Tree (SCST)
BP-SAM-10005	Bruce A - Severe Accident Guide 1 (SAG-1): Inject Into The Heat Transport System
BP-SAM-10006	Bruce A - Severe Accident Guide 2 (SAG-2): Control Moderator Conditions
BP-SAM-10007	Bruce A - Severe Accident Guide 3 (SAG-3): Control Shield Tank Conditions
BP-SAM-10008	Bruce A - Severe Accident Guide 4 (SAG-4): Reduce Fission Product Releases
BP-SAM-10009	Bruce A - Severe Accident Guide 5 (SAG-5): Control Containment Conditions
BP-SAM-10010	Bruce A - Severe Accident Guide 6 (SAG-6): Reduce Containment Hydrogen

BP-SAM #	Procedure Name
BP-SAM-10011	Bruce A - Severe Accident Guide 7 (SAG-7): Inject Into Containment
BP-SAM-10012	Bruce A - Severe Challenge Guide 1 (SCG-1): Mitigate Fission Product Release
BP-SAM-10013	Bruce A - Severe Challenge Guide 2 (SCG-2): Reduce Containment Pressure
BP-SAM-10014	Bruce A - Severe Challenge Guide 3 (SCG-3): Control Containment Atmosphere Flammability
BP-SAM-10015	Bruce A - Severe Challenge Guide 4 (SCG-4): Control Containment Vacuum
BP-SAM-10016	Bruce A - Forms For Use By Technical Support Group
BP-SAM-10017	Bruce A - SAM Parameters And Setpoints
BP-SAM-10018	Bruce A - Computational Aid #1 (CA-1): Individual Dose To A Member Of The Public From A Containment Vent
BP-SAM-10019	Bruce A - Computational Aid #2 (CA-2): Rate Of Water Addition For Decay Heat Removal By Vaporization
BP-SAM-10020	Bruce A - Computational Aid #3 (CA-3): Rate Of Water Addition To Maintain Or Increase Moderator Level
BP-SAM-10021	Bruce A - Computational Aid #4 (CA-4): Hydrogen Flammability In Containment
BP-SAM-10022	Bruce A - Computational Aid #5 (CA-5): Containment Water Level
BP-SAM-10023	Bruce A - Computational Aid #6 (CA-6): Determination Of Magnitude Of Core Damage From Measured Dose Rates
BP-SAM-10024	Bruce A - Severe Accident Exit Guide 1 (SAEG-1): Long-Term Monitoring
BP-SAM-10025	Bruce A - Severe Accident Exit Guide 2 (SAEG-2): SAMG Termination

In addition to the Severe Accident Management Guidelines, Emergency System procedures exist such as: NK21-OM-34360 [142], Powerhouse Emergency Venting System, and NK21-OM-71910 [143], Emergency Boiler Cooling System. These Emergency System procedures primarily relate to design basis accidents; however, a subset were extended in response to the Fukushima event in Japan. Procedures to provide an additional measure of defence for design extension conditions were introduced in 2011, so that these systems could interface with the Emergency Mitigating Equipment, added to support excellence in emergency response. Examples of emergency measures and accompanying procedures interfacing with existing systems include:

- Water makeup via:
  - NK21-OM-32210-05.04 [144], Placing Emergency Moderator Make-up System in Service (Units 12) which uses a new connection to the Moderator via the Moderator Purification System; and
  - NK21-OM-71910-05.05 [143], Placing Emergency Moderator Make-up System in Service (Units 12) which uses a connection to the Emergency Boiler Cooling System.
- Power makeup via the NK21-EME-03504.1 [145], Emergency Mitigating Equipment Guide, series:
  - NK21-EME-03504.1-01.01, Station Loss of Class IV and Class III Power – Coordinating Instructions;
  - NK21-EME-03504.1-01.02, Operation Guide for Station Loss of Class IV and Class III Power – Units 1234;
  - NK21-EME-03504.1-01.03, Operation Guide for Station Loss of Class IV and Class III Power – Unit 0 F/H; and
  - NK21-EME-03504.1-01.04.01 to NK21-EME-03504.1-01.04.09, covering Handouts #1 to #9 for various post-accident activities ranging from energizing a portable emergency diesel generator, actions to preserve batter banks, supplying water to boilers using portable emergency fire department pumper via Emergency Boiler Cooling System piping.

Separately from these emergency procedures which interface with systems, Bruce Power has a series of Emergency Response Procedures that provide guidance on the Operational command structure and responsibilities including responsibilities to manning or remote command centers. These include document in the BP-ERP series -00001 to -00081. For example:

- BP-ERP-00001, Shift Emergency Controller;
- BP-ERP-00008, In-Plant Coordinator;
- BP-ERP-00015, Out-of-Plant Coordinator;
- BP-ERP-00033, Off-Site Centre Monitoring and Decontamination Unit Supervisor; and
- BP-ERP-00060, Emergency Worker Centre Personal Monitoring and Decontamination.

In addition to the processes followed for review, verification and validation for Operating Procedures discussed in Section 5.2, for Emergency Operating Procedures of a larger scale and involving outside organizations, Bruce Power has reviewed their minimum complement of Operators and discussed these with the CNSC [146] [147]. As part of this review the initiating events were defined, emergency plans were referenced and the organizations responding the emergency were outlined, along with the operational and administrative procedures. Examples of event-specific and critical safety parameter symptom-based AIMs were identified.

These have been confirmed and are included in the PROL under Licence Condition 2.1 and are discussed in the LCH under Section 2.1. These minimum complements were most recently reviewed for Emergency Operating Procedure use, such as the Fukushima event. Bruce Power conducted a county wide emergency exercise as part of the Huron Challenge IV Exercise [148] [146] to ensure co-ordination with various provincial jurisdictions [147].

Bruce A and B Quarterly Operations and Central Maintenance and Laundry Facility (CMLF) Quarterly Technical Reports [149] [150] Section 6.0, provides quarterly updates of Emergency Preparedness, including exercises and drills performed in the last quarter and procedural changes. No significant findings arose.

WANO PO&C on Criteria Design and Operating Margin Management CM.1 and Emergency Preparedness EP.2 address the need to ensure that operating procedures exist for design extension conditions. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against these PO&Cs following the 2014 WANO station and 2013 corporate reviews.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular, Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task. No gaps against this review task were identified.

Bruce Power meets the requirements of this review task, as operating procedures exist for design extension conditions and they are consistent with international guidelines.

5.4. Procedures for Maintenance, Testing and Inspection

Review task 3 examines maintenance, testing and inspection procedures.

Licence Conditions 4.1, 4.2, and 4.3 are relevant to this review task and drive oversight activities ensuring that the appropriate procedures for maintenance, testing and inspection exist.

Clauses in CSA N286-05 in Sections 6.3, 6.11, 6.16, 6.17 and 6.19 relating to the operating procedures identify specific requirements that must be met consistent with this review task. Many are identified in BP-PROG-11.01 Appendix C [47].

Similarly, BP-PROG-11.01 Equipment Reliability [47] Appendix C maps:

- S-210, Maintenance Programs for Nuclear Power Plants, against the sub-tier documents of BP-PROG-11.01 Equipment Reliability, including BP-PROC-00778 Scoping and Identification of Critical Components [92], BP-PROC-00779 Continuing Equipment Reliability Improvement [93], BP-PROC-00780 Preventative Maintenance Implementation [94], BP-PROC-00781 Performance Monitoring [95], BP-PROC-00782 Equipment Reliability Program Identification and Resolution [96]; and
- the specific CSA standards mentioned in the PROL to the sub-tier documents of BP-PROG-11.01 Equipment Reliability:
    - N285.5 Periodic Inspection of CANDU Nuclear Power Plants Containment Components, Canadian Standards Association;

- N285.4 Periodic Inspection of CANDU Nuclear Power Plants Components, Canadian Standards Association; and
- N287.7 Periodic Inspection of Concrete Containment Structures in CANDU Nuclear Power Plants, Canadian Standards Association.

BP-OPP-00002, Operating Policies and Principles - Bruce A [33] identifies the policies and principles agreed with the CNSC that drive the programs and processes to comply with these aforementioned requirements. Sections of the OPP with provisions relevant to this review are numerous and include:

- Maintenance Sections 01.6, 02.2, 03.1, 04.1, 21.1, 21.4, 33.7, 33.11, 34.1, 34.4, 40.4, 43.1, 43.2, 50.1, 50.2,54.2, 54.4, 54.5, 55.1, 60.3, 63.1, 63.4, 63.7 and 73.2;
- Testing Sections 01.6, 03.1, 03.5, 04.1, 21.1, 21.4, 21.5, 30.5, 33.1, 34.1, 34.4, 36.2, 40.2, 40.3, 40.4, 43.1, 43.2, 54.2, 54.5, 55.1, 60.3, 63.1, 63.4, 63.14, 71.2, 73.2, A21 and A63.1;
- Inspection Sections 04.1, 21.5, 30.5, 35.3, and 36.2.

BP-PROG-12.01 [51], Conduct of Plant Operations covers Operations Documentation with respect to Safety System tests, which are the execution procedures for many of the OPP identified items. Procedures for the safe and reliable operation of plant equipment are prepared, approved, controlled and readily available to the operating staff.

BP-PROC-00474 [103] provides criteria for identifying High Risk Evolutions (HREs) and Infrequently Performed Tests and Evolutions. A managed process identifies error likely situations, compensatory measures, and critical steps, and provides guidance on planning, briefings, and oversight requirements.

BP-PROG-11.04 [50], Plant Maintenance is the primary program for establishing and implementing the maintenance program ([47] Appendix C). The objective of plant maintenance is to perform the hands-on maintenance of plant SSCs in accordance with approved maintenance strategies, schedules, procedures and practices in a cost effective manner that maximizes the availability and reliability of safety-related and production sensitive equipment, while ensuring that Bruce Power’s commitment to Nuclear Safety; Reactor, Radiation, Environmental and Industrial Safety, is maintained.

Bruce Power’s maintenance strategy consists of “Preventive Maintenance”, which includes “Periodic” (servicing, parts replacements periodic inspections), “Predictive” (monitoring, testing, in-service inspections), and “Planned” (condition based servicing, refurbishment, parts replacement) and “Non-Preventive Maintenance” which refers to maintenance for “Run-to-Failure” and “Unplanned Failure” events.

Bruce Power’s Maintenance Program is implemented by the following documents:

- BP-PROC-00695 [98], Maintenance Program and Activities;
- BP-PROC-00696 [99], Maintenance Organization; and
- BP-PROC-00699 [100], Maintenance Work.

BP-PROC-00695 [98] Maintenance Program and Activities describes the maintenance program for plant equipment, specifying the following elements:

- What maintenance activities are to be performed on given SSCs and at what frequency/intervals;
- Activities aimed at avoiding, detecting and repairing failures of SSCs;
- Monitoring of the SSCs;
- Maintenance program activity optimization; and
- Record keeping of maintenance performed.

BP-PROC-00696 [99], Maintenance Organization ensures that Bruce Power can effectively support and implement its maintenance program.

BP-PROC-00699 [100], Maintenance Work provides a systematic approach for initiating, managing, assessing, prioritizing, planning and scheduling maintenance work.

BP-PROC-00268 [90], the Safety System Testing (SST)[9] Program Procedures defines the Safety-Related System Testing program and lists the roles and responsibilities of stakeholders in relation to the testing requirements of Safety Related Systems. The SST program is intended to test Safety-Related SSCs to determine if they are available and directly links to equipment reliability. Routine SST is performed to ensure the continued availability of Safety-Related Systems. Testing requirements and frequencies are determined by considering design manuals, safety analysis, reliability models, and probabilistic risk assessments.

WANO PO&Cs on Maintenance Fundamentals MA.1, Conduct of Maintenance MA.2, Operational Risk OF.2, Work Management WM.1, Equipment Failure Prevention ER.2, Design and Operating Margin Management CM.1, Operational Configuration Control CM.2, address the need to maintenance, testing and inspection procedures. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against these PO&Cs following the 2014 WANO station and 2013 corporate reviews. SCRs 28473317 and 28467007 were raised against the Work Management processes, but this was specific to improvements in focusing on the actions already identified for improvement and prioritization levels not being consistent with BP-PROC-00328 [97], Work Prioritization and Approval, an implementing procedure of BP-PROG-11.02. SCR 28393911 was raised consistent with MA.2 to strengthen Supervisor engagement but this is not relevant to this review item. Corrective actions were taken to address the condition.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task.

One gap was identified against this review task. As part of this review, it was noted that BP-PROC-00498 [91], Condition Assessment of Generating Units in Support of Life Extension

[9] BP-PROC-00268 uses Safety-Related System Testing and Safety System Testing interchangeably, and each has the acronym SST.

was last updated in 2011 and is in need of revision as part of the standard procedure document review cycle. The procedure either needs to be updated or superseded by existing procedures which adequately capture the necessary information on condition assessments, e.g., System Health Reporting. It is presently part of BP-PROG-14.01, Project Management and Construction [53] rather BP-PROG-11.01, Equipment Reliability [47], which covers SSC health. There is an outstanding action to update this procedure, which remains open. This is discussed in Safety Factor 2 in more detail and there is on-going discussion with the CNSC on improvement to BP-PROG-11.01 to better integrate the sub-tier documents in general and with other documents as part of the transition to new Regulatory Documents which are expected to be included in the new PROL [151]. Gap SF11-5 has been identified in Table 11.

Bruce Power's procedures and processes therefore meet the requirements of this review task; however, some difficulties were identified in Section 7.2.2.1 related to the effectiveness of maintenance planning and scheduling. Additionally, in Sections 7.3.1 and 7.3.2 the effectiveness of Bruce Power Preventative Maintenance Oversight Group (PMOG) to address the Preventative Maintenance (PM) backlog was assessed by CNSC staff and it was noted Bruce Power is experiencing challenges. These have been identified as gap SF11-1 in Table 11.

5.5. Procedures for Issuing Work Permits

Review task 4 examines procedures for issuing work permits and the associated work protection procedures which support issuing of work permits.

No Licence Conditions are relevant and drive station oversight activities ensuring that procedures exist for issuing work permits and associated work protection procedures which support issuing of work permits. Licence Conditions 8.1 and 9.2, plus similar clauses in the LCH, discuss environmental permits to regulate emissions and radiation exposure permits, but these are not the focus of this review task.

Clauses in CSA N286-05 in Sections Annex C.4.2, Annex D.4.1 relating to the operating procedures identify specific requirements that must be met consistent with this review task during construction and commissioning. Similar commissioning requirements are discussed in N286-12 Section 7.8. They both discuss the need for plant equipment and systems to be identified and controlled during commissioning via a system of permits, tags, or other equivalent control procedures are to be established. The General Nuclear Safety and Control Regulations Sections 17 (a) and (b) cover the need for every worker: having available to them the use of equipment, devices, facilities and clothing protecting the environment or the health and safety of persons, and complying with the measures established by the licensee to protect the environment and health and safety of persons, so they are more appropriate to Work Protection. [152] Similarly, agreements with the CNSC and the Ontario Ministry of Labour under the Occupational Health and Safety Act which oversees worker health and safety, include provisions relating to employers' duties to take every reasonable precaution in the work circumstances and worker's general right to refuse unsafe work.

BP-OPP-00002, Operating Policies and Principles - Bruce A [36] identifies the policies and principles agreed with the CNSC that drive the programs and processes to comply with these aforementioned requirements. Sections of the OPP-Bruce A [36] covering provisions relevant to this review include: Section 01.6, which discusses health and safety of station staff, 02.3 and 30.5 on overpressure protection, 10.4 mentions protecting the public and station personnel in emergencies although the discussion does not focus primarily on work protection permits which specify requirements to establish safe working conditions.

BP-PROG-12.01 [51], Conduct of Plant Operations, includes a list of the implementing work protection documents. Unless specifically exempted, the implementing procedure of BP-PROG-10.01 that covers work affecting plant systems and the need to acquire approved Work Authorization is GRP-OPS-00033 ([51] Section 4.3.10). From BP-PROG-12.01, the implementing procedures addressing work protection are shown in Table 5.

Table 5: Work Protection Documents Identified in BP-PROG-12.01 – Conduct of Plant Operations

Procedure Number	Procedure Title
BP-WPP-00001	Work Protection Code
BP-WPP-00002	Clearance Order Procedure
BP-WPP-00003	Work Protection Program
BP-WPP-00004	Approved Isolation Procedure, Approved Work Protection Procedure, Local Instruction Notice or Work Protection Code Departure Contents and Revisions Control
BP-WPP-00005	Personal Protection Tagout
BP-WPP-00006	Work Protection Monitoring
BP-WPP-00007	Caution Tag Procedure
BP-WPP-00008	Boundary Point Procedure
BP-WPP-00010	PASSPORT Tagout Software Change
BP-PROC-00777	Work Protection Performance Management Process

Worker safety is the primary focus and highest priority, along with Nuclear Safety and Environmental Safety, as the NSCA requires protection to worker, the public and the environment. Worker safety is driven by the Occupational Health and Safety Act (OHSA) and Regulations, which require a safe work environment and Management responsibility to take reasonable precautions for the protection of the workers. When work protection is required, as prescribed in BP-SM-00070 [119], Bruce Power Safety Rules, Section 4.1.8, Safe Conditions for Work on Energized Systems and 4.2.1, Electrical Work: General Requirements, it is administered in accordance with the requirements of BP-WPP-00003, Work Protection Program (WPP). These fall under the Health and Safety Management program [38] and the Conventional Safety Program Procedure [56]. As a minimum, the Work Protection Program meets the requirements of the OHSA and associated regulations. As prescribed in the Collective Agreements of the Power Workers Union and the Society of Energy Professionals, and described in BP-WPP-00003 [101], Work Protection Program, tri-partite committees are formed to provide recommendations to assist Management in the development, implementation and evaluation of the effectiveness of the Bruce Power Work Protection program and procedures. ([51], Section 4.4)

Bruce Power governs work via the BP-PROG-11 programs, including BP-PROG-11.01 [47], Equipment Reliability, BP-PROG-11.02 [48], On-Line Work Management, BP-PROG-11.03 [49], Outage Work Management and BP-PROG-11.04 [50], Plant Maintenance. Each of these Programs discussed previously in Section 4.1 maximizes the efficiency and effectiveness of station staff and material resources while performing work, and sustaining safe, reliable and competitive plant operation at optimum cost. Each recognizes as part of its mandate the need to ensure safe operation and maintenance, while due consideration is given to Industrial Safety, as one of the four pillars of Safety.

As mentioned previously with respect to the review of the Licence Conditions, Radiological exposure permits allowing work involving with nearby radiation exposure permissions are handled separately. For example, Radiation Protection Section Operating Procedures which fall out of the ALARA Program, BP-RPP-00044 [117] and their tier four procedures, such as SEC-RPR-00015 [130], Radiation Exposure Permits, and SEC-RPR-00019 [131], Dose Estimation for HP Permit Request Processing are part of the Radiation Protection process covered briefly in Section 5.8, while radioactive shipment permits or transient materials permits are part of the controls over the transport of waste process. Both are addressed in BP-PROG-12.05, rather than this section. Similarly, permits for water use and wildlife habit impacts are covered through Environmental Compliance.

WANO PO&Cs Nuclear Professionals NP.1 and Industrial Safety IS.1 are consistent with this review task. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against these PO&Cs following the 2014 WANO station and 2013 corporate reviews.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task.

A review of Station Condition Records (SCRs) shows a limited number of worker protection SCRs are raised over the last five years, incident examples include:

- SCR 28296738, where the equipment alignment was incorrect to ensure continued worker protection. This was corrected, a plant status control alert was raised so others would not repeat the human error and the responsible individual was coached.

- SCR 28373324 showed confusion over the communication of worker protection barriers with Hydro One. Two barriers were in place, but there was some confusion on whether they were redundant or both necessary. Expectations were subsequently clarified.
- SCR 28330221 showed there was an incomplete understanding of appropriate isolation for sources of energy when working with energized electrical equipment. Subsequent improvements were made following appropriate investigations into the causes.
- SCR 28299257 on creation of Model Work Orders for the Moderator Auxiliary Rooms to allow entry which defeats the automatic logic. Improvements were made to the processes to ensure worker protection.

A further review of work permits and tagging shows few if any worker issues arise as most involve lost keys and proper communication to ensure barriers remain in place. Corrective actions are being effectively raised whenever worker protection questions arise.

No gaps against this review task were identified as the existing process and procedures are effective.

Bruce Power's procedures and processes meet the requirements of this review task, as procedures for issuing work permits and the associated work protection procedures which support issuing of work permits exist, are consistent with industry standards and are effective.

5.6. Procedures for Controlling Modifications to Plant Design, Procedures and Hardware

Review task 5 examines procedures for controlling modifications to the plant design, procedures and hardware, including the updating of documentation.

Licence Condition 5.2, Changes to Facility, Facility Operation, Equipment or Procedure is relevant to this review and drives oversight activities ensuring the appropriate procedures for controlling modification to plant design, procedures and hardware exist. It states that Bruce Power will not make any change to the design of the facility, facility operation, equipment or procedure that would change the operational limits or introduce hazards different in nature or greater in probability than those considered by the Final Safety Analysis Report and Probabilistic Safety Assessment, without CNSC consent.

Sections of the OPP-Bruce A [36] covering provisions relevant to this review include:
Section 01.6, 21.3, 30.5, 33.11, 34.3, 63.3, and 63.11. The key one is 01.6 on Modifications, where it guides operations to ensure that modifications to station systems and procedures are controlled so changes do not invalidate the licensing basis, particularly in the areas of:

- Health and safety of station staff and the public;
- Environment;
- National security; and
- Compliance with international obligations to which Canada has agreed.

Change control programs are to include requirements for review and approval of modifications to station systems or procedures. These programs are to be effectively implemented to identify the impacts of the modifications on the licensing basis.

BP-PROG-10.01 [43] Plant Design Basis Management Appendix A and BP-PROG-10.02 [45] Engineering Change Control Section 5.1, Appendix A and B identify clauses in CSA N286-05 and N286-12 relating to the procedures relevant to the control of modifications. N286-05 Section 6.3 and N286-12 Section 7.5 are particularly important as they cover the interface between the plant operating documentation and the Safe Operating Envelope (SOE).

The design and the safety analysis establish an envelope of plant configurations and operating limits acceptable for safe operation. The operation of the plant needs to remain within this safe operating envelope by (a) defining the acceptable configurations and operating limits; and (b) incorporating these requirements in plant settings and in operating and maintenance procedures, as appropriate.

The CM program is established to ensure that:

- Design requirements for SSCs, tools, software and hardware are defined and documented;
- Changes to Design requirements are identified, documented, controlled, evaluated and approved or disapproved;
- Approved Design Changes and implementation status are recorded and reported throughout the life of the Plant, which results in the accurate implementation of Design Output information into the physical configuration of the Plant (i.e., the as-built status matches the design documents); and
- Plant configuration documents specifying operations, maintenance, testing, installation, procurement, inspection, and training requirements are updated and maintained consistent with the Plant design.

BP-PROG-10.03 [46], the Configuration Management (CM) program ensures that modifications to the plant, operation, maintenance and testing of the physical plant configuration are consistent with the design requirements as expressed in the facility configuration information. This consistency is maintained throughout the operational life-cycle phase, including when changes are proposed. A key implementing procedure is BP-PROC-00786, Margin Management [86] as maintaining margin is a basic principle of nuclear plant design and operation. It is the conservatism included in operating limits, design limits, analysis and fabrication of every SSC. Margin accounts for normal wear and ageing of equipment, degradation of safety analysis assumptions and analytical method uncertainties. It is important that staff are aware of what margins are and how they are controlled so that margin concerns can be recognized and appropriately dispositioned and they are not eroded by changes in design.

BP-PROG-10.02 [45], Engineering Change Control (ECC) identifies the steps necessary to ensure that reviews are conducted prior to the change, so that the Plant Design Basis, Operations and Maintenance procedures can remain synchronized with the implementation of the design changes. The Program specifies how design changes and modifications are defined, planned, implemented, and controlled to ensure design changes and modifications are controlled so the Structures, Systems, Components and Tools (SSCTs) continue to meet the design basis and operate safely for the full duration of design life and the design documentation remains consistent with the as-built and as-operated station, the design basis and the design requirements. The Program includes the following implementing procedures:

- BP-PROC-00743 [81], Site Services Engineering Change Control;
- BP-PROC-00542 [78], Configuration Information Change;
- BP-PROC-00539 [79], Design Change Package;
- BP-PROC-00877 [82], Modification Installation Quality Assurance; and
- BP-PROC-00615 [80], Commissioning Modifications and Projects.

Non-physical changes to the design are covered via BP-PROC-00542 [78] Configuration Information Change. Physical changes are covered via BP-PROC-00539 [79] Design Change Package.

The program applies a graded approach based on risk. The assessment of risk includes elements of safety (industrial safety, reactor safety, environmental safety, radiation safety) and business needs.

BP-PROG-10.01 [43], Plant Design Basis Management maintains the design basis with the elements of the program providing the methods to consistently perform engineering work and activities. It is implemented by the following procedures:

- BP-PROC-00335 [75], Design Management;
- BP-PROC-00363 [76], Nuclear Safety Assessment; and
- BP-PROC-00582 [77], Engineering Fundamentals.

The link to Safety Analysis is captured in BP-PROC-00363 [76], Nuclear Safety Assessment. Lower tier procedures under BP-PROC-00363, including DPT-NSAS-00011 Configuration Management of Safety Analysis Software [120], DPT-NSAS-00012 Preparation and Maintenance of Operational Safety Requirements [121], DPT-NSAS-00015 Planning and Execution of Nuclear Safety Analysis [122], and DPT-NSAS-00016 [123], Integrated Aging Management for Safety Assessment cover: the updating of the SOE, execution of new analysis ensuring its review by those knowledgeable in the SOE, and the requirement to ensure that the condition of the plant is monitored and inspected so that the results can be used to ensure that current safety margins of the aged plant remain adequate.

As part of the SOE program, if the Safety Analysis limits are adjusted, the operating documentation including items such as the Operating Manuals and Safety System Testing are adjusted to remain in configuration.

Non-conformances in configuration are identified as per the BP-PROC-00060 [62], the Station Condition Record process. Trends in configuration can be captured. Ongoing implementation is also monitored through reviews of audit findings related to configuration management.

Separately CM oversight and trending is performed per BP-PROC-00470 [83] Configuration Management Program Oversight and Trending, which establishes a mechanism for monitoring, trending and reporting the health of the Bruce Power CM Program.

The WANO PO&C on Design and Operating Margin Management CM.1, Operational Configuration Control CM.2, Maintenance Fundamentals MA.1, Design Change Processes CM.3, Nuclear Fuel Management CM.4, Operations Fundamentals OP.1, Operational Risk OF.2 and Corporate Support and Performance CO.5 address this review task. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against this PO&C following the 2014 WANO station and 2013 corporate reviews.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular, Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task. No gaps against this review task were identified.

Shortcomings in Maintenance Procedure Adherence captured under MA.1 were noted, but this was not applicable to Configuration Management.

Bruce Power meets the requirements of this review task, as procedures and processes for controlling modifications to the plant design, including the hardware and the documentation, exist and are effective.

5.7. Procedures for Controlling Operating Configuration

Review task 6 examines procedures for controlling the operating configuration.

Licence Conditions 1.4, 3.1, and 5.2 are relevant and drive station oversight activities ensuring that the procedures exist for controlling operating configuration. Clauses in CSA N286-05 in Sections 6.3, 6.9, 6.11, 6.13, 6.14, and 6.15 relate to controlling the operating configuration, recognizing that others impacting operating procedures were discussed in previous review tasks.

BP-OPP-00002, OPP - Bruce A [36] identifies the policies and principles agreed with the CNSC that drive the programs and processes to comply with these aforementioned requirements. Sections of the OPP covering provisions relevant to this review include: the Introduction, Section 01.6, 02.1, 34.7, 35.2, and A21.1.

BP-MSM-1 Sheet 0002 [33], the Approved Reference Chart Authorities and Responsibilities, identifies the following responsibilities for operational configuration control:

- Bruce A Operations Division Manager - Provides for Bruce A plant line-up and status control for all shift and day operations;
- Probabilistic Safety Analysis - Conducts risk and reliability assessments to assess the impact of operational events, planned configurations and abnormal configurations (including deferral of planned and unplanned surveillance deferrals);

- Fuel and Physics - Provide reactor physics problem analysis support and technical advice to the Divisional Manager, Reactor Safety Engineering in support of the Site. Reactor Physics analysis includes core power configurations; and
- Nuclear Safety Analysis & Program Integration - Perform technical review to evaluate safety impact of design modifications and non-standard operating configurations.

The latter three are delivered under the sub-tier processes of BP-PROC-00363 [76], Nuclear Safety Assessment as was discussed in Section 5.6, as they are assessing potential changes in the known configuration. As part of these processes, safety and risk significant configurations are flagged and components are included as part of the testing under BP-PROC-00268 [90], the Safety System Testing (SST)[10] Program Procedure, which defines the Safety-Related System Testing program and lists the roles and responsibilities of stakeholders in relation to the testing requirements of Safety Related Systems. The SST program is intended to test Safety-Related SSCs to determine if they are available and directly links to equipment reliability. Routine SST is performed to ensure the continued availability of Safety-Related Systems. Testing requirements and frequencies are determined by considering design manuals, safety analysis, reliability models, and probabilistic risk assessments. This is a sub-tier document of BP-PROG-11.01 [47] Equipment Reliability. It integrates across the Design, Plant Maintenance and Operations Programs.

The initial responsibility for operational configuration control listed above is delivered through BP-PROG-12.01 [51] Conduct of Plant Operations and discussed more fully in the following.

BP-PROG-12.01 [51], Conduct of Plant Operations covers Operations Documentation and Plant Operation for normal and abnormal operation. Operations[11] Documentation procedures include Operating Manuals, Operating Memos, Alarm Response, Manuals, and Safety System tests. Procedures for the safe and reliable operation of plant equipment are prepared, approved, controlled and readily available to the operating staff. These procedures are prepared for anticipated normal, abnormal and emergency conditions.

Sub-tier Operations Documents of BP-PROG-12.01 [51], Conduct of Plant Operations were discussed in Section 5.2. Under the Plant Operations operational area, which controls the execution of Operator activities in the plants to start-up, operate and shut down the reactor units, to refuel the reactors on an on-going basis, to perform routine operations in support of maintenance activities, and to perform routine surveillance of systems and to respond to unanticipated events, the key sub-tier document for controlling operational configuration are BP-PROC-00734, GRP-OPS-00016, GRP-OPS-00028, GRP-OPS-00031, GRP-OPS-00042, GRP-OPS-00046, and BP-PROC-00907.

- BP-PROC-00734 [104], Plant Status Control, requires the status of all plant components be controlled at all times to maintain configuration control and to ensure personnel safety. Manipulations of components are authorized by the proper authority, and tracked using an approved process.

[10] BP-PROC-00268 uses Safety-Related System Testing and Safety System Testing interchangeably, and each has the acronym SST.

[11] Operations, Operating and Operational are used interchangeably in BP-PROG-12.01.

- GRP-OPS-00016 [107], Position Assured Components, covers the positioning of component's correct positioning where the positioning is essential to ensure safe and proper system function and response. Where improper positioning would likely escape timely detection by normal monitoring activities, the component is designated as a Position Assured Component (PAC). Repositioning of PACs is formally controlled. Regular checks are made to ensure PACs are in their expected positions.
- GRP-OPS-00028 [109], Administration of Reactor Guaranteed Shutdown State, is used to maintain the reactor in a shutdown state. Approved RSGs are defined in the station Operating Policies and Principles. Requirements, standards and expectations for establishing, monitoring, transitioning, and surrendering RSGs shall be clearly defined.
- GRP-OPS-00031 [110], Conduct of Shift Turnovers, includes requirements for turnover between shifts, which are defined to ensure that turnover between the outgoing and incoming shifts provides a thorough transfer of plant status to the incoming shift. This way Operations staff are informed of the configuration of the station including off-normal and temporary configurations.
- GRP-OPS-00042 [111], Equipment Alignment Checks, support safe and reliable operation as equipment alignment checks are performed when returning equipment to service after maintenance or a unit outage to confirm the correct alignment prior to restarting equipment.
- GRP-OPS-00046 [112], Station Key Controls and Locking Requirements, involves the management, identification, storage, and handling of keys under Operations control. Issuing of keys requires proper authorization. Keys are used to formalize when changes are made to standard configurations and equipment positions, as well as entry to controlled rooms.
- BP-PROC-00907 [106], Protected Equipment Program, defines practices used to reduce the risk to the plant/unit of equipment being accidentally operated or disabled when there has been a loss of redundancy. Practices include the use of barriers, signs, tags, and hardened barriers as well as communications to plant staff.

Activities driven by modification changes are covered in Section 5.6 via the Engineering Change Control program. If a design change results in a change to the SSCs covered through the operational configuration management process Operational Attributes and Control Documents are flagged as requiring changes during the Design Change Package and Design Change Notice process discussed in Section 5.6. These Operational changes are made by Operational staff responsible for Operating Procedures.

WANO Performance Objectives and Criteria (PO&C) Operations Fundamentals OP.1, Maintenance Fundamentals MA.1, Operational Risk OF.2, Design and Operating Margin Management CM.1, Operational Configuration Control CM.2 and Emergency Preparedness EP.2 are relevant to this review task. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against this PO&C following the 2014 WANO station and 2013 corporate reviews.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task. No gaps against this review task were identified.

Bruce Power programs and supporting procedures meet the requirements of this review task. Procedures for controlling the operating configuration exist and are effective.

5.8. Procedures for Radiation Protection

Review task 7 examines procedures for radiation protection, including procedures for on-site transport of radioactive material. This is complementary to Safety Factor 15, in which the specific objective is to determine whether the plant design has an adequate design for minimizing doses, both to workers and to the public.

CSA N286-05 Section 6.24 identifies specific requirements that must be met relating to the Radiation Protection Program.

Licence Conditions 1.4, 1.7, 9.1, and 9.2 are relevant to this review and drive oversight activities relevant to ensuring the appropriate procedures for radiation protection exist, including such CNSC Regulatory Guideline documents as G-129, Keeping Radiation Exposures and Doses As Low As Reasonably Achievable (ALARA). This document, discussed more fully in the report on Safety Factor 14, provides guidance for developing, implementing and maintaining a radiation protection program to ensure that exposures will be ALARA.

Sections of the OPP covering provisions relevant to this review include: Section 03.3 on Radiation Protection Requirements, 34.5, 35.4, and 62.2. The key one is 03.3 on Radiation Protection Requirements.

BP-MSM-1 Sheet 0002 [33] identifies that Nuclear Operations is responsible for aspects relevant to BP-PROG-12.05, the Radiation Protection Program, including ensuring governance and oversight, while the Nuclear Operations Support – Radiation Protection Programs organization unit is the programmatic authority, owner and leader of the Radiological Protection Functional Area, including ensuring Benchmarking the Program against programs of the best in the industry and against WANO.

Radiation protection (safety) is one of the four pillars of nuclear safety which supports a healthy nuclear safety culture. This Program is designed to embrace and contribute to the principles of nuclear safety as defined in BP-MSM-1, and recognizes that reactor safety, industrial safety, and environmental safety are essential to the long-term success of this Program.

BP-PROG-12.05 [52] the Radiation Protection Program, defines the implementing approaches and key responsibilities associated with implementing the Radiation Protection Management Policy. This is achieved by establishing and implementing standards and processes for the conduct of licensed activities defined in Appendix A of the program document. The program implementing processes are established to ensure public and occupational exposures to ionizing radiation are controlled so that: a) Individual doses are kept below regulatory dose limits; b) Unplanned exposures are avoided; and c) Individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account.

The Program controls the movement of people and materials to prevent the uncontrolled release of contamination or radioactive materials from Bruce Power facilities.

The Program Document Hierarchy (Appendix B) illustrates the minimum suite of procedures available through this Program that define processes and standards to ensure these objectives are met. This is discussed further in Safety Factor 15.

This Radiation Protection Program is applicable to the Station and workers performing radiological work, whether they are full-time or part time-staff, or contractors.

The Radiation Protection Program [52] defines the implementing approaches and key responsibilities associated with implementing the Radiation Protection Management Policy as defined in the Management System Manual [31]. BP-PROC-00878 [116], Radioactive Waste Management, notes that nuclear safety is the primary consideration of radioactive waste management activities and operational decisions with respect to these activities. This is achieved through establishing and implementing standards and processes for the conduct of radioactive waste activities, which includes radioactive waste packaging, transport and storage [116]. Given that transfers are done on private roads on the Bruce Power site, they are exempt from the Packaging and Transport of Nuclear Substances Regulations. BP-RPP-00033 [124], Unconditional Release and Transfers of Material specifies the requirements for the unconditional release of material into Zone 1 or the public domain and conditional transfer of material between on-site licensed facilities

SEC- RPP-00012 [118], Radiation Protection Performance Indicators describes the performance indicators used to measure the effectiveness of BP-PROG-12.05, Radiation Protection Program [52] through its application in the operation of a nuclear power plant. The Program strives to achieve high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 R1.

Separate from this Program, other programs cover:

- Radiological releases to the environment and subsequent doses to the public. These are monitored by the Chemistry and Environment Departments and controlled by Plant Operations. The requirements for these controls are documented in BP-PROG-00.02, Environmental Safety Management; BP-PROG-12.01, Conduct of Plant Operations; and BP-PROG-12.02, Chemistry Management.
- Administration of CNSC licences issued to Bruce Power (Appendix A). These are covered by BP-PROG-06.01 [154], CNSC Licence Acquisition, and formal communication with the CNSC is conducted via BP-PROG-06.03 [155], CNSC Interface Management.
- Process and procedures for the conventional health and safety of personnel working at Bruce Power, including the management of the respirator fit test program. This is performed via BP-PROG-00.06, Health and Safety Management [38].

Bruce Power’s Performance Report for Bruce A and B dated October 2013 [156] addresses Safety Control Area 07: Radiation Protection and Safety Control Area 14: Packaging and Transport (which includes onsite movements). Performance reviews of both Safety Control Areas (SCAs) indicate that Bruce Powers initiatives have shown to be effective in significantly reducing dose and that no major findings for all CNSC inspections to the transport program performed within the licensed period [156].

The reported dose to a member of the public from the Bruce site (which includes Bruce A, Bruce B, Central Maintenance and Laundry Facility (CMLF), Western Waste Management Facility, and the decommissioned Douglas Point reactor) was 0.0013 mSv, well below the public annual dose regulatory limit (for a member of the public) of 1 mSv ([157] Section 3.1.7).

Section 5.2 of the Bruce A and B Quarterly Operations and CMLF Quarterly Technical Reports [149] [150] provide Occupational Dose information in compliance with S-99, Sections 6.4.1 (m) and (n) alert the CNSC to events or likely events where works may receive a significant dose and provides information on whole body collective dose statistics and doses by work groups (operators, Projects and Modifications, Chemistry, various Maintenance groups).

Section 8.2 of the Quarterly CNSC Performance Indicator Reports [158][159] provides Operational reports on the Total Station Whole Body Radiation Dose and identifies the number of workers, including those with no dose.

Bruce Power’s Radiation Protection program performance satisfies the requirements of the Radiation Protection Regulations and includes performance indicators to monitor RP program performance. The RP program documents and supporting procedures are maintained current, taking into consideration operating experience and industry best practices. In 2013, there were no regulatory findings in this area. The oversight applied in implementing and continuously improving this program has been effective in protecting workers ([157] Section 3.1.7).

WANO PO&Cs Radiological Protection Fundamentals RP.1, Emergency Preparedness EP.2, are relevant to this review task. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against this PO&C following the 2014 WANO station and 2013 corporate reviews.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular Sections 7.1, 7.2, 7.3 and 7.4 discuss in more detail sample audits relevant to this review task. No gaps against this review task were identified.

Bruce Power meets the requirements of this review task. Procedures for radiation protection, including procedures for on-site transport of radioactive material exist, are effective and consistent with international practices.

5.9. Procedures for Management of Radioactive Effluents and Waste

Review task 8 examines procedures for management of radioactive effluents and waste. The adequacy of the program for surveillance of the radiological impact of the plant on the environment to ensure emissions are properly controlled and are as low as reasonably achievable, is assessed in Safety Factor 14.

CSA N286-05 Sections 6.28 and 6.29 identify specific requirements that must be met relating to Radioactive Effluents and Waste, such as requiring the handling, storage, and disposal of hazardous waste to be controlled. CSA N292.3 Standard, Management of low- and intermediate-level radioactive waste, provides more detailed requirements for Waste.

CSA Standard N288.5-11 [160] provides guidance on the design and operation of effluent monitoring programs. Bruce Power has committed to the full implementation of this standard by December 2018 [161].

Licence Conditions 1.4, 1.6, 1.7, 8.1, 8.2, and 8.3 are relevant to this review and drive oversight activities relevant to ensuring the appropriate procedures for management of radioactive effluents and waste exist. Licence Conditions 8.1 and 8.2 are the key ones as they require:

- The implementation of a program which meets CNSC S-296, Environmental Protection, Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills, Canadian Nuclear Safety Commission; and
- Controlling, monitoring and recording of releases of nuclear substances to the environment[12] from the nuclear facility so the releases do not exceed the derived release limits of the PROL.

BP-OPP-00002, OPP - Bruce A [36] identifies the policies and principles agreed with the CNSC that drive the programs and processes to comply with these aforementioned requirements. Sections of the OPP covering provisions relevant to this review include: Sections 00.2, 01.6, 03.1, 03.2, 03.3, 03.5, 04.1, 10.4, 21.5, 33.4, 33.9, 34.6, 71.1, 73.1 and 75. The key one is 03.3 on Radiation Protection Requirements.

The Effluent Monitoring Program and the requirements for recordkeeping are described in BP-PROC-00080 [55]. Results of effluent monitoring are reported in quarterly operations reports to the CNSC, as required by CNSC Standard S-99 (recently superseded by CNSC REGDOC 3.1.1 [20]).

Bruce Power's Performance Report for Bruce A and B dated October 2013 [156] addresses Safety Control Area 07: Radiation Protection, which examines radioactive effluent monitoring (Section 3.7.3). Bruce Power's methods remain consistent with industry best practice and represent realistic values to members of the public [156].

Bruce Power complies with the practices outlined in the CSA standards through the establishment of the following procedural elements:

- Minimization; Handling and Segregation; Collection and Processing; Packaging, Transport and Storage; and Receipt and Processing.

BP-PROC-00878 [116] Radioactive Waste Management implements the Bruce Power Radiation Protection Waste Management Policy from MSM-1. The associated implementing documents are:

- BP-PROC-00107 [125], OPG Waste Acceptance Criteria for Radioactive Waste;
- BP-PROC-00711 [127], Energy Solutions Waste Acceptance Guidelines for Radioactive Waste;

[12] Environmental Protection has been separated from Radiation Protection to align with the CNSC Safety Areas recognizing CNSC S-296 covers both ([16] Section 8.1).

- BP-PROC-00714 [128], Low Level Radioactive Waste Minimization; and
- BP-RPP-00010 [126], Segregation and Handling of Radioactive Waste.

CSA N292.3, Management of low- and intermediate-level radioactive waste [26] has been reviewed in support of this review task (Appendix B). Bruce Power's Performance Report for Bruce A and B dated October 2013 [156] addresses Safety Control Area 11: Waste Management and noted that there were no significant issues identified in a recent CNSC Type II inspection on Hazardous Waste Management although both strengths and areas required for improvement were identified in the preliminary summary of findings. This is a continuation of good performance reported in the Bruce A 2013 Environmental Compliance Approval (Water) Compliance Report for Bruce A [162].

Bruce A and B Quarterly Operations and CMLF Quarterly Technical Reports [149] [150] Section 5.1, provide quarterly updates of in-station radiological conditions including gamma surveys around the station, airborne contamination (tritium and particulate), loose surface contamination, and alpha. Section 4.0 provides information on Environmental Monitoring and Section 5.3 provides information on waste shipments. No significant findings arose.

Section 7.3.4 discusses two inspections related to Transportation of Dangerous Goods and Hazardous Waste Management. These indicated that Bruce Power is complying with the Hazardous Waste Management regulations, and the associated Bruce Power supporting procedures. Three gaps (SF11-2, SF11-3, and SF11-4) were identified in the CSA N292.3 Assessment provided in Appendix B (B.2) and listed in Table 11. These were raised because Bruce Power procedures were not available to confirm that these requirements were addressed; however, they do not change the overall assessment that Bruce Power procedures meet the requirements for management of radioactive effluents and waste, which were confirmed by the recent CNSC inspections noted above.

WANO PO&Cs Nuclear Professionals NP.1, Chemistry Fundamentals CY.1, Effluent Controls CY.3, Radioactive Material Control RP.4, are relevant to this review task. A review of the SCR database shows that no adverse conditions applicable to this review task have been identified against this PO&C following the 2014 WANO station and 2013 corporate reviews.

This was confirmed by a review of the assessments and audits, and CNSC inspections in Section 7.3. Improvements and enhancements have been made to the operating procedures through the completion of correction actions arising from past assessments and audits. In particular Sections 7.1, 7.2 and 7.3 discuss in more detail sample audits relevant to this review task. No gaps against this review task were identified.

Bruce Power meets the requirements of this review task. Procedures for radiation protection, including procedures for on-site transport of radioactive material exist, are effective and consistent with international practices.

6. Interfaces with Other Safety Factors

There is some degree of interrelationship among most of the 15 Safety Factors that comprise the Bruce A ISR. The following identifies specific aspects of this Safety Factor that are addressed in, or where more detail is provided in, another Safety Factor Report.

- "Safety Factor 2: Actual Condition of SSCs" in Section 4 reviews the Bruce Power procedural guidance on condition assessments in terms of adequacy as it relates to actual condition monitoring and collection of necessary information.
- "Safety Factor 10: Organization and Administration" in Section 4.1 reviews Bruce Power's use of procedures by way of the Bruce Power Management System. Safety Factor 10 also discusses the identified strength and commitment to improve the focus on audits and assessments in Section 8.
- "Safety Factor 14: Radiological Impact on the Environment" performs high level reviews of CNSC REGDOC-2.9.1 in Appendix A (A.1) and G-129 in Appendix A (A.7), as well as specific CSA N288 series standards.
- "Safety Factor 15: Radiation Protection" in Section 4.1 discusses Bruce Power's Radiological Protection procedural guidance.

7. Program Assessments and Adequacy of Implementation

Section 7 supplements the assessments of the review tasks in Section 5, by providing information on four broad methods used to identify the effectiveness with which programs are implemented, as follows:

- Self-Assessments;
- Internal and External Audits and Reviews;
- Regulatory Evaluations; and
- Performance Indicators.

For the first three methods, the most pertinent self-assessments, audits and regulatory evaluations are assessed. Bruce Power has a comprehensive process of reviewing compliance with Bruce Power processes, identifying gaps, committing to corrective actions, and following up to confirm completion and effectiveness of these actions. While there have been instances of non-compliance with Bruce Power processes, Bruce Power's commitment to continuous improvement is intended to correct any deficiencies.

For the fourth method, the performance indicators relevant to this Safety Factor are provided. These are intended to demonstrate that there is a metric by which Bruce Power assesses the effectiveness of the programs relevant to this Safety Factor.

Taken as a whole, these methods provide a cross section, intended to demonstrate that the processes associated with this Safety Factor are implemented effectively (individual findings notwithstanding). Thus, program effectiveness can be inferred if Bruce Power processes meet the Safety Factor requirements and if there are ongoing processes to ensure compliance with Bruce Power processes. This is the intent of Section 7.

7.1. Self-Assessments

Generally, self-assessments are used by functional areas to assess the adequacy and effective implementation of their programs. The results of the assessment are compared with business needs, the Bruce Power management system, industry standards of excellence and regulatory/statutory or other legal requirements.

The self-assessments:

- Identify internal strengths and best practices;
- Identify performance and/or programmatic gap(s) as compared to targets, governance standards and “best in class”;
- Identify gaps in knowledge/skills of staff;
- Identify the extent of adherence to established processes and whether the desired level quality is being achieved;
- Identify adverse conditions and Opportunities for Improvements (OFI); and
- Identify the specific improvement corrective actions to close the performance/programmatic gap.

Sample self-assessments relating to this Safety Factor are listed in Table 6.

Table 6: Focus Area Self-Assessment Reports

FASA	Topic	Applicable to Review Section
SA-BAOP-2010-02	Conduct FASA on Plant Status Control DPTSOAB	5.7
SA-BAOP-2010-05	Conduct FASA on Work Protection Tag Out DPTSOAE	5.5
SA-BAOP-2009-09	Personal Protection Tag Out Process	5.5
SA-BPMS-2014-01	Compliance with CSA N286-05	All of 5
SA-BPMS-2013-01	INPO Corporate PO&Cs Gap Analysis	All of 5
SA-BPMS-2012-02	Documentation Review against N286-05 Requirements and Understanding	All of 5
SA-BPMS-2012-01	BPMS Effectiveness Review against N286-05 Requirements and Understanding	All of 5

FASA	Topic	Applicable to Review Section
SA-BS-2011-01	Evaluate Operating Control Documents Process	5.1, 5.2, 5.3, 5.4, 5.5, 5.7, 5.8
SA-COM-2013-05	Assess procedural compliance with BP-PROC-00542, Configuration Information Change	5.6
SA-COM-2013-10	Critical Systems (SG, EPG, and QPS) - Maintenance Readiness FASA	5.6
SA-COM-2011-10	Fidelity of Configuration Information to Plant	5.6
SA-COM-2011-03	CM Performance Indicators & Configuration Management Index	5.6
SA-COM-2010-04	Fidelity of Configuration Information to Plant	5.6
SA-COM-2009-02	Comprehensive Configuration Management Self Assessment	5.6
SA-ERI-2014-05	ER interface with PB Program	5.4
SA-ERI-2013-08	PM Program	5.4
SA-ERI-2013-10	Plant Engineering Evaluations	5.4
SA-ERI-2013-03	System and Component Performance Monitoring Program Compliance	5.4
SA-ERI-2013-08	Effectiveness of ERCOE Implementation	5.4
SA-ERI-2012-01	PMOG Effectiveness	5.4
SA-EPS-2013-01	Standard /Guidlines/Best Practices for EPS	5.3
SA-EPS-2014-06	Safety Culture – Emergency Awareness	5.3
SA-MPA-2010-03	Outage Execution – Maintenance Milestones	5.4
SA-MPR-2014-05	Procedure Use and Adherence - Bruce A	5.4
SA-MPR-2014-10	Procedure Use and Adherence - OMS Focus	5.4
SA-MPR-2012-01	Procedure Use and Adherence	5.4
SA-MPR-2012-10	FLM Knowledge of Predictive Maintenance Program	5.4
SA-MPR-2011-03	Maintenance Line Management Reinforcement & Monitoring of Maintenance	5.4
SA-OCP-2014-01	Operations fundamentals	5.1, 5.2, 5.3, 5.4, 5.5, 5.7, 5.8

FASA	Topic	Applicable to Review Section
SA-OCP-2014-09	Work Protection Qualifications Structure and Practices	5.5
SA-OCP-2013-04	BP-PROG-12.01 N286.5 Audit	5.1, 5.2, 5.4, 5.5, 5.7, 5.8
SA-OCP-2013-02	Procedure Alteration	5.1
SA-OCP-2012-04	Procedure Alteration Process	5.1
SA-OCP-2010-02	Conduct of Infrequently Performed Tests or Evolutions	5.2
SA-OGO-2014-07	Outage Program alignment with EPRI, INPO, and WANO	5.4
SA-OGO-2014-03	Outage Program Documents Assessment	5.4
SA-OGO-2013-01	Maintenance & Test Equipment (M&TE) Data	5.4
SA-PMC-2014-03	Inspection And Test Plan (ITP) Use And Adherence	5.4
SA-RA-2014-01	S-99 Preliminary Reporting Timeliness	3.2
SA-RA-2013-02	S-99 Compliance	3.2
SA-RA-2012-01	Timelines of S-99 Reporting	3.2
SA-RA-2011-01	Timeliness of S-99 preliminary reporting	3.2
SA-RA-2010-02	S-99 Preliminary Reporting Timeliness	3.2
SA-RPR-2014-01	EPD Alarm Follow-up at Bruce A and Bruce B	5.8
SA-RPR-2013-05	Discrete Radioactive Particle Control Evaluation for Bruce A	5.8
SA-RPR-2013-04	Locked High Radiation Area Controls	5.8
SA-RPR-2013-03	Review of RP Program against WANO RP Guidelines	5.8
SA-RPR-2013-02	Bruce Power CANDU Radiological Protection Benchmarking Project Assessment	5.8
SA-RPR-2012-01	Radiation Protection Fundamentals Program	5.8
SA-RPR-2011-01	Fixed Instrumentation Calibration & Maintenance Processes	5.8
SA-RPR-2011-02	Portable Radiation Instrumentation Calibration & Maintenance Process	5.8

FASA	Topic	Applicable to Review Section
SA-RPR-2010-01	Effectiveness of BP-RPP-00040 Oversight of Radiological Work Implementation	5.8
SA-RPR-2010-03	Radiation Data Unit	5.8
SA-RS-2010-01	Impairments Manual Operational Effectiveness	5.2
SA-RS-2010-02	Safety System Test Scheduling and Monitoring	5.2
SA-WMSI-2014-02	Seasonal Readiness	5.3
FASA SA-WMSI-2001-04	Work Management Oversight	5.4
SA-WMSI-2012-02	Work Order Health – Including PM Backlog	5.4

It is a standard practice to review the processes and procedures as part of the majority of FASAs unless the purpose is very specific. The aforementioned FASAs show a continuing improvement in procedures, but shortcomings still exist. There is a continuing improvement process through the frequent review of procedures.

7.1.1. Radiation Protection Procedures

The following FASAs are related to the Radiation Protection Procedures. However, these are captured in Safety Factor 15 as they are more programmatic related and do not focus on Radiation Protection Procedures. They are also captured in Safety Factor 8 as they relate to safety performance. They are not further reviewed in this Safety Factor.

7.1.1.1. SA-RPR-2013-02; Bruce Power CANDU Radiological Protection Benchmarking Project Assessment

The objective of SA-RPR-2013-02 [163] was to review the current RP program elements as compared to good practices identified in the Canada Deuterium Uranium (CANDU) Radiological Protection Benchmarking Project. This Focused Area Self-Assessment (FASA) indicates Bruce Power's commitment to continuous improvement in RP and associated improvements to procedures and is proactively learning from other CANDU utilities.

7.1.1.2. SA-RPR-2013-03; Review of RP Program against WANO RP Guidelines

SA-RPR-2013-03 [164] is a Radiation Protection FASA performed against the WANO RP Guidelines. The WANO guideline document, while very comprehensive in addressing the attributes of a strong Radiological Protection Program, is not fully applicable to CANDU reactors or CNSC regulations. Many gaps were identified between the BP RP Program and the WANO RP Program guidelines; however, no conditions adverse to quality were identified during this assessment. The FASA identified 84 recommendations, further indicating Bruce Power's commitment to continuous improvement.

7.1.2. Performance Improvement Quarterly Review of FASAs

Increased oversight of the FASA completion and effectiveness process was implemented in 2014 with the introduction of Quarterly Focus Area Self Assessment Status & Summary Reports [165][166][167]. There reports provide a quarterly integrated summary view of the FASAs performed across the site by each Functional Area, with the major findings and gap closing measures initiated to close them. These reports provide management with insight on the health of the FASA process so program improvements can be implemented. The reports were instituted in response to weaknesses discovered in the FASA Program Effectiveness SA-PI-2013-06 [168].

7.2. Internal and External Audits and Reviews

The objective of the audit process as stated in BP-PROG-15.01 [54] is threefold:

- To assess the Management System and to determine if it is adequately established, implemented, and controlled;
- To confirm the effectiveness of the Management System in achieving the expected results and that risks are identified and managed; and
- To identify substandard conditions and enhancement opportunities.

The objective is achieved by providing a prescribed method for evaluating established requirements against plant documentation, field conditions and work practices. The process describes the activities associated with audit planning, conducting, reporting, and closing-out. The results of the independent assessments are documented and reported to the level of management having sufficient breadth of responsibility for resolving any identified problems (as stated in Section 5.14.2 of [24]).

Audits are planned and scheduled annually and tracked to ensure that they are performed regularly. About 150 independent audits were performed covering the Bruce Power Programs over the period 2009 to 2013. From a Safety Factor 11 perspective, annual audits are performed on the Environmental Safety Management Program BP-PROG-00.02, and audits are performed every 5 years against CSA N288.4 and N288.5 which cover Radiation Environmental Monitoring, and Effluent Monitoring ant Maintenance. Further audits are performed against the Document Management Program BP-PROG-03.01, the Emergency Measures Program BP-PROG-08.01, the Work Management Programs under BP-PROG-11.02 and -11.03, and the Radiation Protection Program BP-PROG-12.05 at least every 3 years. Requirements and the frequency of audits for specific areas is given in documents such as CSA N286-05 [24] and BP-PROC-00295, Planning and Scheduling Audits [169]. BP-PROC-00295 Sheet 0001, Audit Basis and Approach provides details of how often Environmental Safety Management Audits are conducted for air and water emissions and waste management, as these are conducted every second year [170].

7.2.1. External Audits and Reviews

In addition to the four aforementioned type of reviews, Bruce Power have a Nuclear Oversight and Regulatory Affairs (NORA) improvement initiative, where NORA continuously reviews the effectiveness of their Oversight against the WANO Performance Objectives and Criteria to learn the lessons from Stations around the world [149].

7.2.2. Internal Audits

Table 7 identifies audits related to this Safety Factor selected from a list of audits completed after 2008.

Table 7: Corporate Risk Oversight and Audit Division Audits

Audit	Topic	Applicable to Review Section
AU-2013-00007	Bruce Power Management System	All
AU-2013-00014	Procedure Alterations	All of 5
AU-2010-00031	N286-05 Implementation	All of 5
AU-2010-00029	Reporting of S-99 Emergency and Fire Events	5.3
AU-2012-00011	Records Management	5.1
AU-2011-00019	Summer Readiness	5.2, 5.3
AU-2010-00013	Continuity Management Audit	5.2, 5.3
AU-2011-00017	Safety System Testing Scheduling and Completion	5.2
AU-2014-00005	Nuclear Emergency Plan	5.3
AU-2013-00004	Emergency Measures	5.3
AU-2011-00006	Nuclear Emergency Plan	5.3
AU-2013-00008	Outage Management	5.4
AU-2013-00006	Maintenance Program	5.4
AU-2013-00005	Relief Valve Repairs	5.4
AU-2011-00025	Preventative Maintenance Deferrals	5.4
AU-2011-00007	Relief Valve Repairs	5.4
AU-2012-00006	Equipment Reliability	5.4

Audit	Topic	Applicable to Review Section
AU-2012-00014	Work Management	5.5, 5.9
AU-2012-00012	Health and Safety Management	5.5
AU-2011-00001	Health and Safety Management	5.5
AU-2010-00002	Work Protection Audit	5.5
AU-2012-00005	Configuration Management Engineering	5.6
AU-2013-00015	PassPort Equipment Data Management	5.6
AU-2014-00017	Position Assured Components	5.7
AU-2011-00009	Operations	5.7
AU-2014-00022	Radiation Protection Waste Management	5.8
AU-2011-00013	Radiation Protection and Alpha Radiation Recovery Plan	5.8
AU-2009-00013	Radiation Protection Practices	5.8
AU-2014-00004	Radiation Environmental Monitoring	5.9
AU-2013-00003	Environmental Safety Management	5.9
AU-2012-00004	Radiation Environmental Monitoring	5.9
AU-2012-00003	Environmental Safety Management	5.9
AU-2010-00035	Radiation Environmental Monitoring Program	5.9
AU-2010-00030	Radioactive Shipments	5.9
AU-2010-00005	EMS Program / Environmental Compliance Audit	5.9
AU-2010-00003	Hazard Waste Management Audit	5.9

Similar to the findings in the 2008 ISR Basis Report, the sampling of audits reviewed provides evidence that the audit process is effective and audits, when conducted, go into sufficient detail to evaluate the process to determine whether it is implemented and complies with requirements. Audit reports reviewed contained records of the audit plans, briefings, and clear audit scopes. Reports contained detailed references to samples reviewed and adverse conditions observed during the assessment. Where process weaknesses were observed these conditions were recorded as opportunities for improvement and appropriately flagged in the SCR system to assist in the continuous improvement activities relating to Procedures.

The following more recent key audits related to this Safety Factor were selected from the list of audits completed after 2009.

7.2.2.1. AU-2011-00025, Preventative Maintenance Deferral Process

AU-2011-00025 shows the Preventative Maintenance (PM) Work Order deferral process has not been effectively managed to ensure that equipment performance meets industry standards. This condition was identified as an issue (WANO Evaluation, 1999). Although some performance improvements have been experienced, the Equipment Reliability Index performance continued to be in the "Red" despite the numerous improvements plans that have been developed and implemented. Improvement initiatives had shown a reduced number of PMs not being completed before the last possible date and an increasing number of PMs being completed in a timely manner. The main drivers for these improvements were achieved by assigning strong PM Coordinators and the development of the Preventative Maintenance Oversight Group (PMOG), with a focus on removing barriers that prevent completion of PMs until the late date.

Subsequently, CNSC Inspections have been conducted to assess maintenance planning and scheduling [Section 7.3], and the effectiveness of the PMOG process [Section 7.3.2]. These sections discuss the findings and recommendations of the inspection reports and Regulatory actions and recommendations in depth.

This issue has been identified as a gap in this report (SF11-1).

7.2.2.2. AU-2013-00014, Procedure Alterations

The objective of this audit was to evaluate the effectiveness of BP-PROC-00811, Procedure Alteration [153], and included a review of Maintenance and Operations procedure alterations that occurred in the previous year.

The audit was conducted following a WANO evaluation at Bruce A, which identified procedure alterations as an area for improvement (AFI OP.4-1 - Ops Procedures Associated with Procedure Use Including Alterations). WANO identified a weakness in the quality, use and deviation (alteration) process. The WANO Evaluation found:

> *"Extensive and long-standing problems with procedure quality and inconsistent application of procedure use expectations have resulted in plant transients and an increase in station vulnerability to events. Contributing to this is a liberal use of a weak procedure deviation process, ineffective management of the procedure change backlog, and ineffective coaching by managers and supervisors."*

The audit noted that BP-PROC-00811 [153] was focused on the generating facilities even though it applied to the whole site. Varying levels of compliance to BP-PROC-00811 and understanding of the procedure alteration process, were noted across the site. The majority of compliance was found at the generating stations within Operations. Gaps were noted in the guidance provided in BP-PROC-00811, which limited the effectiveness of the procedure to provide instruction for all alterations to site procedures.

Additionally, the audit found that the procedure deviation tool does not provide sufficient guidance regarding limitations in its use and conflicts with other documents that control procedure content, and allows first-line supervisors to authorize non-intent changes to any procedure and intent changes to procedures that are not safety-related. This can lead to insufficient reviews of changes before implementation because workers with appropriate technical knowledge may not be involved in the review. Station procedures give a definition of intent changes, but this is not well referenced in the procedure deviation tool. In addition, the operations procedure document indicates that all intent changes require either the shift manager or department manager approval, in conflict with the allowances in the procedure deviation tool. As a result, this process is open to wide and generous use to assist in accomplishing work and is being used as a workaround to the procedure quality deficiencies.

It was noted that a station condition record (SCR) is not initiated when the procedure deviation process is used. This desensitizes workers to the importance of following high-quality procedures. An SCR would provide the ability to trend and evaluate the scope of procedure weaknesses. BP-PROC-00811 is widely used, and has few constraints to ensure that the intent or the quality of the procedure is not altered which masks the magnitude of the station procedure quality gap.

The audit resulted in the following adverse conditions being raised:

- Adverse condition: documenting non-adherence to BP-PROC-00811 at the Bruce A Plant and the Bruce B Plant;
- Adverse condition: documenting implementation and integration gaps; and

The required BP-PROC-00811 revisions [153], to address these adverse conditions were completed in December 2013.

7.3. Regulatory Evaluations and Reviews

After a licence is issued, the CNSC stringently evaluates compliance by the licensee on a regular basis. In addition to having a team of onsite inspectors, CNSC staff with specific technical expertise regularly visit plants to verify that operators are meeting the regulatory requirements and licence conditions. Compliance activities include inspections and other oversight functions that verify a licensee's activities are properly conducted, including planned Type I inspections (detailed audits), Type II inspections (routine inspections), assessments of information submitted by the licensee to demonstrate compliance, and other unplanned inspections in response to special circumstances or events.

Type I inspections are systematic, planned and documented processes to determine whether a licensee program, process or practice complies with regulatory requirements. Type II inspections are planned and documented activities to verify the results of licensee processes and not the processes themselves. They are typically routine inspections of specified equipment, facility material systems or of discrete records, products or outputs from licensee processes.

The CNSC carefully reviews any items of non-compliance and follows up to ensure all items are quickly corrected.

The regulatory evaluations or reviews of the Bruce Units 0A and 1-4 relevant to the Procedures Safety Factor since 2011 were reviewed. Table 8 identifies examples of regulatory correspondence evaluations and reviews relevant to Procedures. A review of these inspections shows compliance with the majority of the requirements, and continuing improvement.

Table 8: Regulatory Evaluations and Reviews

NK21-CORR-00531	BRUCE A COMPLIANCE INSPECTION REPORT	Issues	Summary Comments
-09463 -10510	Transportation of Dangerous Goods – Class 7 Radioactive Material BRPD-AB-2013-006 General Compliance (NK21-CORR-00524-00001)	See Section 7.3.4	
-10716	Waste Management Program	Bruce Power assigned contact for future audit.	Notification of Audit but not yet conducted
-10899	BRPD-AB-2013-014 – Hazardous Waste Management	Six recommendations to improve practices.	No formal actions necessary.
-10676 -10760	Abnormal Incident Manuals	Used to establish minimum shift complement; simulator reviews discussed.	Support to CNSC to better understand documents, training for AIM inspection.
-11276 -11319 -11507 -11547 -11684	Action Item 2014-07-5293: BRPD-AB-2014-006 - S-99 Reporting	Improve preliminary report timeliness; improved detailed reports	Meeting S-99 reporting requirements
-07917 -08519 -09309 -10265 -10361 -10573 -10639 -11125 -11236 -11681 -11754	Action Item 1307-3968: Response to Compliance Inspection Report BRPD-AB-2012-016 – Management System Review and BP-PROC-00016, Business Assessment Process	State of Functional Area Assessment process was incomplete.	Corrective actions taken to resolve concerns. MSM-1 and BP-PROG-01.02 subsequently revised, as well as BP-PROC-00016. Action Item closed.
-09245 -09721 -09869 -09870 -10773 -11117 -11139 -11436 -11445	Action Item 1107-2924 - BPRD-2011-AB-011 - Radiation Protection Alpha Monitoring and Control; Action Item 1307-4696 - BRPD-AB-2013-018 – Radiation Control - Worker Dose Control;	A process establishing requirements for alpha monitoring is required; hazard posting frequency; personal air samplers; deficiencies with whole body monitor calibration data labels; procedure verification	Worker dose activities in compliance with regulatory requirements but improvements have been suggested.
-08074 -08165 -08380 -08487 -08557 -09165	Action Item 100712: BRPD-2010-AB-002 Radiation Protection Compliance Inspection Report; Action Item 110706 – BRPD-2010-AB-007 - Radiation Protection Program;	Update Restart Radiation Safety Plan and Procedures to become consistent with Station procedures; perform FASA on contractor and employee onboarding; improve clearances of waste materials; posting and	Bruce Power was in the process of revising their documentation to ensure top down compliance of the lower tier documents; corrective action plan defined the change timeline.

NK21-CORR-00531	BRUCE A COMPLIANCE INSPECTION REPORT	Issues	Summary Comments
-09245 -09514 -09565 -09613 -09609 -09683 -09721 -09817 -09833 -09851 -09869 -10219 -10220 -10221 -10222 -10282 -10347 -10354 -10567 -11141 -11422 -11459 -11661 -11704	Action Item 1107-2924 - BRPD-2011-AB-011 – Radiation Protection Alpha Monitoring and Control; Action Item 1207-3516 – BRPD-AB-2012-009 – Radiological Hazard Control; Action Item 1207-3292 Outage ALARA Planning; Action Item 2949 CNSC review of Bruce Power's effectiveness review, of the implementation of BP-RPP-00022, R009 Contamination Control; Action Item 1207-3516: BP-RPP-00005 FASA Action Item 2014-07-5397 – BRPD-AB-2014-010	communication of hazards; air purifying respirators; Radiation Exposure Permits; Housekeeping; monitoring at zonal boundaries; CCA requirement compliance; alpha monitoring; lunch room surveillance; dosimetry; waste removal; radiation instrument management; qualification; Contamination Control	Occupational ALARA Planning and Control meet regulatory requirements with areas and opportunities for improvement
-09271 -09429 -10426	Action Item 1207-3075: Inspection Report BRPD-2011-AB-018 CFAM Organization Responsibilities	Gaps wrt Supply Chain and Configuration Management	Corrective actions subsequently completed
-08325 -09003 -09024	Document Control MSD- BSGAB-2009-T16492 and Records Management Inspection Report and Document Control of Program Document - BRPD-2011-AB-013	No formal actions, but a recommendation wrt when BP-PROG documents are issued to CNSC past the original stated date.	Improvements made to process. BP-PROG documents which need to be submitted to the CNSC are identified in the LCH.
-09401 -09503 -09521 -09563 -10535 -10696 -10818 -10951 -11483 -11716	Maintenance Planning and Scheduling Inspection BRPD-AB-2013-004, Action Item 1307-4113	See Section 7.3.1	
-09708 -10695 -10857 -11132 -11139 -11251	Maintenance Backlogs Action Item 1307-4229: PMOG Inspection	See Section 7.3.2	
-10395	2013 Fall Emergency Exercise	Nuclear Emergency and Fire Plans complete but minor	Effective Huron Challenge Integration Exercise

NK21-CORR-00531	BRUCE A COMPLIANCE INSPECTION REPORT	Issues	Summary Comments
-10589 -10658 -10838 -10899 -10973 -11010 -11143 -11276 -11550 -11595	Action Item 1307-4148: BRPD-AB-2013-007 EPS Fire Drill 2014 Fall Corporate Emergency Exercise BRPD-2011-AB-017: Corporate Emergency Exercise	non-adherences to procedure. Annual reviews of exercises.	
-09069 -09192 -10607 -09077 -10284 -10473 -10926 -11050 -11707	BRPD-2011-AB-010 – Software Configuration Management Action Item 1107 – 2761 BRPD-2011-AB-004 Configuration Management Action Item 100713 BRPD-AB-2013-011 – Engineering Change Control Process Action Item 1307-4427	Need for software maintenance plans, software storage improvements. 6 action notices addressed Update to BP-PROG-10.01 and 10.02 based on lessons learned including installation and commissioning requirements for temporary and equivalent modifications in BP-PROC-00539. Provide performance indicators and review monthly records to ensure compliance. Determine the method and extent of record verification for change procedures. Complete Bruce Power Improvement Plan.	Action Items closed
-09749 -10457	Minimum Shift Complement Action Item 080702 – Licensing Basis	Clarification of minimum number of shift employees to handle emergency situations	In-depth consolidation of licensing inputs explaining how numbers are derived.
-11126 -11210 -11479 -11717 -09256	BRPD-A-2013-010 – Emergency Operating Procedures & Minimum Shift Complement Validation; BRPD-A-2012-005 - Verification of Outage Heat Sink Line-up	Two action notices identified and six recommendations No outstanding issues.	Actions complete. Requirements of heat sink process met.
-09425 -09537 -10036 -11482 -11635	BRPD-A-2012-013 – Environmental Monitoring Bruce A and Outside Bruce Power fence Action Item 1207-3231 Environmental Monitoring at Bruce Site	Improvement on temporary configuration change management for particularly for active liquid waste handling to ensure they are removed sooner. Number of outstanding temporary changes reduced.	Awareness and adherence to procedures; meet requirements. BP-PROC-00368 revised to clarify temporary change requirements. Bruce Power meeting requirements.

NK21-CORR-00531	BRUCE A COMPLIANCE INSPECTION REPORT	Issues	Summary Comments
-07731 -07972 -09061 -09520	BRPD-AB-2009 – Work Management System Activities Related to Maintenance AI 100700	Summary of FASA SA-WMSI-2001-04 findings on 13 week process gaps provided. CNSC concurred with actions from corrective action plan. Actions completed.	Process improvement gaps in planning, schedule and execution identified.
-09442	BRPD-A-2012-015 - Maintenance Inspection Work Execution by Nuclear Maintenance Services Crew	No formal actions	Hazards identified during pre-job brief. Complying with S-210 and G-210.
-09539 -09628	BRPD-A-2012-019 - Action Item 1207-3289/3884: Unit 2 Return to Service Safety System Test 2.18 Development and Use of SST Procedures	Confirmation of CNSC notice for SST commissioning	Agreement on sufficient notification to CNSC

Table 9 assists the reader in determining the relationship between the compliance inspections impact and the review tasks discussed in Section 5.

Table 9: Relationship Between CNSC Compliance Inspections and Review Tasks

CNSC Compliance Inspection	Topic	Applicable to Review Section
BRPD-AB-2014-006 BRPD-A-2012-015	Action Item 2014-07-5293: S-99 Reporting Maintenance Inspection Work Execution by Nuclear Maintenance Services Crew	3.2
BRPD-AB-2012-016 BRPD-2011-AB-018	Action Item 1307-3968: Response to Compliance Inspection Report – Management System Review and BP-PROC-00016, Business Assessment Process Action Item 1207-3075: CFAM Organization Responsibilities	All of 5
BRPD-2011-AB-013	Document Control MSD- BSGAB-2009-T16492 and Records Management Inspection Report and Document Control of Program Document	All of 5
BRPD-A-2012-019	Action Item 1207-3289/3884: Unit 2 Return to Service Safety System Test 2.18 Development and Use of SST Procedures	5.2
-	Abnormal Incidents Manuals Minimum Shift Complement - Action Item 080702 - Licensing Basis BRPD-A-2012-005 - Verification of Outage Heat Sink	5.2

CNSC Compliance Inspection	Topic	Applicable to Review Section
	Line-up	
BRPD-A-2013-010 BRPD-A-2012-005	Emergency Operating Procedures & Minimum Shift Complement Validation; Verification of Outage Heat Sink Line-up	5.2, 5.3
BRPD-2011-AB-017	2013 Fall Emergency Exercise Action Item 1307-4148: BRPD-AB-2013-007 EPS Fire Drill 2014 Fall Corporate Emergency Exercise Corporate Emergency Exercise	5.3
BRPD-AB-2009	Work Management System Activities Related to Maintenance AI 100700	5.4
BRPD-A-2012-015	Maintenance Inspection Work Execution by Crew	5.4
BRPD-AB-2013-004	• Action Item 1307-4113: Maintenance Planning and Scheduling Inspection; • Development, Maintenance and Use of Procedures: development, maintenance and use of the Safety System Test and Maintenance procedures.	5.4 5.2
BRPD-AB-2013-008	Action Item 1307-4229: PMOG Inspection	5.4
BRPD-AB-2013-011 BRPD-2011-AB-010 BRPD-2011-AB-004	Engineering Change Control Process Software Configuration Management Action Item 1107 – 2761; Configuration Management Action Item 100713	5.6
BRPD-2010-AB-002 BRPD-2010-AB-007 BPRD-2011-AB-011 BRPD-AB-2012-009 BRPD-AB-2013-018	Action Item 100712: Radiation Protection Compliance Inspection Report; Action Item 110706: Radiation Protection Program; Action Item 1107-2924: Radiation Protection Alpha Monitoring and Control; Action Item 1207-3516: Radiological Hazard Control; Action Item 2949 CNSC review of Bruce Power's effectiveness review, of the implementation of BP-RPP-00022, R009 Contamination Control; Action Item 1307-4696: Radiation Control - Worker Dose Control;	5.8

CNSC Compliance Inspection	Topic	Applicable to Review Section
BRPD-AB-2014-010	Action Item 2014-07-5397	
BRPD-AB-2013-006	Transportation of Dangerous Goods – Class 7 Radioactive Material General Compliance - NK21-CORR-00524-00001	5.9
-	Waste Management Program	5.9
BRPD-AB-2013-014	Hazardous Waste Management	5.9
BRPD-A-2012-013	Environmental Monitoring Bruce A and Outside Bruce Power fence Environmental Monitoring at Bruce Site	5.9

7.3.1. Maintenance Planning and Scheduling Inspections

Five correspondence letters related to the CNSC maintenance planning and scheduling inspection in June 2013 were reviewed. CNSC staff raised three Action Notices and two Recommendations under Action Item (AI) 1307-4113 [171].

Additionally, a more recent inspection was conducted in October 2014 based on the inspection notification [172], related to the development, maintenance and use of the Safety System Test and Maintenance procedures, although the report was not available at the time of writing this report.

The correspondence is listed below:

- NK21-CORR-00531-10535, Bruce A and B: Maintenance Planning and Scheduling Inspection BRPDAB-2013-004, New Action Item 1307-4113 [171];
- NK21-CORR-00531-11483, Notification of the CNSC Type II Compliance Inspection - Development, Maintenance and Use of Procedures: development, maintenance and use of the Safety System Test and Maintenance procedures [172];
- NK21-CORR-00531-10696, AI 1307-4113: Response to Bruce A and B: Maintenance Planning and Scheduling Inspection Report # BRPD-AB-2013-004 [173];
- NK21-CORR-00531-10818, Bruce A and B: Maintenance Planning and Scheduling Inspection BRPD-AB-2013-004, Action Item 1307-4113 [174];
- NK29-CORR-00531-11716, CNSC Type II Compliance Inspection Report: BRPD-B-2014-002 Maintenance Planning and Scheduling [175]; and

- NK21-CORR-00531-10951, Action Item 1307-4113: Bruce A and B Maintenance Planning and Scheduling Inspection BRPD-AB-201 3-004 [176].

The inspection is part of the CNSC baseline inspection program covering the planning and scheduling of maintenance work, and was one of several inspections looking at the maintenance program. The focus of the inspection was to have an oversight of maintenance planning and scheduling process and included observing various meetings and desktop reviews of work assessments for several work packages, and interviews with Bruce Power staff.

The inspection was focused on the Regulatory Standard S-210, Maintenance Programs for Nuclear Power Plants [177], specifically clauses 5.2.1, 5.2.3, 5.3.1, 5.3.2, 5.4.1, 5.5, 5.5.1, 5.5.2, 5.5.4 and 5.7. CNSC staff used an Inspection Guide written to the criteria of RD/GD-210 [178].

The main focus of the inspection was the observation of the following meetings:

- the maintenance work week meetings including new work screening;
- the Station Look Ahead Meeting;
- the work management lead team meeting;
- the T-12 to T+1 scheduling meetings; and
- the work management and maintenance lead team meeting.

CNSC staff also performed a work assessment review in PassPort using a sample of work orders selected by CNSC staff.

CNSC staff concluded that Bruce Power is having issues meeting the expectations of BP-PROC-00329, On Line Work Management Process [179] and performing maintenance in a timely manner. This conclusion was based on the following:

- Multiple tasks were being sent back to assessing, past T-10, and work orders created from model work orders still required additional assessing;
- Planning and scheduling was not completed early enough in the process to ensure tools, equipment and parts were available for the work to start;
- Many Preventive Maintenance (PMs) were deferred late in the T weeks at both stations;
- Bruce Powers staff did not show a low tolerance for equipment with deficiencies, as the PM and Emergent Work (EM) backlogs have consistently been increasing; and
- CNSC staff witnessed procedural non-compliances to Bruce Power programs BP-PROG-02.02, Worker Learning and Qualification [180], BP-PROG-11.02, On-Line Work Management Program [181] and procedure BP-PROC-00329 [179] at both stations.

During the inspection, Bruce Power managers explained that they were aware of the high and increasing EM backlogs and the high number of PM deferrals. They identified that these negative trends were being tracked and there is a risk-based approach in place to resolve these issues. Bruce A is focusing on limiting the scope and increasing resources in the Fix It Now team to address emergent work and reduce high maintenance backlogs. Bruce Power managers also agreed with CNSC staff’s concerns with high deferral rate of PMs. Bruce Power managers identified that the PMOG is a management focus area and indicated there should be positive changes to the overall program to bring the deferral numbers down. CNSC staff reviewed the PMOG program as part of the reactive PMOG inspection (Section 7.3.2).

During the inspection CNSC staff found little evidence of the initiatives from AI-110721 had a positive effect and CNSC staff were not convinced that the implementation of all the initiatives were effective in improving the overall plant performance.

The following Action notices were raised:

- BRPD-AB-2013-004-AN01 - CNSC staff requests that Bruce Power review the deferral and rescheduling of tasks in the last 5 weeks of scheduling process and provide a plan with target dates to ensure the purpose stated in BP-PROG-11.02, Section 1.0 [181] is met.
- BRPD-AB-2013-004-AN02 - To ensure compliance with BP-PROG-02.02 Section 4.0 [180], CNSC staff requests that Bruce Power document all special qualifications for workers so that FLMs and workers are aware of the qualification required, prior to performing the work. Bruce Power is requested to provide a brief summary of any procedural changes made to ensure compliance.
- BRPD-AB-2013-004-AN03 - CNSC staff request that Bruce Power provide a corrective action plan that will ensure that Bruce Power's maintenance planning and scheduling process is effectively meeting the purpose stated in BP-PROG-11.02, Section 1.0 [181]. The plan should include target implementation dates that will reduce the deferred PM and EM backlogs and the current deferred PM and EM backlog trends for the past year.

The following recommendations were made:

- BRPD-AB-2013-004-R01 - CNSC staff recommends that Bruce Power define the term “special training qualifications” as it is used in BP-PROC-00543, Task Planning [182], more than once; and
- BRPD-AB-2013-004-R02 - CNSC staff recommends that Bruce Power improve their model work order program by ensuring further assessment are not required on work orders derived from model work orders.

The following positive observations were noted during this inspection:

- During the meetings, CNSC staff noted that the work was categorized;
- A list of priority work was included;
- The majority of the scheduled work was Preventative Maintenance;
- Conflicts with other maintenance activities were identified when scheduling preventive maintenance;
- ALARA was used as a criterion;
- Environmental Qualification of equipment is being identified and steps are put into place to maintain it during the assessment process at both stations;
- OPEX was included in the work assessments at both stations;

- Impacts of the maintenance activities on safety of the plant, personnel, Regulatory requirements and the plant operational limits and conditions were identified in the assessment process;
- Work packages included the need for special equipment, scaffolding, fire protection and contamination control; and
- Preventive maintenance deferred past its grace period was reviewed and authorized by qualified personnel.

Bruce Power's responses to action notices were rejected by CNSC staff and clarifications were issued [174] [175]. Bruce Power's response to AN03 to have an internal committee to review the backlogs was recognized as a good step, but also did not address the action notice. Regular updates (quarterly or semi-annually) on progress made in addressing the issue were requested along with explanations for any anomalies. The updates are expected to continue until Bruce Power has reduced the backlogs to sustainable levels which meet industry standards.

During a maintenance planning and scheduling inspection at Bruce B [175], CNSC staff noted that Bruce Power has implemented corrective actions; however, they continue to struggle with their planning and scheduling process. They noted that this is starting to have a negative impact on work that does make it to execution week, especially in Bruce A. CNSC staff stated in its view, it will take some time to see an overall noticeable improvement to the planning and scheduling process, as Bruce Power implements long term effective corrective actions. CNSC staff will continue to monitor Bruce Power's corrective actions and their effectiveness through the open Action Item 1307-4113, surveillance and monitoring, and through future scheduled inspections such as Maintenance Oversight Planning and Scheduling [172].

A subsequent letter [176] provided additional responses to the CNSC staff detailed review comments and clarifications [174]. Bruce Power recognized the need to aggressively reduce the current Critical Corrective and Deficient Corrective backlog, as well as creating a sustainable solution that respects the current process. Bruce Power advised they will provide semi-annual updates starting in February 2015, on the progress in achieving sustainable maintenance backlogs which will meet industry standards. A Maintenance Productivity Improvement plan and a T-26 improvement plan, has been developed and implemented to ensure that the right PM scope and frequency are met. Additionally, it further reviewed its procedures and committed to implementing the required procedural changes to address the weaknesses identified in the June 2013 CNSC Inspection. Bruce Power advised that they will request closure of the Action Item when they meet the maintenance backlog requirements.

Section 5.4 assessed Bruce Power maintenance procedures and inspections and concluded the required procedures are in place. This information indicates the effectiveness of maintenance planning and scheduling is experiencing difficulties (as identified in gap SF11-1). However, Bruce Power is committed to improving its program and striving to reduce maintenance backlogs and achieve industry best practices.

7.3.2. Preventive Maintenance Oversight Group Effectiveness Inspections by CNSC

There are four correspondence letters related CNSC staff inspection report assessing the effectiveness of the PMOG. The inspection was conducted as a follow-up to Action Item 1207-3218, BRPD-AB- 2012-002-AN01, to ensure Critical Category 1 and 2 equipment is maintained within their technical basis, through performance of Preventative Maintenance (PM). The correspondence is listed below:

- NK21-CORR-00531-10695, Action Item 1307-4229, PMOG Inspection at Bruce A and B, Report #BRPD-AB-2013-008 [183];
- NK21-CORR-00531-10857, Action Item 1307-4229: Response to PMOG Inspection at Bruce A and Bruce B. Report #BRPD-AB-201 3-008 [184];
- NK21-CORR-00531-11132, Bruce A and B: PMOG Inspection at Bruce A and B BRPD-AB-2013-008, Action Item 1307-4229 [185]; and
- NK21-CORR-00531-11251, Action Item 1307-4229: Response to PMOG Inspection at Bruce A and B. Report #BRPD-AB-2013-008 [186].

The details of the inspection are identified in NK21-CORR-00531-10695 [183], which identified three action notices and three recommendations under Action Item 1307-4229. CNSC staff found Bruce Power's current practices regarding the deferral of Preventive Maintenance Work Orders (PMWO) did not align with the procedures. CNSC staff suggested that Bruce Power change their current practice in order to align with industry best standards. CNSC staff further found that BP-PROC-00456, Preventative Maintenance (PM) WO Deferral Process [187], was inconsistent with its governing procedure BP-PROC-00501, Integrated Preventative Maintenance Program [188], on issues relating to the path forward once a PM work order deferral request was rejected by the Responsible System Engineer.

CNSC staff noted four trends:

- All the elevated PM deferrals that are brought to PMRC committee are assessed on equipment specific issues and no assessment is done for overall aggregate effects of the equipment failure on reliability of the station;
- All the deferrals are raised due to maintenance and work management issues such as crew overloading for the week, scheduling issues and parts unavailability;
- Several Crit Cat 1 and 2 PMs, have been deferred multiple times and these include licensing and mandatory PMs; and
- There is a high PM deferral backlog identified at Bruce A for April's monthly PMOG, even without the Units 1 and 2 PMs being turned on.

Bruce Power staff self-identified the high backlogs and had advised they had put several initiatives in place along with goals that the PMOG committee is striving to achieve in order to meet industry best practices. Two major initiatives that are currently in place to work down the PM backlogs were identified, including the T-26 Just in Time review and an enhanced focus to eliminate the backlog of PM Change Requests.

CNSC staff requested that Bruce Power perform the following corrective actions:

- BRPD-AB-2013-008-AN01: Perform corrective actions to become compliant with BP-PROC-00501 and S-99. The corrective actions need to include a gap analysis of BP-PROC-00501 and BP-PROC-00456 [187] to ensure alignment;
- BRPD-AB-2013-008-AN02: Perform corrective actions to become compliant with BP-PROC-00501 section 4.3.3 [188] by ensuring that all deferral forms include valid equipment risk technical justification for a deferral; and
- BRPD-AB-2013-008-AN03: Perform corrective actions to become compliant with BP-PROC-00456 [187] by ensuring that an SCR is raised for each PM that is deferred multiple times and implement corrective actions to drive long term resolutions to multiple deferrals issue.

CNSC staff recommended the following:

- BRPD-AB-2013-008-RO1: CNSC staff recommends that Bruce Power does not change the definition of delinquent stated in BP-PROC-00501 [188], as this would not align with industry best practices;
- BRPD-AB-2013-008-R02: CNSC staff recommends that Bruce Power conduct a one-time assessment of aggregate effects of PM deferrals on overall station reliability; and
- BRPD-AB-2013-008-R03: CNSC staff recommends that both Bruce A and B conduct an assessment of the resources required, with the established wrench times, to execute the complete PM program and assuming that there are no issues related to parts, scheduling and equipment status. Bruce A should include in this assessment the PMs from Units 1 and 2 that are not yet turned on.

CNSC staff concluded that Bruce Power has high backlogs of PM Deferral Requests and PM Change Requests and there are a high number of multiple PM deferrals, which are indicators of weakness in the PM program which require appropriate focus from the licensee staff.

NK21-CORR-00531-10857 [184] responded to the three corrective actions and requested closure of Action Item 1307-4229. The CNSC staff advised they found the submission did not adequately address issues raised in the inspection report for AN01 and AN02, and also did not respond to the recommendations, and requested Bruce Power submit actions taken in response to each recommendation. NK21-CORR-00531-11251 [186] provided additional details in response to the CNSC staff review comments on action notices AN01 and AN02, as well as response and description of the actions taken for each recommendation R01, R02 and R03.

Bruce Power stated that the Deferral Technical Evaluation (DTE) form has been enhanced and expectations have been reinforced through organizational roll-outs to ensure that a thorough risk evaluation (not justification) has been completed as part of the deferral. This will allow the appropriate level of the organization to make a decision on the acceptability of the documented risk for deferring a PM Work Order. BP-PROC-00501 [188] and BP-PROC-00456 [187] will be revised in order to clarify the roles and responsibilities for the DTE and acceptance of the identified risk.

Bruce Power recognizes that there is currently some misalignment between the implementing procedures and governing program documents. Bruce Power advised it is revising BP-PROG-11.01, Equipment Reliability, and BP-PROC-00780, Preventive Maintenance Implementation, to ensure appropriate authority is granted to BP-PROC-00456 [187] and BP-PROC-00501 [188] and to include deferral process details as required.

Bruce Power advised that all document revisions in response to AN01 will be complete by October 2014.

Starting with the end of July 2014 Health Reports, Bruce Power proposes to strengthen DPT-PE-00010, System Health Reporting [189], to include an aggregate risk assessment of the effect of late and deferred PMs on a system basis and to determine the required corrective actions to address and mitigate these risks. Bruce Power completed an assessment of the resources required to execute the complete PM program, including the Units 1 and 2 PMs, with subsequent assessments part of the ongoing Equipment Health initiative efforts.

This information suggests the effectiveness of the PMOG in addressing PM backlogs is experiencing challenges. This has been identified as a gap (SF11-1) in Table 11. However, Bruce Power is demonstrating a commitment to improving its program and achieving industry best practices and the required procedures are in place (Section 5.4).

7.3.3. Compliance with the Requirements of the S-99 Standard

There are two correspondence letters relating to the CNSC staff inspection report [190] on Bruce Power's compliance with the requirements in CNSC S-99, Reporting Requirements for Nuclear Power Plants [19], and Bruce Power's response and request for closure of the associated action notices [191]. Due to perceived trends in timeliness and quality of information in recent S-99 reports, the inspection was performed to verify the compliance with regulatory requirements in CNSC S-99. CNSC staff concluded Bruce Power is meeting the requirements of S-99 but identified areas for improvement related to various aspects of procedural adherence for filing S-99 reports. Two action notices and three recommendations were raised under AI 2014-07-5293. The correspondence is listed below:

- NK21-CORR-00531-11507, Action Item 2014-07-5293: CNSC Type II Compliance Inspection Report: BRPD-AB-2014-006 - S-99 Inspection [190]; and
- NK21-CORR-00531-11547, Action Item 2014-07-5293: CNSC Type II Compliance Inspection Report: BRPD-AB-2014-006 - S-99 Inspection [191].

The scope of the regulatory activity was to verify compliance with Bruce A PROL Condition 1.7 and S-99, focusing on unscheduled reporting. In BRPD-AB-2014-006-AN01, CNSC staff requested that Bruce Power become compliant with BP-PROC-00059, Event Response and Reporting [192], Appendix C, by developing and implementing a corrective action plan to ensure that preliminary event reports are provided in a timely manner, including those events in which the First Line Manager, the Management Review Meeting members, and the specialist determine whether an event is reportable. In AN02, CNSC staff requested that Bruce Power come compliant with BP-PROC-00165 [193], Reporting to CNSC - Power Reactor Operating Licences, Section 4.2.1.2, Item 1, and implement corrective actions to ensure that the Detailed

Event Reports contain updated information beyond what was provided in the preliminary reports.

The CNSC staff recommendations included using all data when conducting FASA assessments related to timelines for preliminary event reports and consider an implementing an upper limit on how long an SCR remains with an indeterminate reportability status. Additionally, to ensure that there are no challenges meeting the requirements of CNSC REGDOC-3.1.1 [20], they recommended that Bruce Power review the effectiveness of the corrective actions implemented to reduce timelines for submitting detailed and additional reports.

CNSC staff concluded that the licensee met the regulatory requirements, with the exception of minor non-compliances, and did not find evidence of unsafe operation that would result in undue risk to the health and safety of persons, the environment, or that would compromise respect for Canada's international obligations.

In NK21-CORR-00531-11547 [191], Bruce Power advised that during the first half of 2014 they became aware that preliminary reporting timeliness performance needed improvement as a result of routinely applied internal oversight applied to S-99 reporting. The degraded performance was largely attributable to the relatively new Duty Managers responsible for filing the reports. They required more time than their predecessors to satisfy themselves of the reportability of events and were taking extra time to provide as much detailed information in the preliminary reports as possible. To address this, expectations for the timing of preliminary report filing were communicated and metrics were provided to improve timeliness, while the required preliminary report content detail requirements were reviewed to ensure that the timeliness of the report is prioritized over the availability of data and/or information.

In addition, and in anticipation of fully implementing CNSC REGDOC-3.1.1 [20], the Licensing Section is providing additional oversight of the S-99 preliminary reporting process. Licensing Section staff track the progress of draft preliminary reports through the process and engage the Duty Managers if the reporting appears to be taking too long. An internal self-assessment of the timing of filing S-99 preliminary reports for all of 2014 was conducted, which corroborated the poor performance in the first half of 2014, but revealed that the corrective actions discussed above were effective and resulted in significant improvement for the second half of the year. The importance of timely reporting has been reinforced as part of the site wide activities to implement CNSC REGDOC-3.1.1.

In response to AN02, Bruce Power advised that BP-PROC-00165 [193] was to ensure available updated information is provided when a detailed report is written even if an additional report follows.

CNSC staff concluded that Bruce Power met the S-99 regulatory requirements with the exception of minor non-compliances, which Bruce Power have proactively addressed through their own processes, and in response to this inspection. The expectation is that Bruce Power will meet the filing requirements of CNSC REGDOC 3.1.1.

7.3.4. Transportation of Dangerous Goods and Hazardous Waste Management

Three correspondence letters relating to Transportation of Dangerous Goods and Hazardous Waste Management were reviewed. There were no regulatory actions resulting from the Transportation of Dangerous Goods inspection in May 2013 [194] or a Hazardous Waste Management inspection in August 2013 [195] or the subsequent report [196].

The correspondence is listed below:

- NK21-CORR-00531-10510, CNSC Type II Compliance Inspection: Transportation of Dangerous Goods - Class 7 Radioactive Material BRPD-AB-2013-006 [194];
- NK21-CORR-00531-10716, CNSC Type II Compliance Inspection - Waste Management Program at Bruce A and B [195]; and
- NK21-CORR-00531-10899, Bruce A and B CNSC Compliance Inspection Report BRPD-AB-2013-014 - Hazardous Waste Management [196].

CNSC staff conducted a Type II Inspection at Bruce A to assess the Safety and Control Area of Packaging and Transport in March, 2013 [194]. This inspection was undertaken to assess compliance with regulations and standards that are in place to reduce the possibility and to mitigate the impact of an accident during transportation, and to assess the information provided to emergency responders. The assessment was achieved by evaluating Bruce Power's compliance to the relevant regulations governing the transportation of Class 7 Radioactive Material.

This inspection verified compliance with respect to the following aspects of Bruce Power's Transportation of Dangerous Goods program:

- Training and Training Documentation;
- Shipping Documentation;
- Labels and Placards;
- Technical Specifications; and
- Radiation Protection and Contamination Control.

CNSC staff concluded that Bruce Power is effectively following the regulations governing the transport of radioactive material. CNSC staff did not observe any instance of non-compliance and there were no regulatory corrective actions as a result of this inspection.

CNSC staff performed a Type II Inspection on the Waste Management Program for Bruce A, in September, 2013 [195], as part of a baseline inspection [196]. The objective of the Type II inspection was to verify the Waste Management program is maintained in accordance with Bruce A PROL 15.00/2014 licence condition 8.1. The criteria for the inspection included relevant portions of CSA N286-05, Management System Requirements for Nuclear Power Plants [20], and Bruce Power Hazardous Waste documentation referenced through the Licence.

As a result of this inspection, CNSC staff concluded that Bruce A, Hazardous Waste Management Program have met expectations. No formal actions were being placed on Bruce Power; however, four recommendations were suggested that were applicable to Bruce A [195].

Hazardous Waste Generation at Bruce Power was found in compliance with sampling and segregation requirements; however, Bruce A was noted to be struggling to ensure that the samples were analyzed on time due to delays in chemical laboratory. CNSC staff made the following recommendation:

- BRPD-AB-2013-014-R01: Bruce A follows Bruce B's lead and have a dedicated chemical technician for hazardous waste sample analysis to avoid any delays in the shipment of hazardous waste.

Hazardous Waste Collection and Storage Chemical Storage cabinets at Bruce A were found to be overfilled and incompatible materials were stored together, with some labels missing information. The CNSC noted that the Hazardous Waste Section was already conducting presentations at the operator scheduled trainings to address all these issues.

Hazardous waste storage areas are zoned with secondary containment, storage areas are ventilated, and facilities have easy access for the movement of material handling equipment (e.g., forklifts, drum movers, dollies, and trucks). Inflammable drums and chemical waste cabinets were grounded, and fire suppression and detection were present throughout the facility. The following recommendations were made:

- BRPD-AB-2013-014-R03: An official log book to identify where the waste comes from, should be created to replace the handwritten waste drop off accounting sheet; and
- BRPD-AB-2013-014-R04: Either inventory lists should be taken of the chemical cabinets or they should be updated if they are going to be posted to ensure all the chemicals in the cabinets are accounted for.

CNSC staff noted that Bruce Power is taking appropriate action to ensure compliance with their procedures and regulations relating to hazardous waste disposal and transportation. Hazardous waste drums and containers were kept in good condition, liquid and solid drums were segregated and all liquid drums were stored in secondary containment. Liquid drums were not filled more than 80% as required by the procedures and brand new empty drums were stored off the ground on the skids.

CNSC staff noted that an oil water separator is located in Unit 0 at Bruce A, two units away from the Hazardous Waste Area, creating the potential for a spill while transferring drums of liquids from the hazardous waste area to Unit 0 for processing. The following recommendation was made:

- BRPD-AB-2013-014-R05: Review the possibility of locating an oil water separator within the hazardous waste facility at Bruce A similar to Bruce B, to avoid the possibility of spills.

CNSC staff found that the activities with respect to records keeping, reporting and monitoring were in accordance with the Bruce Power's procedures. CNSC staff observed that the hazardous waste management staff had the required training and were knowledgeable of their procedures and duties.

Overall, the two inspections related to Transportation of Dangerous Goods and Hazardous Waste Management indicated that Bruce Power is complying with the regulations and their procedures, and are proactively improving their processes although further improvements can be made. Section 5.9 found that the Bruce Power management of radioactive waste procedures met requirements.

7.3.5. Regulatory Quarterly Field Inspections

In addition to the Type I and II CNSC Inspections, thirteen Quarterly Field Inspections Reports were completed by CNSC staff from the last quarter of 2011 through 2014. These are shown in Table 10, and cover the field surveillance inspections conducted to address each of the CNSC Safety Control Areas. The SCAs closely align with the IAEA SSG-25 Safety Factors. The Safety Control Area (SCA) most closely mapping to Safety Factor 11 are: SCA 1 on Management Systems, SCA 7 on Radiation Protection, SCA 9 on Environmental Protection, SCA 10 on Emergency Management and Fire Protection and SCA 11 on Waste Management. The review tasks may be considered to have a minor link to SCA 8 on Conventional Health and Safety and SCA 14 on Packaging and Transport.

The CNSC staff Compliance and Verification activities did not find evidence of deficient operating procedures that would result in undue risk to health and safety of persons, the environment, or that would compromise respect to Canada's international obligations. Major issues result in an Action Item being opened so the issue resolution can be tracked. Minor issues are usually corrected immediately by Station staff or acceptable responses for the issues were provided. Major issues were reviewed to see if they impacted the Procedures relevant to this review task, but as expected no gaps were identified, as the CNSC would have requested quick remedial action.

Table 10: CNSC Quarterly Field Inspections Reports

NK21-CORR-00531	BRUCE A AND B QUARTERLY FIELD INSPECTION REPORT	Minor Issues	Major Issues / comments
-09267	BRPD-2011-AB-019	Minor non-compliances with Radiation protection procedures with respect to contamination control area hazard signs.	None
-09826 -09947	BRPD-AB-2012-008	Maintenance Backlogs on work request tags in the Plan Main Control Room; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	None
-10080	BRPD-AB-2012-014	16 positive findings; 7 areas with minor findings; key area: Maintenance backlogs; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	None
-10247	BRPD-AB-2012-017	Scaffolding inspection practices; Work Requests for Main Control Room panels remain a problem; SSTs, Environmental Monitoring, Emergency Management, Waste Management, Work Permits, and Radiation Protection meeting expectations	None

NK21-CORR-00531	BRUCE A AND B QUARTERLY FIELD INSPECTION REPORT	Minor Issues	Major Issues / comments
-10539	BRPD-AB-2013-005	18 positive findings; 5 areas minor issues; Key - Elective Maintenance Work Request high backlogs; 3 action notices and 2 recommendations on elective maintenance; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	None
-10731	BRPD-AB-2013-010 - ACTION ITEM 1307-4270	16 positive findings; 6 areas of minor issues; 3 areas needing improvement; Operator Surveillance, (Elective) Deficient Maintenance Work Requests; Scaffold inspections; 1 action notice and recommendation; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	2 Enforcement Actions outside the area of this SF
-10930	BRPD-AB-2013-010	Operator Field Inspection concerns; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	1 action notice on Operator Field Inspections
-11018	BRPD-AB-2013-015	18 positive findings; 4 areas of minor issues; 3 areas needing improvement; Operator Surveillance, (Elective) Deficient Maintenance Work Requests; Whole body counters; 1 action notice and recommendation; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations but a whole body counter were out of service;	None
-11194	BRPD-AB-2014-001	21 positive findings; 2 areas of minor issues; 2 areas needing improvement; Operator Surveillance, (Elective) Deficient Maintenance Work Requests; Whole body counters; 1 recommendation; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	Improve tagging recommended
-11354	BRPD-AB-2014-003	17 positive/ compliant findings; 6 areas of minor issues; 2 areas needing improvement: Operator Surveillance, (Elective) Deficient Maintenance Work Requests; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	None
-11381	BRPD-AB-2014-005	1 small area for improvement; 1 recommendation on Fukushima implementation with respect to Unit 4 Safety Relief Valve instrument air hoses for consistency with the other Bruce A units; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	Concurrence on procurement of equipment and modifications to date as consistent with progress updates
-11551 -11607	BRPD-AB-2014-008	17 compliant findings; 5 areas of minor issues; 4 areas needing improvement: Deficient Maintenance Work Requests, Housekeeping, combustible material management and scaffolding inspection; 1 action notice; SSTs, Environmental Monitoring, Emergency Management, Waste Management and Radiation Protection meeting expectations	Reviewing the process for inspecting scaffolds.
-11698	BRPD-AB-2014-011	18 compliant findings; 5 areas of minor issues; 4 areas needing improvement: Deficient Maintenance Work Requests, and scaffolding inspection; SSTs, Environmental Monitoring, Emergency	None

NK21-CORR-00531	BRUCE A AND B QUARTERLY FIELD INSPECTION REPORT	Minor Issues	Major Issues / comments
		Management, Waste Management and Radiation Protection meeting expectations	

For the SCA relevant to this Safety Factor, Bruce Power met Regulatory Expectations; however, there remains a concern with Maintenance Backlogs.

7.4. Performance Indicators

Performance indicators are defined as data that are sensitive to and/or signals changes in the performance of systems, components, or programs.

There are no performance indicators associated specifically with procedures.

The CNSC produces an annual report on the safety performance of Canada's NPPs. The report for 2013, "CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2013" which was issued in September 2014 [157], summarizes the 2013 ratings for Canada's NPPs in each of the 14 CNSC Safety and Control Areas. Procedures are included in the CNSC's review of SCAs such as human performance, operating performance and management system. The integrated plant rating for Bruce A for 2013 was "satisfactory".

8. Summary and Conclusions

The overall objective of the Bruce A ISR is to conduct a review of Bruce A against modern codes and standards and international safety expectations and provide input to a practicable set of improvements to be conducted during the Major Component Replacement in Units 3 and 4, and during asset management activities to support ongoing operation of all four units, that will enhance safety to support long term operation. The specific objective of the review of procedures is to determine whether the operating organization's processes for managing, implementing and adhering to operating and working procedures and for maintaining compliance with operational limits and conditions and regulatory requirements are adequate and effective and ensure plant safety. This specific objective has been met by the completion of the review tasks specific to procedures.

Strengths identified during this review are:

- The existence of a comprehensive suite of programs and procedures that ensure procedures will be controlled and well documented in the future. Additionally, Bruce Power demonstrates a strong commitment to continuous improvement by conducting regular self-assessments of their processes and revision of their procedures to meet best industry practice. This Safety Factor 11 review for Bruce A found that all aspects of the processes are satisfactory.
- The commitments to improvements that are systematically being undertaken based on the strong direction and guidance from the Nuclear Oversight and Regulatory Affairs organization, both in their audit and assessment reviews and their push to comply with

more recent Regulatory Documents, Guidance Documents and Standards. The organization was re-organized to improve their focus on both Audits and Assessments and has committed to the CNSC to introduce a risk-informed process to their audits and assessments process to ensure risk significant areas are reviewed more frequently. These are discussed in detail in Safety Factor 10. This strength, however, is also directly applicable to the tasks identified for this Safety Factor and its assessment of procedures.

Table 11 summarizes the key issues arising from the Integrated Safety Review of Safety Factor 11.

Table 11: Key Issues

Issue Number	Gap Description	Source(s)
SF11-1	Difficulties in Maintenance Planning and Scheduling including meeting the expectations of On-Line Work Management Process [179] and in performing maintenance in a timely manner are currently being experienced. High backlogs of PM Deferral Requests and PM Change Requests and the high number of multiple PM deferrals currently exist. Bruce Power had proactively identified PMOG as a management focus area and expected there should be positive changes to the overall program to bring the PM deferral numbers down and are actively addressing this gap. A graded approach is applied to backlogs to ensure safety significant backlogs are addressed in a timely manner.	Sections 5.4, 7.2.2.1, 7.3.1 and 7.3.2
SF11-2	The selection of a radioactive waste processing method should include assessment of the maturity of technologies in relation to minimizing processing risks. This requirement is not explicitly identified in the Bruce Power procedures.	Section 5.9 Micro-gaps against requirement clauses: CSA N292.3-14 – Clause 9.1

Issue Number	Gap Description	Source(s)
SF11-3	Dismantling and segmentation of equipment and/or structures should be considered to reduce radioactive waste volumes and to yield an improved packaging efficiency. This requirement is not explicitly identified in the Bruce Power procedures.	Section 5.9 Micro-gaps against requirement clauses: CSA N292.3-14 – Clause 9.2.6
SF11-4	The concept of "storage for decay" is not identified in Bruce Power documentation.	Section 5.9 Micro-gaps against requirement clauses: CSA N292.3-14 – Clause 11.2.1 CSA N292.3-14 – Clause 11.2.2 CSA N292.3-14 – Clause 11.2.3
SF11-5	BP-PROC-00498 on Condition Assessments is out of date and has been committed for future revision. The procedure needs to be updated or superseded by existing procedures which adequately capture the necessary information.	Section 5.4

Bruce Power's Programs meet the requirements of Safety Factor 11 with respect to managing, implementing and adhering to operating and working procedures, with the exceptions noted in Table 11.

9. References

[1] NK21-CORR-00531-11617, Integrated Safety Review for Bruce A, Bruce Power Letter, F. Saunders to K. Lafrenière, including enclosure K-421231-00010-R00, Candesco Report, October 27, 2014.

[2] NK21-CORR-00531-11005/NK29-CORR-00531-11397, Submission of Safety Basis Report, Bruce Power Letter, F. Saunders to R. Lojk, December 30, 2013.

[3] IAEA SSG-25, Periodic Safety Review of Nuclear Power Plants, 2013.

[4] RD-360, Life Extension of Nuclear Power Plants, CNSC, 2008.

[5] NK21-CORR-00531-03839, Bruce A Environmental Assessment Study Report, December 7, 2005.

[6] CNSC REGDOC-2.3.3, Operating Performance: Periodic Safety Reviews, CNSC, April 2015.

[7] NK21-CORR-00531-00514, Bruce A: CNSC Approval to Restart Units 3 and 4 and Application to Amend PROL 15.01/2003, Bruce Power Letter, F. Saunders to J.H.M. Douglas, November 16, 2001.

[8] NK21-CORR-00531-04059, Bruce A Refurbishment for Life Extension – Systematic Review of Safety: Plant Design, Bruce Power Letter, F. Saunders to P. Webster, March 30, 2006.

[9] NK21-CORR-00531-04339, Bruce A Units 1 and 2 Return to Service – Systematic Review of Safety, Bruce Power Letter, F. Saunders to P. Webster, July 31, 2006.

[10] NK21-CORR-00531-05976, Bruce A Units 3 and 4 Refurbishment for Life Extension and Continued Operation: ISR Safety Factor Reports, Bruce Power Letter, F. Saunders to P. Elder, June 2, 2008.

[11] NK21-CORR-00531-06596, Bruce A Units 3 and 4 Refurbishment for Life Extension and Continued Operation: ISR Safety Factor Reports 1, 2, 3 and 4, Bruce Power Letter, F. Saunders to K. Lafrenière, December 18, 2008.

[12] NK21-CORR-00531-06076, Bruce A Units 3 and 4 Refurbishment for Life Extension and Continued Operation: ISR Safety Factor Reports 5, 6, and 7, Bruce Power Letter, F. Saunders to P. Elder, July 22, 2008.

[13] NK21-CORR-00531-10576/NK29-CORR-00531-10975, Application Requirements for Renewal of Power Reactor Operating Licences for Bruce Nuclear Generating Stations A and B, Bruce Power Letter, F. Saunders to R. Lojk, July 17, 2013.

[14] Nuclear Safety and Control Act, 1997, c. 9, N-28.3, CNSC, Assented to March 20, 1997.

[15] NK21-CORR-00531-11272, Nuclear Power Reactor Operating Licence, Bruce Nuclear Generating Station, PROL 15.00/2015, May 1, 2014.

[16] NK21-CORR-00531-11391, Bruce Nuclear Generating Station A Nuclear Power Reactor Operating Licence: Licence Conditions Handbook (LCH-BNGSA-R8), June 4, 2014.

[17] PROL 18.00/2020, e-Doc 4723908, Nuclear Power Reactor Operating Licence, Bruce Nuclear Generating Station A and Bruce Nuclear Generating Station B, June 1, 2015.

[18] LCH-BNGS-R000, e-Doc 4659316, Bruce Nuclear Generating Station A and Bruce Nuclear Generating Station B Power Reactor Operating Licence, June 1, 2015.

[19] S-99, Reporting Requirements for Operating Nuclear Power Plants, CNSC, March 2003.

[20] CNSC REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants, CNSC, 2014.

[21] RD/GD-99.3, Public Information and Disclosure, CNSC, March 2012.

[22] CNSC S-296, Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills, CNSC, March 2006.

[23] CNSC REGDOC-2.9.1, Environmental Protection: Policies, Programs and Procedures, CNSC, September 2013.

[24] CAN/CSA N286-05, Management System Requirements for Nuclear Power Plants, (Update No. 1, 2007), 2005.

[25] CAN/CSA N286-12, Management System Requirements for Nuclear Facilities, CSA, 2012.

[26] CAN/CSA N292.3-14, Management of Low- and Intermediate-Level Radioactive Waste, CSA, May 2014.

[27] NK21-CORR-00531-11189/NK29-CORR-00531-11593, Action Item 1307-4697: CSA N286-12 - Management System Requirements for Nuclear Facilities, Bruce Power Letter, F. Saunders to K. Lafrenière, May 16, 2014.

[28] NK21-CORR-00531-11494, CSA N286-12 - Management System Requirements for Nuclear Facilities, Action Item 1307-4697, CNSC Letter, K. Lafrenière to F. Saunders, July 24, 2014.

[29] NK21-CORR-00531-11563, CSA N286-12 - Management System Requirements for Nuclear Facilities, Action Item 1307-4697, Bruce Power Letter, F. Saunders to K. Lafrenière, September 9, 2014.

[30] IAEA SSR-2/2, Safety of Nuclear Power Plants: Commissioning and Operation, July 2011.

[31] BP-MSM-1-R012, Management System Manual, Bruce Power, June 23, 2014.

[32] BP-MSM-1 Sheet 0001-R020, MSM-Bruce Power Program Matrix, Bruce Power, January 2015.

[33] BP-MSM-1 Sheet 0002-R015, MSM - Approved Reference Chart Authorities and Responsibilities, Bruce Power, January 20, 2015.

[34] BP-MSM-1 Sheet 0003-R005, MSM - List of Applicable Governing Acts, Regulations, Codes & Standards, Bruce Power, September 30, 2014.

[35] BP-MSM-1 Sheet 0004-R007, MSM - Program Summaries, Bruce Power, September 23, 2014.

[36] BP-OPP-00002-R012, Operating Policies and Principles – Bruce A, Bruce Power, July 24, 2013.

[37] BP-PROG-00.02-R009, Environmental Safety Management, Bruce Power, October 2014.

[38] BP-PROG-00.06-R008, Health and Safety Management, Bruce Power, January 31, 2014.

[39] BP-PROG-01.02-R008, Bruce Power Management System (BPMS) Management, Bruce Power, December 18, 2014.

[40] BP-PROG-01.07-R010, Corrective Action, Bruce Power, August 30, 2013.

[41] BP-PROG-03.01-R015, Document Management, Bruce Power, August 18, 2014.

[42] BP-PROG-08.01-R007, Emergency Management Program, Bruce Power, December 16, 2013.

[43] BP-PROG-10.01-R009, Plant Design Basis Management, Bruce Power, December 4, 2014.

[44] BP-PROG-00.04-R020, Pressure Boundary Quality Assurance Program, March 21, 2014.

[45] BP-PROG-10.02-R010, Engineering Change Control, Bruce Power, December 2014.

[46] BP-PROG-10.03-R006, Configuration Management, Bruce Power, February 5, 2015.

[47] BP-PROG-11.01-R004, Equipment Reliability, Bruce Power, October 8, 2013.

[48] BP-PROG-11.02-R006, On-Line Work Management, Bruce Power, October 23, 2012.

[49] BP-PROG-11.03-R005, Outage Work Management, Bruce Power, July 26, 2011.

[50] BP-PROG-11.04-R006, Plant Maintenance, Bruce Power, November 27, 2013.

[51] BP-PROG-12.01-R007, Conduct of Plant Operations, Bruce Power, August 13, 2013.

[52] BP-PROG-12.05-R003, Radiation Protection Program, Bruce Power, November 18, 2013.

[53] BP-PROG-14.01-R005, Project Management and Construction, Bruce Power, January 24, 2014.

[54] BP-PROG-15.01-R004, Nuclear Oversight Management, Bruce Power, December 18, 2013.

[55] BP-PROC-00080-R006, Effluent Monitoring Program, Bruce Power, October 23, 2013.

[56] BP-PROC-00389-R002, Conventional Safety Programs, Bruce Power, August 23, 2011.

[57] BP-PROC-00016-R008, Business Assessment Process, Bruce Power, August 11, 2014.

[58] BP-PROC-00166-R024, General Procedure and Process Requirements, Bruce Power, December 17, 2014.

[59] BP-HBK-08130-00001-R002, GOSP Implementation Handbook, Bruce Power, September 11, 2014.

[60] BP-PROC-00703-R001, Change Management Guidance, Bruce Power, December 1, 2010.

[61] BP-PROC-00774-R002, Program Requirements, Bruce Power, November 2, 2011.

[62] BP-PROC-00060-R026, Station Condition Record, Bruce Power, July 22, 2014.

[63] BP-PROC-00068-R022, Controlled Document Life Cycle Management, Bruce Power, December 12, 2014.

[64] BP-PLAN-00001-R004, Bruce Power Nuclear Emergency Response Plan, Bruce Power, April 24, 2014.

[65] BP-PLAN-00002-R010, Winter Storm Transportation Plan, Bruce Power, September 7, 2014.

[66] BP-PLAN-00003-R005, Bruce Power Electricity Emergency Plan, Bruce Power, February 11, 2014.

[67] BP-PLAN-00004-R008, Business Continuity Management, Bruce Power, February 10, 2014.

[68] BP-PLAN-00005-R005, Rad Materials Transportation Emergency Response Plan, Bruce Power, February 20, 2014.

[69] BP-PLAN-00006-R001, Conventional Emergency Management, Bruce Power, April 12, 2013.

[70] BP-PLAN-00008-R003, Fire Safety Management, Bruce Power, May 1, 2013.

[71] BP-PROC-00127-R011, Radioactive Liquid Emissions Response Procedure, Bruce Power, February 28, 2014.

[72] BP-PROC-00317-R004: Crisis Management, Bruce Power, January 21, 2014.

[73] BP-PROC-00659-R002, Severe Accident Management, Bruce Power, February 3, 2014.

[74] BP-PROC-00722-R003, Staff Shortage – Health Related, Bruce Power, February 20, 2014.

[75] BP-PROC-00335-R006, Design Management, Bruce Power, May 24, 2013.

[76] BP-PROC-00363-R003, Nuclear Safety Assessment, Bruce Power, January 24, 2013.

[77] BP-PROC-00582-R003, Engineering Fundamentals, Bruce Power, July 25, 2014.

[78] BP-PROC-00542-R005, Configuration Information Change, Bruce Power, July 25, 2013.

[79] BP-PROC-00539-R015, Design Change Package, Bruce Power, August 26, 2014.

[80] BP-PROC-00615-R001, Commissioning Modifications and Projects, Bruce Power, September 20, 2013.

[81] BP-PROC-00743-R003, Site Services Engineering Change Control, Bruce Power, November 28, 2012.

[82] BP-PROC-00877-R000, Modification Installation Quality Assurance, Bruce Power, October 29, 2012.

[83] BP-PROC-00470-R004, Configuration Management Program Oversight and Trending, Bruce Power, October 1, 2012.

[84] BP-PROC-00584-R007, PASSPORT Equipment Data Management, Bruce Power, November 28, 2014.

[85] BP-PROC-00638-R012, Temporary Configuration Change Management, Bruce Power, May 7, 2014.

[86] BP-PROC-00786-R003, Margin Management, Bruce Power, August 5, 2014.

[87] BP-PROC-00898-R000, Equipment Codes, Bruce Power, June 19, 2013.

[88] SEC-DO-00001-R009, Drafting Office Work Management, November 29, 2012.

[89] SEC-DSS-00001-R001, Statusing and Dispositioning of Legacy ECNs, September 28, 2012.

[90] BP-PROC-00268-R005, Safety System Testing (SST) Program, Bruce Power, August 27, 2014.

[91] BP-PROC-00498-R006, Condition Assessment of Generating Units in Support of Life Extension, Bruce Power, January 19, 2011.

[92] BP-PROC-00778-R001, Scoping and Identification of Critical Components, Bruce Power, April 11, 2013.

[93] BP-PROC-00779-R000 Continuing Equipment Reliability Improvement, Bruce Power, December 6, 2011.

[94] BP-PROC-00780-R000, Preventative Maintenance Implementation, Bruce Power, December 9, 2011.

[95] BP-PROC-00781-R002, Performance Monitoring, Bruce Power, September 22, 2012.

[96] BP-PROC-00782-R000, Equipment Reliability Program Identification and Resolution, Bruce Power, December 6, 2011.

[97] BP-PROC-00328-R014, Work Prioritization and Approval, Bruce Power, November 26, 2014.

[98] BP-PROC-00695-R003, Maintenance Program and Activities, Bruce Power, June 27, 2014.

[99] BP-PROC-00696-R002, Maintenance Organization, Bruce Power, December 2, 2013.

[100] BP-PROC-00699-R003, Maintenance Work, Bruce Power, December 5, 2013.

[101] BP-WPP-00003-R003, Work Protection Program, Bruce Power, November 21, 2014.

[102] BP-PROC-00250-R007, Writer's Guide for Station Systems Procedures. Bruce Power, February 18, 2014.

[103] BP-PROC-00474-R009, High Risk and Infrequently Preformed Tests and Evolutions, Bruce Power, February 12, 2014.

[104] BP-PROC-00734-R005, Plant Status Control, Bruce Power, April 22, 2014

[105] BP-PROC-00777-R002, Work Protection Performance Management Process, April 28, 2015.

[106] BP-PROC-00907-R000, Protected Equipment Program, Bruce Power, August 8, 2013.

[107] GRP-OPS-00016-R006, Position Assured Components, October 1, 2013.

[108] GRP-OPS-00022-R003, Operator Aids, Bruce Power, February 7, 2013.

[109] GRP-OPS-00028-R002, Administration of Reactor Guaranteed Shutdown State, November 7, 2011.

[110] GRP-OPS-00031-R003, Conduct of Shift Turnovers, August 19, 2013.

[111] GRP-OPS-00042-R005, Equipment Alignment Checks, September 24, 2013.

[112] GRP-OPS-00046-R001, Station Key Controls and Locking Requirements, July 9, 2013.

[113] GRP-OPS-00050-R002, Requirements for Station Operating Procedure Development and Revision, Bruce Power, December 2, 2014.

[114] DIV-OPA-00003-R007, Response to Transients – Bruce A, Bruce Power, March 27, 2014.

[115] BP-PROC-00188-R002, Radioactive Material Transpiration, Bruce Power, October 11, 2013.

[116] BP-PROC-00878-R000, Radioactive Waste Management, Bruce Power, August 28, 2013.

[117] BP-RPP-00044-R002, ALARA Program, Bruce Power Radiation Protection, June 26, 2013.

[118] SEC-RPP-00012-R003, Radiation Protection Performance Indicators, Bruce Power, October 12, 2012.

[119] BP-SM-00070-R001, Bruce Power Safety Rules, Bruce Power, February 16, 2012.

[120] DPT-NSAS-00011-R004, Configuration Management of Safety Analysis Software, Bruce Power, October 11, 2013.

[121] DPT-NSAS-00012-R004, Preparation and Maintenance of Operational Safety Requirements, Bruce Power, October 28, 2014.

[122] DPT-NSAS-00015-R004, Planning and Execution of Nuclear Safety Analysis, Bruce Power, October 16, 2013.

[123] DPT-NSAS-00016-R000, Integrated Aging Management for Safety Assessment, Bruce Power, June 21, 2013.

[124] BP-RPP-00033-R004, Unconditional Releases and Conditional Transfers of Material, Bruce Power, June 25, 2013.

[125] BP-PROC-00107-R005, OPG Waste Acceptance Criteria for Radioactive Waste, Bruce Power, December 5, 2013.

[126] BP-RPP-00010-R005, Segregation and Handling of Radioactive Waste, Bruce Power, April 5, 2013.

[127] BP-PROC-00711-R000, Energy Solutions Waste Acceptance Guidelines for Radioactive Waste, Bruce Power, December 4, 2013.

[128] BP-PROC-00714-R001, Low Level Radioactive Waste Minimization, Bruce Power, December 13, 2013.

[129] BP-RPP-00011-R011, Requirements for Planning Radiological Work, Bruce Power Radiation Protection, June 27, 2013.

[130] SEC-RPR-00015-R005, Radiation Exposure Permits, Bruce Power Radiation Section, May 27, 2013.

[131] SEC-RPR-00019-R002, Dose Estimation for HP Permit Request Processing, Bruce Power Radiation Section, November 29, 2013.

[132] NK21-CORR-00531-05749, Bruce A Units 3 and 4 Integrated Safety Review Basis, Bruce Power Letter, F. Saunders to P. Elder, February 29, 2008.

[133] NS-G-2.10, Periodic Safety Review of Nuclear Power Plants, IAEA Safety Standards Series, IAEA, August 2003.

[134] NK21-CORR-00531-06686, Bruce Power Correspondence, Verification and Validation Plan for the Bruce A and B AIMs, Bruce Power Letter, F. Saunders to K. Lafrenière, January 14, 2009.

[135] NK21-CORR-00531-08497, CNSC Correspondence, Bruce A and B CNSC Inspection Report, AIM Validation in Main Control Room BRPD-2010-AB-008, CNSC, March 2011.

[136] NK21-CORR-00531-08566, Bruce Power Correspondence, Action Item 080702: Submission of AIM Validation Report, Bruce Power Letter, F. Saunders to K. Lafrenière, March 30, 2011.

[137] NK21-SR-013200-00003-R004, Bruce A Safety Report Part 3: Accident Analysis, August 31, 2011.

[138] NK21-OM-09110-R093, Overall Unit Operating Manual, Bruce Power, November 27, 2013.

[139] NK21-OM-03674-R044, Outage Heat Sinks, Bruce Power, September 4, 2009.

[140] NK21-OM-09034-R113, Abnormal Incidents Manual, Bruce Power, April 15, 2014.

[141] NK21-OM-03672-R011, Safety Related System Impairment Manual Units 01234, Bruce Power Operating, 2014.

[142] NK21-OM-34360-R004, Powerhouse Emergency Venting System (PEVS), Bruce Power, February 2015.

[143] NK21-OM-71910-05.05-R000, Placing Emergency Moderator Make-up System in Service (Units 12), Bruce Power, May 13, 2011.

[144] NK21-OM-32210-05.04-R000, Placing Emergency Moderator Make-up System in Service (Units 12), Bruce Power, May 3, 2011.

[145] NK21-EME-03504.1, Emergency Mitigating Equipment Guide, Bruce Power, April 28, 2014.

[146] CMD-15-H2.1, Delivering Safe, Reliable Operations, Bruce Power Written Submission - Application for the Renewal of the Bruce A and Bruce B Power Reactor Operating Licence, January 2015.

[147] NK21-CORR-00531-10457, Action Item 080702: Licensing Basis for Minimum Shift Complement, Bruce Power Letter, F. Saunders to R. Lojk, May 31, 2013.

[148] NK21-CORR-00531-10330, Bruce Power's Huron Challenge IV Exercise After Action Report, Bruce Power Letter, F. Saunders to R. Lojk, March 25, 2013.

[149] B-AQR-02-2014, 2014-Q2, Nuclear Oversight Quarterly Report, July 11, 2014.

[150] B-AQR-03-2014, 2014-Q3, Nuclear Oversight Quarterly Report, October 14, 2014.

[151] NK21-CORR-00531-11261, Re: BP-PROC-00498, Bruce Power email, M. Burton to R. Agnes, December 9, 2013.

[152] NK21-CORR-00531-09267, Bruce A and B Quarterly Field Inspection Report BRPD-2011-AB-019, CNSC Letter, R. Lojk to F. Saunders, February 6, 2012.

[153] BP-PROC-00811-R002, Procedure Alteration, Bruce Power, December 12, 2013.

[154] BP-PROG-06.01-R004, CNSC Licence Acquisition, Bruce Power, September 29, 2011.

[155] BP-PROG-06.03-R005, CNSC Interface Management, Bruce Power, December 18, 2014.

[156] NK21-CORR-00531-10874, Performance Review for Bruce A and Bruce B – October 2013, Bruce Power Letter, F. Saunders to M. Leblanc, November 1, 2013.

[157] CC171-11-2013-CNSC, CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2013, Canadian Nuclear Safety Commission, September 2014.

[158] B-REP-00531-00025-R000, Q4 2008 Quarterly CNSC Performance Indicator Report, March 24, 2009.

[159] B-REP-00531-00049-R000, Bruce Nuclear Generating Station A and B Quarterly Report of Performance Indicators Second Quarter 2014, September 2014.

[160] CAN/CSA N288.5-11, Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills, CSA Standard, April 2011.

[161] NK21-CORR-00531-11715, Re: Bruce Power: Requests and Supplemental Information for Licence Renewal, Bruce Power Letter, F. Saunders to M. Leblanc, November 28, 2014.

[162] NK21-CORR-00541-00460, 2013 Environmental Compliance Approval (Water) Compliance Report for Bruce A, Bruce Power Letter, F. Saunders to R. Chappell, May 28, 2014.

[163] SA-RPR-2013-02, Bruce Power CANDU Radiological Protection Benchmarking Project Assessment, September 13, 2013.

[164] SA-RPR-2013-03, Review of RP Program against WANO RP Guidelines (GL 2004-1, Rev-1), October 31, 2013.

[165] B-REP-01070-06OCT2014, Focus Area Self Assessment Status & Summary Reports – Q3 2014, October 16, 2014.

[166] B-REP-01070-08JUL2014, Focus Area Self Assessment Status & Summary Reports – Q2 2014, July 8, 2014.

[167] B-REP-01070-25APR2014, Focus Area Self Assessment Status & Summary Reports – Q1 2014, April 25, 2014.

[168] SA-PI-2013-06, FASA Program Effectiveness, Performance Improvement, August 8, 2013.

[169] BP-PROC-00295-R012, Planning and Scheduling Audits, Bruce Power, September 20, 2013.

[170] BP-PROC-00295 Sheet 0001-R003, Audit Basis and Approach, Bruce Power, September 20, 2013.

[171] NK21-CORR-00531-10535, Bruce A and B: Maintenance Planning and Scheduling Inspection BRPDAB-2013-004, New Action Item 1307-4113, CNSC Letter, R. Lojk to F. Saunders, May 22, 2013.

[172] NK21-CORR-00531-11483, Notification of the CNSC Type II Compliance Inspection - Development, Maintenance and Use of Procedures: Development, Maintenance and Use of the Safety System Test and Maintenance Procedures, CNSC Letter, K. Lafrenière to F. Saunders, July 22, 2014.

[173] NK21-CORR-00531-10696, AI 1307-4113: Response to Bruce A and B: Maintenance Planning and Scheduling Inspection Report # BRPD-AB-2013-004, Bruce Power Letter, F. Saunders to R. Lojk, August 8, 2013.

[174] NK21-CORR-00531-10818, Bruce A and B: Maintenance Planning and Scheduling Inspection BRPD-AB-2013-004, Action Item 1307-4113, CNSC Letter, R. Lojk to F. Saunders, March 11, 2014.

[175] NK29-CORR-00531-11716, CNSC Type II Compliance Inspection Report: BRPD-B-2014-002 Maintenance Planning and Scheduling, CNSC Letter, K. Lafrenière to F. Saunders, May 7, 2014.

[176] NK21-CORR-00531-10951, Action Item 1307-4113: Bruce A and B Maintenance Planning and Scheduling Inspection BRPD-AB-201 3-004, Bruce Power Letter, F. Saunders to K. Lafrenière, July 31, 2014.

[177] CNSC S-210, Maintenance Programs for Nuclear Power Plants, CNSC, Regulatory Standard, July 2007.

[178] CNSC RD/GD-210, Maintenance Programs for Nuclear Power Plants, CNSC, November 2012.

[179] BP-PROC-00329-R015, On-Line Work Management Process, Bruce Power, September 23, 2014.

[180] BP-PROG-02.02-R013, Worker Learning and Qualification, Bruce Power, October 15, 2014.

[181] BP-PROG-11.02-R006, On-Line Work Management Program, Bruce Power, October 23, 2012.

[182] BP-PROC-00543-R010, Task Planning, Bruce Power, May 16, 2014.

[183] NK21-CORR-00531-10695, Action Item 1307-4229, PMOG Inspection at Bruce A and B, Report #BRPD-AB-2013-008, CNSC Letter, R. Lojk to F. Saunders, August 2, 2013.

[184] NK21-CORR-00531-10857, Action Item 1307-4229: Response to PMOG Inspection at Bruce A and Bruce B. Report #BRPD-AB-201 3-008, Bruce Power Letter, F. Saunders to R. Lojk, November 25, 2013.

[185] NK21-CORR-00531-11132, Bruce A and B: PMOG Inspection at Bruce A and B BRPD-AB-2013-008, Action Item 1307-4229, CNSC Letter, K. Lafrenière to F. Saunders, February 18, 2014.

[186] NK21-CORR-00531-11251, Action Item 1307-4229: Response to PMOG Inspection at Bruce A and B. Report #BRPD-AB-2013-008, Bruce Power Letter, F. Saunders to K. Lafrenière, May 23, 2014.

[187] BP-PROC-00456-R009, Preventative Maintenance (PM) WO Deferral Process, Bruce Power, January 30, 2015.

[188] BP-PROC-00501-R005, Integrated Preventative Maintenance Program, Bruce Power, May 27, 2014.

[189] DPT-PE-00010-R006, System Health Reporting, Bruce Power, August 27, 2013.

[190] NK21-CORR-00531-11507, Action Item 2014-07-5293: CNSC Type II Compliance Inspection Report: BRPD-AB-2014-006 - S-99 Inspection, CNSC Letter, K. Lafrenière to F. Saunders, July 29, 2014.

[191] NK21-CORR-00531-11547, Action Item 2014-07-5293: CNSC Type II Compliance Inspection Report: BRPD-AB-2014-006 - S-99 Inspection, Bruce Power Letter, F. Saunders to K. Lafrenière, October 24, 2014.

[192] BP-PROC-00059-R022, Event Response and Reporting, Bruce Power, December 11, 2014.

[193] BP-PROC-00165-R012, Reporting to CNSC - Power Reactor Operating Licences, Bruce Power, December 22, 2014.

[194] NK21-CORR-00531-10510, CNSC Type II Compliance Inspection: Transportation of Dangerous Goods - Class 7 Radioactive Material BRPD-AB-2013-006, CNSC Letter, R. Lojk to F. Saunders, May 7, 2013.

[195] NK21-CORR-00531-10716, CNSC Type II Compliance Inspection - Waste Management Program at Bruce A and B, CNSC Letter, R. Lojk to F. Saunders, August 15, 2013.

[196] NK21-CORR-00531-10899, Bruce A and B CNSC Compliance Inspection Report BRPD-AB-2013-014 - Hazardous Waste Management, CNSC Letter, R. Lojk to F. Saunders, November 4, 2013.

Appendix A – High-Level Assessments Against Relevant Codes and Standards

No codes or standards relevant to Safety Factor 11 were subjected to high-level assessment. This Appendix is retained only for consistency with the Appendix numbering scheme in all other Safety Factor Reports.

Appendix B – Clause-by-Clause Assessments Against Relevant Codes and Standards

This appendix presents the clause-by-clause assessments that are performed for this Safety Factor. The ISR Basis Document provides the following compliance categories and definitions for clause-by-clause assessments:

- Compliant (C) – compliance has been demonstrated with the applicable clause;
- Indirect Compliance (IC) – Compliance has been demonstrated with the intent of the applicable clause;
- Acceptable Deviation (AD) – Compliance with the applicable clause cannot be demonstrated; however, a technical assessment has determined that the deviation is acceptable. For this case a detailed discussion and explanation shall be included in the ISR documentation;
- Gap – system design and/or operational improvements may be necessary;
- Guidance: A potential programmatic, engineering, analytical or effectiveness gap found against non-mandatory guidance;
- Relevant but not Assessed (RNA) – The ISR Basis Document defines RNA as "the particular clause provides requirements that are less strenuous than clauses of another standard that has already been assessed". The definition has been broadened to include the guidance portion of clauses in which a gap has already been identified against the requirement;
- Not Relevant (NR) – The topic addressed in the specific clause is not relevant to the safety factor under consideration but may well be assessed under a different Safety Factor; and
- Not Applicable (NA) – The text is not a clause that provides requirements or guidance. Also used if the clause does not apply to the specific facility.

B.1. IAEA SSR 2/2: Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements

In support of the review tasks listed in Section 5, a detailed assessment of IAEA SSR 2/2 has been performed in Table B1.

Table B1: IAEA SSR 2/2: Safety of Nuclear Power Plants: Commissioning and Operation Specific Safety Requirements

Article No.	Article Requirement	Assessment	Compliance Category
3.		The Management and Organizational Structure of the Operating Organization	NA
Requirement 1: Responsibilities of the operating organization	The operating organization shall have the prime responsibility for safety in the operation of a nuclear power plant.	PROG-01.02, BRUCE POWER MANAGEMENT SYSTEM (BPMS) MANAGEMENT Sec 1.0 states: Nuclear Safety is a primary consideration for Bruce Power therefore our management system must support the enhancement and improvement of safety culture and the achievement of high levels of safety as well as business performance. The Bruce Power Management System (BPMS) is described in BP-MSM-1, Management System Manual, and is made up of the Management System Manual and all the Programs that support it, including this one. The BPMS Management Program establishes the governance, provides oversight, support and enables the maintenance of an integrated management system framework for Bruce Power. This Program supports the implementation of the BPMS in such a way that it is known, understood and followed. This Program establishes the expectation that BPMS Functional Areas follow a plan-do-check-act cycle in their Program development and adopt an integrated approach to requirements management, while ensuring safety is the paramount consideration for guiding decisions and actions. This Program establishes the management system framework necessary for the achievement of International Organization for Standardization (ISO) 14001, Environment Management System and Occupational Health and Safety Assessment Series (OHSAS) 18001:2007 standard. It supports CAN/CSA N285.0 by enabling certain aspects of Bruce Power's Pressure Boundary Quality Assurance Program. It is developed in consideration of International Atomic Energy Agency (IAEA) Safety Guide no. GS-G-3.1, Application of the Management System for Facilities and Activities (2006).	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.1 states: Safety is the Paramount Consideration for Guiding Decisions and Actions Authorities for nuclear safety and for decisions affecting nuclear safety are described in the documentation of the management system. BPMS Functional Area specific considerations: This Program sets a common framework for the establishment of Programmatic Governance and Oversight of all Bruce Power processes and for managing changes to the various elements of the BPMS such as organizational, document hierarchy and process changes as well as providing Oversight to assure the requirements of N286-05 are integrated within the BPMS. Any proposal for significant changes to the BPMS is required to consider the safety and regulatory implications of such changes, ensuring that decision making reflects “Safety First”. Where there is the potential for safety impacts of changes, an instruction to consider those impacts is described in implementing procedures in this Program. Responsibilities of all Corporate Functional Area Managers (CFAMs): Each CFAM is required to consider and identify how the processes and practices of the Functional Area over which they have programmatic governance and oversight fosters a healthy nuclear safety culture and ensures that nuclear safety requirements and considerations are given the highest priority within their Functional Area. Section 4.2.1.1 says: The President and Chief Executive Officer (CEO) is accountable for the BPMS and approves BP-MSM-1. The Management System Manual shall include a statement from the CEO committing the management and staff to adhere to the requirements of the management system [N286-05 c3]. The Executive Vice President and Chief Nuclear Officer is the executive sponsor of the BPMS. The Executive Team and Officers of Bruce Power are accountable to ensure CFAMs, Site Functional Area Managers (SFAMs) and other leaders meet the requirements of the Management System and that all staff adhere to the requirements of the Management System. The Vice President, Nuclear Oversight and Regulatory Affairs (NORA) is the owner of BP-MSM-1, accountable to ensure the BPMS controls and standards are implemented throughout Bruce Power and that they conform to regulatory requirements. The Vice-President, NORA provides assurance that the management system is established and maintained in conformance with BP-	

Article No.	Article Requirement	Assessment	Compliance Category
		MSM-1 requirements and conforms to the requirements of CSA N286 per the requirements defined in the Power Reactor Operating Licences. BP-MSM-1 Sheet 2 says the Bruce A Senior Vice-President is: Accountable for the safe and reliable operation of the nuclear station per WANO PO&C CO.2.	
3.1.	The prime responsibility for safety shall be assigned to the operating organization of the nuclear power plant. This prime responsibility shall cover all the activities related to the operation directly and indirectly. It includes the responsibility for supervising the activities of all other related groups, such as designers, suppliers, manufacturers and constructors, employers and contractors, as well as the responsibility for operation of nuclear power plant(s) by the operating organization itself. The operating organization shall discharge this responsibility in accordance with its management system [2].	Assessed under Requirement 1 above in PROG-01.02 and BP MSM-1, and as indicated below: MSM - Approved Reference Chart Authorities And Responsibilities - Sheet 0002 describes organizational roles, decision making authority and responsibilities associated with direct and indirect activities related to operation. It includes the responsibility for supervising the activities of all other related groups, such as designers, suppliers, manufacturers and constructors, employers and contractors, as well as the responsibility for operation of nuclear power plant(s) by the operating organization itself. BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 3.1 and 7.7.1 state: "The Executive Vice President and Chief Nuclear Officer (CNO) is the executive sponsor of the Management System. The Executive Team and Officers of Bruce Power are accountable to ensure Corporate Functional Area Managers (CFAMs), Site Functional Area Managers (SFAMs) and other leaders meet the requirements of the Management System and that all staff adhere to the requirements of the Management System. The Vice President Nuclear Oversight and Regulatory Affairs is accountable to ensure the Management System controls and standards are implemented throughout Bruce Power and that they conform to regulatory requirements. The Vice President Nuclear Oversight and Regulatory Affairs provides assurance that the management system is established and maintained in conformance with the Bruce Power Management System Manual requirements and conforms to the requirements of CSA N286 05, Management system requirements for nuclear power plants. Within the Nuclear Oversight and Regulatory Affairs Division, the Manager, Management System is accountable for: -Coordinating the development of corporate policies, programs, processes and implementation tools and establishing the standards around their publication and implementation. -Providing programmatic governance and oversight for management of change as required by the Bruce A and Bruce B Power Reactor Operating Licenses. -Providing governance, oversight and support for Management System implementation,	C

Article No.	Article Requirement	Assessment	Compliance Category
		maintenance, continual improvement and enhancements. -Providing programmatic governance and oversight of a process that ensures periodic management review of the of the management system. The review will monitor and confirm its effectiveness, adherence to requirements and assess the need for changes to the management system, its principles and scope. 7.7.1 Supplier Program Management Quality is an intrinsic element of Bruce Power's Management System through its alignment with industry standard N286 05, Management System requirements for nuclear power plants. When it becomes necessary to employ the services of, or to buy products from, outside contractors or suppliers, they have a responsibility to ensure that the product or service they provide meet our requirements and perform as expected. The Contract sets the technical specification and boundaries of the Contractor's Quality Assurance (QA) Program. The Contractor must be audited to ensure their QA Program meets the specification and is then approved for use by Bruce Power." BP-MSM-1 Sheet 2 says the Bruce A Senior Vice-President is: Accountable for the safe and reliable operation of the nuclear station per WANO PO&C CO.2. PROG-01.02, BRUCE POWER MANAGEMENT SYSTEM (BPMS) MANAGEMENT Sec 1.0 states: The BPMS Management Program establishes the governance, provides oversight, support and enables the maintenance of an integrated management system framework for Bruce Power. This Program supports the implementation of the BPMS in such a way that it is known, understood and followed. This Program establishes the expectation that BPMS Functional Areas follow a plan-do-check-act cycle in their Program development and adopt an integrated approach to requirements management, while ensuring safety is the paramount consideration for guiding decisions and actions.	
3.2.	The management system, as an integrated set of interrelated or interacting components for establishing policies and	Assessed in detail under article 3.1 above in PROG-01.02 and BP-MSM-1, and as indicated below:	C

Article No.	Article Requirement	Assessment	Compliance Category
	objectives and enabling the objectives to be achieved in an efficient and effective manner, shall include the following activities: (a) Policy making for all areas of safety, which includes: —Setting management objectives; —Establishing the policy for safety;	*NOTE: each sub-requirement is repeated in the assessment section to avoid confusion due to the length of each assessment.* (a) Policy making for all areas of safety, which includes: — Setting management objectives; BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 2.1 states: "By design, the BPMS contributes to the establishment of a nuclear safety culture that assures reactor, environmental, industrial and radiological safety, during normal operations as well as during extreme events. It also provides the necessary guidance for making risk-based decisions that satisfy the desired balance between safety, commercial, corporate reputation and other performance requirements. No single element of the BPMS operates independently; all parts of the Management System are interconnected and interdependent. A graded approach is used throughout the Management System. The degree to which management system requirements are applied reflects the importance of the activity to safety, health, environmental, security, quality, economic or other business requirements. Where a graded approach is adopted, the grading process is documented, with safety being for guiding decisions and actions." — Establishing the policy for safety; BP-PROG-00.06, Health and Safety Management, sec 1.0 states: "This program document defines the fundamental business need, constituent elements,	

Article No.	Article Requirement	Assessment	Compliance Category
	—Developing management and staff who value learning, have skills in creating, acquiring and transferring knowledge, and can adapt the organization on the basis of new knowledge and insights;	functional requirements, implementing approaches and key responsibilities associated with Occupational Health and Safety (OHS) Management. The objective of OHS Management is to oversee the planning, implementation, maintenance, and continual improvement of business processes, activities, and human behaviors which contribute to the achievement of worker health and safety and conform to the goals of Bruce Power's Occupational Health and Safety Policy, as defined in BP-MSM-1, Management System Manual. Bruce Power has adopted the Occupational Health and Safety Assessment Series (OHSAS) 18001:2007 standard as the framework for managing its Occupational Health and Safety Management System (OHSMS). The overall Bruce Power Occupational Health and Safety Management System conforms to the Canadian Nuclear Safety Commission (CNSC) regulatory standards CSA N286-05 clause 6.27 Workplace Safety." — Developing management and staff who value learning, have skills in creating, acquiring and transferring knowledge, and can adapt the organization on the basis of new knowledge and insights; BP-PROG-01.04, Leadership Talent Management, Sec 1.0 states: "This program document defines the fundamental business need, constituent elements, functional requirements, implementing approaches, and key responsibilities associated with the Talent Management process for managers. This program defines how leadership is defined, how managers are selected for both their leadership and technical skills, and then how managers are on-boarded, managed and developed. It also defines how Bruce Power ensures sufficient number of managers with the right leadership and technical skills are available to deliver the business plan. The elements of this program are intended to satisfy the following clauses of CSA N286-05: • Section 5.2 - The organization is defined and understood. • Section 5.3 - Personnel are competent at what they do.	

Article No.	Article Requirement	Assessment	Compliance Category
	—Promoting a strong safety culture. Strategies and management objectives shall be developed in accordance with the policy in order to put the policy into effect.	• Section 5.4 - Personnel know what is expected of them." BP-PROG-02.02, Worker Training and Qualification states: The purpose of the Worker Learning and Qualification program is to enable personnel to competently and safely operate, maintain and improve the performance of our Stations. Learning includes: 1. The training elements that support Worker Qualifications that grant working rights. 2. Training elements that support Professional Development. Qualification includes all qualifications approved to be included within Training Qualification Documents (TQDs). The Worker Learning and Qualification program satisfies the worker Qualification and worker Training requirements of applicable legislation (e.g., acts and regulations), licenses, certifications, and codes and standards commensurate with Bruce Power's business needs including commitments made in our PROL application and requirements included in our PROL. The Worker Learning and Qualification program ensures conformance with clause 5.3 of N286-05, Management System Requirements for Nuclear Power Plants, which states that personnel must be "competent at the work that they do". The Worker Learning and Qualification program sets the standard for the entire company on how to ensure that personnel are competent at the work that they do. — Promoting a strong safety culture. Strategies and management objectives shall be developed in accordance with the policy in order to put the policy into effect. BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 2.2 and Sec 7.3.4 state: "Section 2.2 Our Management System addresses and incorporates the following principle, consistent with Canadian Standards Association industry developed standard CSA N286-12, Management system requirements for nuclear facilities and International Atomic Energy Agency (IAEA) GS-R-3 The management system for facilities and activities: Safety is the paramount consideration	

Article No.	Article Requirement	Assessment	Compliance Category
		guiding decisions and actions. Section 7.3.4 The NSRB has the responsibility for considering and advising the Boards the extent to which Bruce Power affairs are being conducted in a manner that promotes reactor, radiological, industrial and environmental safety and for continuing to emphasize the long-term effort required to improve safety culture permanently, including changing management behaviours and demonstrating leadership." BP-PROG-00.07, Human Performance Program, Sec 1.0 states: "Bruce Power's management model for achieving excellence describes our vision, values, key results areas, policies, programs and procedures. It defines how we execute, how we manage performance, and how we assess results. Central to this is fostering a healthy Safety Culture and being recognized for excellence in all aspects of nuclear safety including reactor safety, radiation safety, industrial safety and environmental safety management". BP-PROC-00892, NUCLEAR SAFETY CULTURE MONITORING, Sec 1.0 states: "1.0 PURPOSE The purpose of this document is to provide the framework for Bruce Power to monitor nuclear safety culture between formal assessment activities, in particular to have mechanisms to identify and correct potential gaps in nuclear safety culture [NEI 09-07]. The approach is collegial and supports the development of a common understanding of safety culture within senior and middle levels of leadership at the nuclear power stations and describing the traits and attributes of the desired safety culture IAEA GS-G-3.5, Sections 2.22 (b-d), 2.27, 2.28]. This monitoring and adjustment process facilitates the desired behaviors of a learning organization – one that places nuclear safety as its overriding priority and relentlessly seeks ways to continuously improve itself [CSA N286-12, clause 4.2(d) and WANO PO&C 2013-1, SC.1, Performance Objective]. The document supports compliance with CSA N286-05, Management system requirements for nuclear power plants, in particular clause 0.3, Operational safety focus and clause 5.14.1, Self-assessment."	
	(b) Allocation of responsibilities with corresponding lines of authority and communication, for:	(b) Allocation of responsibilities with corresponding lines of authority and communication, for:	

Article No.	Article Requirement	Assessment	Compliance Category
	—Allocating resources; —Providing human resources with the appropriate level of education and training and material resources;	— Allocating resources; BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 3.5 states: "Business plans are developed annually in alignment with strategic direction for the organization. The business plan builds from the various supporting plans (e.g., capital plan, generation plan) to ensure an integrated plan for success. Business planning establishes priorities, allocates resources and forms the bases for defining metrics to which we hold ourselves accountable." BP-PROG-02.01, Worker Staffing, Sec 1.0 "The objective of Worker Staffing is to recruit, orient, and deploy staff that possess the competencies required for maintaining staffing levels consistent with the requisite organization structure, and includes the subsequent release of staff." — Providing human resources with the appropriate level of education and training and material resources; BP-PROG-02.04 Worker Development and Performance Management, Section 1.0 Purpose states the following: This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with the management of worker development and performance. This includes the establishment and communication of our commitments to nuclear safety: reactor safety, industrial safety, radiation safety and environmental safety. Worker development and performance is managed through the establishment of personal performance plans linked to business plans, the provision of timely and high quality feedback through performance coaching, informal reviews and formal appraisals, and by giving appropriate recognition. The elements of this program are intended to satisfy the following clauses of CSA N286-05: Clause 5.3 – Personnel are competent at the work they do.	

Article No.	Article Requirement	Assessment	Compliance Category
	—Retaining the necessary competences;	Clause 5.4 – Personnel know what is expected of them. 2.0 EXCEPTIONS None - While the references in this document are to workers, they apply equally to managers as well as individual contributors at all levels. BP-PROG-02.02, Worker Training and Qualification states: This program is the Bruce Power process for mandating and controlling worker learning and qualification. The procedures and job aids required to implement this program shall gain their authority from this program. These procedures and job aids shall: 1. Implement the necessary controls to ensure personnel shall be competent to do the work assigned to them. Competence shall be assessed through the evaluation of education, training, skills, experience, and ability. Training programs based on the work performed by personnel shall be systematically developed and implemented so that the required competency is achieved and maintained. Any prerequisite education, experience, and training shall be identified. 2. Implement the intent of the Bruce Power Training Performance Objectives and Criteria (TPO&C). The Bruce Power TPO&C address the intent of both the Canadian Nuclear Safety Commission (CNSC) and Institute of Nuclear Power Operations (INPO) training performance objectives and criteria. Reference B-HBK-09500-00003, Training Performance Objectives and Criteria, which documents the relationship between the Bruce Power and the CNSC performance objectives and criteria. B-HBK-09500-00003, TRAINING PERFORMANCE OBJECTIVES AND CRITERIA, Sec 3.4 states: "3.4 OBJECTIVE 4 - Continuing Training Continuing training uses a systematic approach to training to refresh and improve the application of knowledge and job related skills and to meet management expectations for personnel and plant performance. Criteria 4.2 Lessons learned from operating experience are included in continuing training to increase depth of understanding and application of knowledge and skills to job performance."	

Article No.	Article Requirement	Assessment	Compliance Category
	—Approving the contents of management programmes;	— Retaining the necessary competences; BP-PROG-02.01, Worker Staffing, Section 4.4.1 Employee Development & Retention states: BP-PROG-02.04, Worker Development & Performance Management, BP-PROG-02.02, Worker Training and Qualification, and other processes related to employee engagement and retention ensures that employees' development, training, and performance is managed and linked to our long term business needs. Appropriate employee development contributes to the retention, engagement, and increase in productivity levels of skilled employees as well as reduce and/or delay voluntary attrition that are unrelated to retirements. Lower attrition rates and improved productivity ratios increase the Return on Investment on our Human Capital Asset: Bruce Power Employees." — Approving the contents of management programmes BP-MSM-1 Management System section 3.0 describes the plan-program and process controls. Sections 3.1 and 3.2 state the following: 3.1 Executive Ownership The President and Chief Executive Officer (CEO) is accountable for the Management System. The President and CEO is accountable to ensure that the organizational structure responsible for the monitoring and assessing of the effectiveness of the Management System reports to a management level such that the required authority and organizational freedom are provided and costs and schedule considerations do not override quality requirements. This ensures that persons performing, verifying, and auditing work are appropriately independent. The Executive Vice President and Chief Nuclear Officer (CNO) is the executive sponsor of the Management System. The Executive Team and Officers of Bruce Power are accountable to ensure Corporate Functional Area Managers (CFAMs), Site Functional Area Managers (SFAMs) and other leaders meet the requirements of the Management System and that all staff adhere to the requirements of the Management System. The Vice President Nuclear Oversight and Regulatory Affairs is accountable to ensure the Management System controls and standards are implemented throughout Bruce Power and that they conform to regulatory requirements. The Vice President Nuclear Oversight and Regulatory	

Article No.	Article Requirement	Assessment	Compliance Category
		Affairs provides assurance that the management system is established and maintained in conformance with the Bruce Power Management System Manual requirements and conforms to the requirements of CSA N286-05, Management system requirements for nuclear power plants. Within the Nuclear Oversight and Regulatory Affairs Division, the Manager, Management System is accountable for: • Coordinating the development of corporate policies, programs, processes and implementation tools and establishing the standards around their publication and implementation. • Providing programmatic governance and oversight for management of change as required by the Bruce A and Bruce B Power Reactor Operating Licenses. • Providing governance, oversight and support for Management System implementation, maintenance, continual improvement and enhancements. • Providing programmatic governance and oversight of a process that ensures periodic management review of the of the management system. The review will monitor and confirm its effectiveness, adherence to requirements and assess the need for changes to the management system, its principles and scope. 3.2 Clear Program Ownership Program ownership and expectations are well defined and accountabilities are understood. Bruce Power uses a Governance, Oversight, Support, Perform (GOSP) model of accountability to clarify the expectation of program owners. All programs and processes must have clearly defined owners. A Corporate Functional Area Manager (CFAM) is the owner of one or more Bruce Power Programs that support a functional area. CFAMs work together to integrate and optimize the overall system of processes, avoiding an isolated focus on only their own programs. Under the GOSP Model, the “Perform” function is undertaken by the Site Functional Area Manager (SFAM) role. Through Peer Groups, SFAMs collaborate with CFAMs to identify and implement programmatic improvements. The authorities, responsibilities and accountabilities of CFAMs, SFAMs, Functional Area Peer Groups are further defined in the GOSP Implementation Handbook (B-HBK-08130-00001), a	

Article No.	Article Requirement	Assessment	Compliance Category
	—Developing procedures and instructions, and having a strict policy to adhere to these procedures and instructions;	procedure document that supports the implementation of the BPMS Management Program (BP-PROG-01.02). — Developing procedures and instructions, and having a strict policy to adhere to these procedures and instructions; BP-PROG-12.01, Conduct of Plant Operations Sec 4.1 Operator Documentation states: "Operations Documentation includes: Operating procedures (Operating Manuals, Operating Memos, Alarm Response Manuals, Safety System tests, etc.). Operational flowsheets. Procedures for the safe and reliable operation of plant equipment shall be prepared, approved, controlled and readily available to the operating staff. These procedures shall be prepared for all anticipated normal, abnormal and emergency conditions. All operating procedures shall be created as controlled document, in accordance with the requirements of BP-PROG-03.01, Document Management to ensure document lifecycle management requirements are met. (BP-PROC-00068, Controlled Document Life Cycle Management)." BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 1.3.2, states: "1.3.2 Professionalism and Personal Integrity We believe in honouring ourselves, our business, and our personal commitments. We Adhere to procedures BP-PROC-00166 General Procedure and Process Requirements specifies the requirements for administrative process and procedure document formatting and presentation. It establishes standards, methodology and processes necessary to ensure Bruce Power practices reflect a commitment to nuclear safety and a consistent approach to procedure quality. Well written procedures that use consistent structures, styles and language help reduce human error and promote consistent results. This is an implementing document of BP-PROG-01.02, Bruce Power Management System (BPMS) Management. BP-PROC-00166 Section 2.0 defines the adherence and application of this procedure.	
	—Setting policies on fitness for duty;	— Setting policies on fitness for duty;	

Article No.	Article Requirement	Assessment	Compliance Category
	—Establishing a programme to make the necessary changes to any of these functions on the basis of the performance in achieving objectives.	BP-PROG-12.01, Conduct of Plant Operations states: "4.2.4 Fitness for Duty Considerations for Shift Complement Staff Held Over for More Than 13 Hours Guidance shall be provided for supervisors to follow when workers are held over from their regular shift in order to ensure compliance with the requirements for Station Minimum Shift Complement. These shall include direction for recognizing fatigue as well as mitigating strategies to ensure safe and reliable plant operation. GRP-OPS-00055" BP-PROC-00610, Fitness for Duty: Outlines Bruce Power's procedure regarding fitness for duty in the workplace and describes the processes for management of fitness for duty issues and for dealing with incidents. Its focus is the effective management of the worker's fitness for duty issues. It applies to all Bruce Power employees and contractors. Bruce Power's The Fitness for Duty procedure drives work to be performed to the best of the abilities of the worker and ensures that remedial steps are taken in a timely manner if the worker is not able to perform the work as assigned. At all times, safe operation and the respectful treatment of workers is observed. — Establishing a programme to make the necessary changes to any of these functions on the basis of the performance in achieving objectives BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 5.0 states the following: Monitoring for Results outlines how we hold ourselves accountable for business plan results, achieving strategic objectives, meeting regulatory requirements and identifying opportunities for improvement. Key features include: • Performance Monitoring. • Management Meetings. • Corrective Actions. • Benchmarking and Operating Experience. • Assessments. 5.1 Performance Monitoring We have an established set of performance indicators that are monitored and reported on a regular basis.	

Article No.	Article Requirement	Assessment	Compliance Category
		5.2 Management Meetings Regular management meetings are conducted to reinforce accountability and ensure ongoing monitoring and control. Such meetings include: • Operational Performance Reviews. • Business Assessment Reviews. • Business Plan Reviews. 5.3 Corrective Actions Where opportunities for improvement are identified, the Corrective Action process is used. The Corrective Action process provides for identifying, investigating, analyzing and correcting adverse conditions, incidents and acts/practices/behaviours that represent sub-standard or nonconformance situations with regard to established quality requirements. It does so in a manner that ensures a consistent approach to problem solving. The process includes provision of an automated tracking system to assist in the identification and implementation of actionable items arising from corrective actions or improvement opportunities. 5.4 Benchmarking and Operating Experience We seek out leading practice and determine how to apply it at Bruce Power to enable continuous improvement. The “Operating Experience” process provides for evaluating and disseminating in-house and industry operating experience information. This information is sought by and supplied to appropriate personnel for consideration and initiation of actions to prevent adverse conditions or to improve performance with respect to plant safety, reliability, economy and profitability. 5.5 Assessments In addition to Event Review Boards and the Nuclear Safety Review Board which provide oversight, we use a combination of assessments and audits to confirm that work activities meet the stipulations of the Management System, evaluate the Management System and confirm the integrity of plant conditions. Assessments include: • Self Assessments. • Internal and External Audits and Surveillance Activities.	

Article No.	Article Requirement	Assessment	Compliance Category
	(c)Operating functions, which include executive decision making and actions for the operation of a plant for all operational states and accidents conditions.	• Annual State of the Functional Area Assessment. • Performance Assessments and Accountability Reviews. • Technical Assessments. The Management System is assessed to determine if it is adequately established, implemented, controlled, to confirm its effectiveness in achieving the expected results and that risks are identified and managed and to identify substandard conditions and enhancement opportunities as per the Nuclear Oversight Management program and its implementing procedure. The overall effectiveness of the Bruce Power Management System (BPMS) is evaluated by the Business Assessment Process. (c) Operating functions, which include executive decision making and actions for the operation of a plant for all operational states and accidents conditions. Bruce Power defines the roles, authorities and responsibilities unique to each leadership position at section manager level and above. MSM - Approved Reference Chart Authorities And Responsibilities - Sheet 0002 describes organizational roles, decision making authority and responsibilities associated with the operation of the plant for all operational states and accidents conditions. BP-MSM-1, Management System Manual Sec 2.3 page 14 states: "The BPMS is used: • By the leadership team in day-to-day operations to achieve results. • To enable Governance, Oversight, Support and Perform (GOSP) accountabilities. • In business planning." BP-MSM-1, Management System MANUAL, Sec 2.4 page 14 states: "The Governance, Oversight, Support and Perform (GOSP) Model ensures each member of the organization clearly understands and are accountable for their roles." BP-PROG-08.01, Emergency Management Program, Sec 1.0 states: "The purpose of the program is to describe how Bruce Power manages risks that have the potential to impact reactor safety, public safety, employee and responder safety, environmental	

Article No.	Article Requirement	Assessment	Compliance Category
	(d)Support activities, which include obtaining, from both on-site and off-site organizations, including contractors, the technical and administrative services and the use of facilities necessary to perform the operating functions. For sites with shared safety related resources (e.g. sites with multiple units or with more than one operating organization), the arrangements for the use of such shared resources shall be clearly defined.	safety and corporate reputation through a risk-based program of prevention, mitigation, preparedness, response, and recovery. Following an Incident Management System (IMS) approach, this document outlines the functional requirements, implementing approaches and key responsibilities for applying an all hazards emergency management process to identified threats to ensure rapid, effective response to events that reduces time at risk ensuring the continuity of Bruce Power's business operations." (d) Support activities, which include obtaining, from both on-site and off-site organizations, including contractors, the technical and administrative services and the use of facilities necessary to perform the operating functions. For sites with shared safety related resources (e.g. sites with multiple units or with more than one operating organization), the arrangements for the use of such shared resources shall be clearly defined. Bruce Power manages all of its activities including support activates through program ownership which is described in section 3.2 of MSM-1 as follows: Program ownership and expectations are well defined and accountabilities are understood. Bruce Power uses a Governance, Oversight, Support, Perform (GOSP) model of accountability to clarify the expectation of program owners. All programs and processes must have clearly defined owners. A Corporate Functional Area Manager (CFAM) is the owner of one or more Bruce Power Programs that support a functional area. CFAMs work together to integrate and optimize the overall system of processes, avoiding an isolated focus on only their own programs. Under the GOSP Model, the "Perform" function is undertaken by the Site Functional Area Manager (SFAM) role. Through Peer Groups, SFAMs collaborate with CFAMs to identify and implement programmatic improvements. The authorities, responsibilities and accountabilities of CFAMs, SFAMs, Functional Area Peer Groups are further defined in the GOSP Implementation Handbook (B-HBK-08130-00001), a procedure document that supports the implementation of the BPMS Management Program (BP-PROG-01.02). B-HBK-08130-00001, GOSP Implementation Handbook, Sec 4.1.2, states: "4.1.2 GOSP Model	

Article No.	Article Requirement	Assessment	Compliance Category
		The GOSP Model separates the role of standard bearer / Program owner (Governance and Oversight) from the role of execution (Perform). By separating Program and process owner from performer, the GOSP Model allows management of Programs and processes across organizational boundaries. Functional Areas represent the main groupings of Program Suites (Programs and processes identified as BP-PROG-XX.XX in the BPMS Document Hierarchy). Functional Areas can cross station, business unit or site boundaries (Figure 1), and may remain constant despite changes in organizational structure. Line management always retains accountability for nuclear safety. Process based management allows for integration, standardization, elimination of duplication, and efficient management of resources. The GOSP Model is proven to improve business results for organizations that value standardization across fleets. Other utilities have also adopted the GOSP Model, with some differences in implementation. Bruce Power implements GOSP using a collaborative approach for CFAM/SFAM interaction." CFAMs and SFAMs obtain, from both on-site and off-site organizations, including contractors, the technical and administrative services and the use of facilities necessary to perform the operating functions. BP-PROG-05.01 Supply Chain ensures that activities related to the specification, purchase, receipt, storage, issuance and return of items, equipment and services are adequately planned, implemented and controlled. Elements of the program include: • Procurement of Items and Services. • Contract Management. • Warehouse Operations. • Quality Oversight.	
	(e) Review activities, which include monitoring and assessing the performance of the operating functions and supporting functions on a regular basis. The purpose	(e) Review activities, which include monitoring and assessing the performance of the operating functions and supporting functions on a regular basis. The purpose of monitoring is to verify compliance with the objectives for safe operation of the plant, to reveal deviations, deficiencies and equipment failures, and to provide information for the purpose of taking timely corrective actions and making improvements. Reviewing functions shall also include review of the overall safety performance of the organization to assess the effectiveness of management	

Article No.	Article Requirement	Assessment	Compliance Category
	of monitoring is to verify compliance with the objectives for safe operation of the plant, to reveal deviations, deficiencies and equipment failures, and to provide information for the purpose of taking timely corrective actions and making improvements. Reviewing functions shall also include review of the overall safety performance of the organization to assess the effectiveness of management for safety and to identify opportunities for improvement. In addition, a safety review of the plant shall be performed periodically, including design aspects, to ensure that the plant is operated in conformity with the approved design and safety analysis report, and to identify possible safety improvements.	for safety and to identify opportunities for improvement. In addition, a safety review of the plant shall be performed periodically, including design aspects, to ensure that the plant is operated in conformity with the approved design and safety analysis report, and to identify possible safety improvements. BP-MSM-1, Management System Manual, Sec 5.5 states: "5.5 Assessments In addition to Event Review Boards and the Nuclear Safety Review Board which provide oversight, we use a combination of assessments and audits to confirm that work activities meet the stipulations of the Management System, evaluate the Management System and confirm the integrity of plant conditions." BP-MSM-1, Management System Manual, Sec 1.4 states: "1.4 Key Result Areas Annual business targets are forecast and defined by the following high level Key Performance Indicators. Performance metrics are held in a central repository administered in accordance with BP-PROG-01.01, Business Plan Management. 1. Nuclear Performance Index (NPI) NPI is based on a WANO score out of 100 made up of 10 indicators. The WANO performance indicators have been adopted to provide a quantitative indication of plant performance in the areas of nuclear plant safety and reliability and personnel safety. It is expected that WANO performance indicators will encourage emulation of the best industry performance and motivate the identification and exchange of good practices in nuclear plant operation. 2. Safety Performance This is a set of metrics which measures the ongoing safety performance of our people. Corporate level Key Performance Indicators include Collective Radiation Exposure (CRE) and Industrial Safety Accident Rate (ISAR)." BP-MSM-1, Management System Manual, Sec 5.1 states: "5.1 Performance Monitoring We have an established set of performance indicators that are monitored and reported on a regular basis."	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-MSM-1, Management System MANUAL Sec 5.0 states: "5.0 Check - Monitoring for Results Monitoring for Results outlines how we hold ourselves accountable for business plan results, achieving strategic objectives, meeting regulatory requirements and identifying opportunities for improvement. Key features include: Performance Monitoring. Management Meetings. Corrective Actions. Benchmarking and Operating Experience. Assessments." BP-MSM-1, Management System Manual Sec 5.3 states: "5.3 Corrective Actions Where opportunities for improvement are identified, the Corrective Action process is used. The Corrective Action process provides for identifying, investigating, analyzing and correcting adverse conditions, incidents and acts/practices/behaviours that represent sub-standard or nonconformance situations with regard to established quality requirements. It does so in a manner that ensures a consistent approach to problem solving. The process includes provision of an automated tracking system to assist in the identification and implementation of actionable items arising from corrective actions or improvement opportunities." BP-PROG-01.07, Corrective Action, Sec 1.0, states: "This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with the Corrective Action Program in fostering a healthy Nuclear Safety Culture in all aspects of nuclear safety. The objective of the corrective action program is to identify and eliminate or mitigate adverse conditions that have resulted in or could result in loss.	

Article No.	Article Requirement	Assessment	Compliance Category
		This program is applicable to all Bruce Power staff, including contractors." BP-PROG-15.01, Nuclear Oversight Management, Sec 1.0 states: "1.0 Purpose This program describes the fundamental business need, constituent elements, functional requirements, implementing approaches, and key responsibilities associated with Nuclear Oversight Management. It identifies the processes required to independently oversee the functioning of Bruce Power's Management System. This program contributes to the development and growth of Nuclear Safety Culture by communicating the Nuclear Safety message, setting the example for nuclear safety, and demonstrating this commitment through words and actions. The Nuclear Oversight Management Program also serves to meet the embedded Power Reactor Operating Licence requirements for oversight of Pressure Boundaries and Environmental Protection. This is accomplished by the Planning, Scheduling, Conducting, Reporting, and Overall Evaluation of Audits and Assessments." BP-PROC-00863, Engineering Programs Health, Sec 1.0 states: "1.0 PURPOSE This procedure provides the basis and expectations related to the development and generation of Program Health Reports (PHR) to meet Bruce Power's Equipment Reliability (ER) goals and continuous improvement. Health Reports are developed for those Engineering Programs that are deemed critical to ensure safe and reliable plant operation. Engineering Program is defined as an administratively controlled and ongoing engineering activity that implements regulatory requirements, WANO recommendations, plant efficiency and safety improvements, industry Operating Experience, or management requirements that are non-component specific. Within the context of this procedure Program refers to Engineering Program or process. Program Health Reports will measure the health of Program scoping, planning and execution	

Article No.	Article Requirement	Assessment	Compliance Category
	(f)Design integrity, which includes maintaining a formally designated entity that has overall responsibility for the continuing integrity of the plant design throughout its lifetime, and managing the interfaces and lines of communication with the responsible designers and equipment suppliers contributing to this continuing integrity [4].	using defined criteria and metrics detailed in this procedure. This procedure is applicable to the Programs as described in Appendix A of this procedure. The procedure directly supports execution of Appendix E of BP-PROC-00166, Specific Requirements for Engineering Programs. In addition, this procedure supports BP-PROC-00781, Performance and Condition Monitoring. BP-PROC-00781 in turn supports the BP-PROG-11.01, Plant Reliability Integration Program and implementation of the INPO AP-913 Equipment Reliability Process at Bruce Power." (f) Design integrity, which includes maintaining a formally designated entity that has overall responsibility for the continuing integrity of the plant design throughout its lifetime, and managing the interfaces and lines of communication with the responsible designers and equipment suppliers contributing to this continuing integrity [4]. BP-PROG-10.03, Configuration Management, Sec 1.0, states: "1.0 PURPOSE To provide an overview of the Configuration Management (CM) Program at Bruce Power and establish guidance to promote consistent application of the following CM objectives across the site: 1. Clearly define and communicate CM scope, responsibilities, authorities, principles, and interfaces. 2. Design basis and licensing basis requirements, which apply to the plant will be accurately identified, documented, maintained, and accessible. 3. The plant's physical structures, systems and components, and process computer controls will conform to design basis and license basis requirements." BP-MSM-1 Sheet 2, MSM Approved Reference Chart Authorities and Responsibilities, Engineering, Page 45 SHEET 0002 states: "Ensure a strong nuclear safety culture consistent with Guideline WANO GL 2006 02 "Principles	

Article No.	Article Requirement	Assessment	Compliance Category
		for a Strong Nuclear Safety Culture”, specifically: Ensure reporting relationships, positional authority, staffing, and financial resources for nuclear safety are well defined and clearly understood within Engineering. Ensure senior managers and supervisors practice visible leadership and demonstrate their commitment both in word and action by placing “eyes on the problem”, coaching, mentoring and reinforcing standards in nuclear safety. Foster a high level of trust within the organization through timely and accurate communication to allow a free flow of information in which safety issues are raised and addressed. Ensure all Engineering personnel are systematic and rigorous in making decisions that support safe, reliable plant operation. Ensure all decisions and actions are carried out safely recognizing the special and unique characteristics of nuclear technology. Encourage Engineering staff to demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. Ensure operating experience is highly valued, and the capacity to learn from experience is well developed through training, self-assessments, corrective actions and benchmarking. Maintain a constant scrutiny on nuclear safety through a mix of self-assessments and independent oversight to strengthen safety and improve performance. Provide a safe and reliable design for the nuclear facility. Act as Bruce Power’s designated Design Authority. Ensure all design activities are carried out in a manner that produces high quality design outputs in accordance with applicable codes, standards and regulatory requirements. Ensure the management of the Engineering Division is in accordance with applicable legislation, policies, programs, procedures and agreements. Maintain up to date Program and Processes that ensures compliance to standards, that ensures correct and safe practices are followed and that ensures plant reliability and availability are maintained to a high standard. Prepare the Engineering Division business plan and provide leadership for the execution of the	

Article No.	Article Requirement	Assessment	Compliance Category
		approved business plan." BP-PROG-10.02, Engineering Change Control, Sec 1.0 states: "1.0 Purpose This purpose of the Engineering Change Control (ECC) program is to specify the manner in which design changes and modifications are defined, planned, implemented, and controlled. The main objective of the ECC program is to ensure that design changes and modifications are controlled such that structures, systems, components, and significant tools (SSCTs) continue to meet the design basis and operate safely for the full duration of design life."	
3.3.	The operating organization shall establish liaison with the regulatory body and with relevant authorities to ensure a common understanding of, and to ensure compliance with, safety requirements and their interface with other requirements, such as those for security, protection of health or protection of the environment.	BP-PROG-06.03, CNSC Interface Management states: "This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with managing the interface between Bruce Power and the Canadian Nuclear Safety Commission (CNSC). This is achieved by establishing and implementing standards and processes that meet the expectations of both parties and facilitate conformance to the Nuclear Safety and Control Act (NSCA), applicable regulations and other CNSC requirements and expectations. The scope of this program is limited to the managing the interface between Bruce Power and the CNSC. It does not include other regulatory agencies or stakeholders." BP-PROG-09.02, Stakeholder Interaction, Sec 1.0 states: "1.0 Purpose This program document defines the fundamental business need, implementing approaches and key responsibilities associated with managing stakeholder interaction and communication. This program satisfies the requirements of RD/GD-99.3: Public Information and Disclosure. It is structured to meet the plan-do-check-act cycle of CSA N286-05 Management System requirements for nuclear power plants and to specifically address clause 5.1, 5.2, 5.4 and 5.7. This program satisfies the requirements of ISO14001 section 4.4.3 and OHSAS 18001 4.4.3.1. Bruce Power maintains a single program to address stakeholder interaction and disclosure related to all of its activities; those aspects of the program that are specific to license applications or the licensed activities shall be identified in the implementing documents."	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-00.04 Pressure Boundary Quality Assurance Program Section 1 – Organization states: "2.0 General The Bruce Power corporate organization structure is established by the President and CEO and documented in the Management System Manual (MSM). Executive Vice Presidents (Groups) and Senior Managers (Senior Vice Presidents, Vice Presidents, Division Managers and Department Managers) are responsible to document the functional organizational structure in Organization Manuals that contain functional responsibilities, levels of authority and lines of communication within each organization. Lines of communication, interfaces between internal and external organizations (and changes thereto) and responsibilities of personnel are further defined and documented in Programs, General Procedures and Station System Procedures, which are described in Sections 2, 5 and 6. Organizations at Bruce Power are responsible to provide assurance that Pressure Boundary (PB) activities are performed in accordance with this Program manual and applicable codes and standards." BP-PROC-00165 Reporting to CNSC - Power Reactor Operating Licences Sec 2.0 item 7, states: "Safeguards-related reports on fissionable and fertile substances listed in a) to c) below. Refer to BP-PROC-00839, Reporting to CNSC/IAEA - Safeguards. a) Reports on the inventory and transfer of fissionable and fertile substances at Bruce A and Bruce B made pursuant to S-99, Section 6.4.11, as referenced in Regulatory Document RD-336, Accounting and Reporting of Nuclear Material. Note: RD-336 became effective on January 1st, 2011. It replaced Atomic Energy Control Board document AECB-1049/Rev 2, Reporting Requirements for Fissionable and Fertile Substances. d) Informal reports and information transfer to the CNSC/IAEA regarding the internal transfer of fissionable and fertile substances at Bruce A and Bruce B, which includes reports on Core Discharge Monitors, Bundle Counters and any additional reports as requested by the CNSC/IAEA made pursuant to Article 72 of the Agreement between Canada and the IAEA for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons."	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-08.02, Nuclear Security, Sec 1.0 states: "This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with providing a World Class Nuclear Utility Protection Service in accordance with the Nuclear Safety and Control Act (NSCA), applicable regulations and other Canadian Nuclear Safety Commission (CNSC) requirements and expectations. This program establishes proactive "best-in-business" security processes and supports the nuclear safety principles while it conforms to the goals, objectives and legislative requirements. The Nuclear Security Program supports Bruce Power's fundamental nuclear safety objective to protect the public, site personnel and the environment from harm, by establishing and maintaining effective security defenses against radiological hazards caused by malicious and malevolent acts."	
Requirement 2: Management system	The operating organization shall establish, implement, assess and continually improve an integrated management system.	BP-PROG-01.02, BRUCE POWER MANAGEMENT SYSTEM (BPMS) MANAGEMENT The BPMS Management Program (BP-PROG-01.02) establishes the framework for the ongoing implementation to and change management of the BPMS. This supports the ongoing plan-do-check-act cycle for the continuous improvement of an integrated management system at Bruce Power. Section 4.5.3 says The Management System is Continually Improved. At Bruce Power, the Performance Improvement Functional Area defines processes and practices for self-evaluation and improvement planning that result in opportunities for continuous improvement. Improvement and level of effort activities identified by each CFAM together with those initiatives arising as a result of processes and practices defined within the Corporate Planning. Functional Areas are used to plan and prioritize activities necessary for the implementation of the BPMS. Detailed actions arising from identified deficiencies or assessments are included in the action tracking system. Major improvement activities are included in Improvement Planning and reviewed annually as part of the State of the Functional Area Assessment defined in BP-PROC-00016. Periodic accountability reviews are held with the Program Approver and/or Sponsor to	C

Article No.	Article Requirement	Assessment	Compliance Category
		ensure activities associated with this Program are being managed. BPMS Functional Area specific considerations: Within the BPMS Management Program the implementing procedure BP-PROC-00016, evaluates the effectiveness of the BPMS and identifies opportunities for continuous improvement. The process provides insights to senior leadership for consideration as part of strategic business planning, per the processes defined by the Corporate Planning Functional Area, and contributes to continuous improvement of the BPMS. The executive sponsor of the BPMS, the Executive Vice President & Chief Nuclear Officer, meets periodically with the CFAM, BPMS to review improvements opportunities and progress and leads discussions of relevance around implementation of an integrated management system with Senior Leader peers. Responsibilities of all CFAMs: Each CFAM is required to consider and identify how the processes and practices of the Functional Area ensure continuous improvement. The periodic SOFA Assessment, part of BP-PROC-00016 enables improvement planning. Functional Areas with Peer Groups benefit from sharing experience between SFAMs and all CFAMs are expected to understand industry leading practice and maintain an awareness of standards and industry trends and developments within their Functional Areas. As articulated in the message from the Chief Executive Officer in BP-MSM-1, ‘A commitment to stretch goals and continuous improvement’ is one of the fundamental elements of achieving top performance. As described in Section 1.3.4 of MSM-1, Passion for Excellence is one of the five key values and behaviors at Bruce Power: We demonstrate commitment to continuous improvement to create sustainable performance excellence which benefits all of our stakeholders. We… • Benchmark actively and intelligently to align our performance metrics and targets with	

Article No.	Article Requirement	Assessment	Compliance Category
		the top quarter of the industry. • Explore the world for industry leading practices. • Input and champion new ideas and innovate to leap ahead of our competition. • Embrace systematic and rigorous planning, scheduling and preparation to ensure success. • Execute our Business Plan by developing, executing and monitoring detailed action plans using key performance indicators. • Engage, challenge, and positively motivate each other to create contagious commitment and engagement throughout the organization. • Are cost conscious in every business decision. • Actively minimize waste. • Constantly critique ourselves to identify lessons learned. • Use training to support continuous performance improvement. Sec 4.2 states: "4.2 Functional Area Support Bruce Power is committed to continuous process improvement in order to achieve our vision. Support for our functional areas, Corporate Functional Area Managers and Site Functional Area Managers is critical to improved performance within Bruce Power. Functional areas are supported by the Manager, Management System Department, and a combination of: industry benchmarking, reviews of industry best practices, peer group facilitation and business assessment." 5.0 Check - Monitoring for Results	

Article No.	Article Requirement	Assessment	Compliance Category
		Monitoring for Results outlines how we hold ourselves accountable for business plan results, achieving strategic objectives, meeting regulatory requirements and identifying opportunities for improvement. Key features include: •Performance Monitoring. •Management Meetings. •Corrective Actions. •Benchmarking and Operating Experience. •Assessments. 5.4 Benchmarking and Operating Experience We seek out leading practice and determine how to apply it at Bruce Power to enable continuous improvement. The "Operating Experience" process provides for evaluating and disseminating in-house and industry operating experience information. This information is sought by and supplied to appropriate personnel for consideration and initiation of actions to prevent adverse conditions or to improve performance with respect to plant safety, reliability, economy and profitability.	
3.4.	The operating organization shall ensure through the establishment and use of a management system that the plant is operated in a safe manner and within the limits and conditions that are specified in the safety assessment and established in the authorization.	BP-PROG-12.01 Conduct of Plant Operations This program document defines the fundamental business need, functional requirements, constituent elements and key responsibilities associated with the conduct of operations at Bruce A and Bruce B. The overall objective of the program is to safely and reliably operate the station systems within the design basis for which the plants are licensed. Operations conducted in accordance with the standards and expectations defined in this program will provide strong support for the four pillars of nuclear safety: 1. Reactor 2. Conventional 3. Radiation protection	C

Article No.	Article Requirement	Assessment	Compliance Category
		4. Environmental BP-OPP-00002 Operating Policies and Principles- Bruce A are defined to clearly outline operating boundaries within which the station may be operated safely. Within these boundaries, detailed operating procedures are written for clearly defined operating requirements. These boundaries and associated operating procedures comply with licencing basis of the facility as prescribed in Nuclear Power Reactor Operating Licence Bruce Generating Station A. BP-OPP-00002 defines operating requirements and licensing limits of SSCs for safe operation of plant based on the conditions and limits set in the PROL and the safety report.	
3.5.	The management system shall integrate all the elements of management so that processes and activities that may affect safety are established and conducted coherently with other requirements, including requirements in respect of leadership, protection of health, human performance, protection of the environment, security and quality, and so that safety is not compromised by other requirements or demands.	BP-MSM-1, Management System Manual, Sec 2.0, States: "2.0 Overview of the Bruce Power Management System 2.1 How the BPMS Works The BPMS describes the way we manage our business. It is described at a high level in this document. It is the leadership "road map" or direction that defines how all aspects of our business fit together in an integrated manner and drives us towards excellence. Nuclear Safety is a primary consideration for Bruce Power; therefore our management system must support the enhancement and improvement of safety culture and the achievement of high levels of safety as well as business performance. The BPMS is designed to ensure the Bruce Power leadership team can consistently deliver expected results and satisfy stakeholders such as the regulator, the public, its shareholders and employees. It ensures that Bruce Power meets the stipulations of its operating licenses, other applicable codes, standards, legal and business requirements. The purpose of this Management System Manual (MSM) is to define and document Bruce Power's Management System. This system establishes the need for: Directors and officers to govern the corporation by establishing and overseeing the corporate direction, strategy, structure and performance, while satisfying corporate due diligence requirements. A leadership team to manage the business by planning the company requirements, providing leadership direction and support to staff, and assessing the effectiveness of results achieved. Personnel to safely perform their work by conforming with documented business processes in	C

Article No.	Article Requirement	Assessment	Compliance Category
		support of operating the plant to achieve high standards of safety and commercial performance. By design, the BPMS contributes to the establishment of a nuclear safety culture that assures reactor, environmental, industrial and radiological safety, during normal operations as well as during extreme events. It also provides the necessary guidance for making risk-based decisions that satisfy the desired balance between safety, commercial, corporate reputation and other performance requirements. No single element of the BPMS operates independently; all parts of the Management System are interconnected and interdependent." The BPMS Management Program (BP-PROG-01.02) establishes the framework for the ongoing implementation to and change management of the BPMS. This supports the ongoing plan-do-check-act cycle for the continuous improvement of an integrated management system at Bruce Power.	
3.6.	The management system of the operating organization shall provide for arrangements to ensure safety in activities performed by external support organizations. Responsibility for activities performed by external support organizations, and for their overall control and supervision, rests with the operating organization. The operating organization shall establish a system for the supervision of work performed by support organizations. It shall be the responsibility of the operating organization to ensure that the personnel of external support organizations who perform activities on structures, systems or components important to safety or activities affecting safety are qualified to perform their assigned tasks. The overall contracted	BP-PROG-14.02, Contractor Management states: "The purpose of this program is to provide guidance to Bruce Power employees managing contractors who are performing work for Bruce Power. It is to ensure work is executed per contractual documents and in accordance with applicable procedures, planned budgets and schedules and in conformance with Bruce Power's requirements for worker health and safety according to BP-PROG-00.06, Health and Safety Management and within expectations for nuclear safety (radiological safety, industrial safety, reactor safety, environmental safety)." The program is implemented by BP-PROC-00547, Management of Contractors Section 7.2 Contract Manager/Officer states: 7.2.1 Responsible for the site administration, coordination and overall performance of the contractor while working at the site, including but not limited to: quality, timeliness, safety and error-free performance. 7.2.2 Ensures the requirements of the Occupational Health and Safety Act (OHSA) Regulations and all applicable Bruce Power Policies, Programs and Procedures are considered and that nuclear safety principles are applied according to these programs and procedures. 7.2.3 Works with Supply Chain to include the applicable requirements in the contractual documents. 7.2.4 Ensures the contractor's personnel are qualified and trained to perform the work assigned including any additional risk based training that may be required for specific tasks.	C

Article No.	Article Requirement	Assessment	Compliance Category
	activity shall be clearly specified in writing and shall be approved by the operating organization prior to its commencement. The operating organization shall ensure long term access to knowledge of the plant design and manufacturing and construction throughout the lifetime of the plant.	7.2.5 Assigns a Contract Supervisor if required. BP-PROC-00041, Contract Management, Sec 4.5, States: "4.5 Closeout 4.5.1 In the Closeout phase of the process, the Contract Manager shall: Ensure that the completion of the Contract work includes any walkdown of work, turnover of documentation as defined by the Contract, and that all operating, maintenance, design or other documentation has been updated to reflect the Contracted deliverables. Quality records must be received, reviewed and accepted by appropriate Bruce Power personnel. Ensure through records checks, walkdowns and Bruce Power Engineering acceptance of engineering deliverables, that all contract conditions have been met, completion notices issued, payment certificates cleared and final payments processed. Forward quality records to the Document Management Section - Nuclear Records for retention and storage in accordance with BP-PROC-00098, Records Management." BP-PROC-00098, Records Management, Sec 3 states: "3.1.8 Record - Information in any format that has been authenticated (i.e., initialed, stamped or signed, dated, clearly identified) and is retained to meet business or regulatory requirements, by authorized personnel. Records shall be designated permanent or non-permanent. 1. Permanent Record is a record which meets one or more of the following criteria and is maintained for the life of the plant, or at least for the life of the particular item concerned: Records of value in demonstrating capability for safe operation. Records required to maintain, rework, repair, replace or modify a structure, system, or component. Records of value in determining the cause of an accident, malfunction or unscheduled	

Article No.	Article Requirement	Assessment	Compliance Category
		occurrence. Records required to provide baseline data for periodic inspection. Records that would be of value in decommissioning a system, component, or structure."	
3.7.	The operational safety of a plant is subject to oversight by a regulatory body independent of the operating organization. The operating organization, in accordance with the regulatory requirements, shall submit or make available to the regulatory body all necessary documents and information. The operating organization shall develop and implement a procedure for reporting events to the regulatory body in accordance with the established criteria and the State's regulations. The operating organization shall provide the regulatory body with all necessary assistance to enable it to perform its duties, including enabling unhindered access to the plant and providing documentation.	BP-MSM-1, Management System Manual, Appendix A, Bruce Power Policy Statements states: "Disclosure Management Bruce Power shall enable its limited partners to comply with their statutory and regulatory obligations concerning the timely disclosure of material facts and material changes in the business and affairs of Bruce Power and in maintaining the confidentiality of such information in those circumstances when its disclosure is delayed." BP-PROG-06.03, CNSC INTERFACE MANAGEMENT Sec 4.1 and 4.2 state: "4.1 General Requirements The CNSC regulatory framework consists of a mix of requirements and guidance. Requirements are set out in legislation, regulations, licences and CNSC regulatory documents. Guidance on how applicants and licensees can meet regulatory requirements is provided in CNSC guidance documents. INFO-documents provide more general information on the regulatory regime and processes for the broader public. All CNSC interface management processes shall be structured to facilitate compliance with CNSC requirements and to conform, where possible, to CNSC guidance or expectations. Note: Compliance to a CNSC Regulatory Document (RD) is mandatory (i.e. a legal requirement) when the RD is referred to in a CNSC licence. Deviations from a licence-referenced RD and transitional arrangements, where necessary, shall be addressed on a case by case basis in accordance with the applicable Licence and/or Licence Conditions Handbook (LCH). Compliance is expected, but not mandatory, for RDs that are not referred to in a CNSC licence (i.e. not a legal requirement). All interfaces and information exchanges between Bruce Power and the CNSC shall be in accordance with the requirements set out below as applicable to the transaction. These requirements shall be reflected within all CNSC Interface Management implementing procedures and expanded upon to the extent necessary to facilitate compliance. The requirements are: 1. All processes and activities that involve interfaces and information exchanges between Bruce	C

Article No.	Article Requirement	Assessment	Compliance Category
		Power and the CNSC shall be conducted in accordance with documented interface protocols. Refer to subsection 4.2 below which establishes and describes the procedure for CNSC – Bruce Power Interface Protocols. 2. All transactions with the CNSC should be conducted in recognition of the objects of the Commission established in the Nuclear Safety and Control Act (NSCA). 3. CNSC interface management processes and their outputs shall be in compliance all applicable regulations, other CNSC requirements (e.g. licence conditions) and in consideration of CNSC staff expectations. 4. All transactions with the CNSC shall be conducted in compliance with obligations of licensees established in the NSCA and associated regulations. As part of fulfilling the licensee obligations, Bruce Power shall inform workers of their obligations under CNSC regulations, and workers shall fulfill these obligations. 5. CNSC interface management processes shall integrate the roles and responsibilities of the Designated Licensing Authority (DLA) into implementing procedures where deemed necessary by the Corporate Functional Area Manager (CFAM) for CNSC Interface Management. Refer to subsection 4.1.1 (below) for a description of the DLA role and authorities. 6. CNSC interface management procedures and processes shall comply with applicable elements of CSA Standard N286-05, Management System Requirements for Nuclear Power Plants as further described in BP-PROG-01.02, Bruce Power Management System (BPMS) Management and its implementing procedures. 7. CNSC interface management processes that require the involvement of a Responsible Person or an Authorized Delegate (individuals designated by Bruce Power pursuant to Section 15 of the GNSCR; see definitions) shall interface with or refer to BP-PROC-00826, Licensing Responsibility and Authority, an implementing procedure of BP-PROG-06.01, CNSC Licence Acquisition. 8. In recognition that consistency across the industry provides certain benefits when dealing with a regulatory agency, the requirements established by CNSC Interface Management processes applicable to the Power Reactor Operating Licences (PROLs) shall be developed in consideration of the interface protocols and processes established by other power reactor licensees. 4.2 CNSC Bruce Power Interface Protocols	

Article No.	Article Requirement	Assessment	Compliance Category
		1.The objectives of this process are: e) To provide for and accommodate access of CNSC staff and Inspectors at Bruce Power facilities."	
Requirement 3: Structure and functions of the operating organization	The structure of the operating organization and the functions, roles and responsibilities of its personnel shall be established and documented.	BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 4.1.5 states: "An Approved Reference Chart of the organization structure is maintained. It is derived from information contained in the SAP database (the official system of record) and defines the organizational names, positional/role titles, reporting structure, key responsibilities and associated information. This chart is found on the Human Resources Intranet page. For each organization unit defined in the Approved Reference Chart, there are related roles, authorities and responsibilities defined in BP-MSM-1 Sheet 0002, Management System Manual Approved Reference Chart Authorities and Responsibilities Sheet 0002 or in Organization Manuals."	C
3.8.	Functional responsibilities, lines of authority, and lines of internal and external communication for the safe operation of a plant in all operational states and in accident conditions shall be clearly specified in writing. Authority for the safe operation of the plant may be delegated to the plant management. In this case, the necessary resources and support shall be provided.	BP-MSM-1, Management System Manual, Sec 7.0 states: "Bruce Power's organizational effectiveness is determined by the design of its organization structure, and the clear specification of responsibilities, authorities, accountabilities and interfaces associated with each of the defined management and individual contributor roles/positions. For the organization to properly function" The following sheets from the MSM further define the roles and responsibilities: MSM - Bruce Power Program Matrix - Sheet 0001 MSM - Approved Reference Chart Authorities And Responsibilities - Sheet 0002" BP-PROG-08.01, Emergency Management Program, Sec 1.0 and 4.0 state: "1.0 Purpose The purpose of the program is to describe how Bruce Power manages risks that have the potential to impact reactor safety, public safety, employee and responder safety, environmental safety and corporate reputation through a risk-based program of prevention, mitigation, preparedness, response, and recovery. Following an Incident Management System (IMS) approach, this document outlines the functional requirements, implementing approaches and key responsibilities for applying an all hazards emergency management process to identified threats to ensure rapid, effective response to events that reduces time at risk ensuring the continuity of Bruce Power's business	C

Article No.	Article Requirement	Assessment	Compliance Category
		operations. 4.0 Program Description Threats to employee and public health and safety, environmental safety and to the continuity of Bruce Power's business are identified through activities, which include but are not limited to the review by Bruce Power staff of internal and external operating experience reports. As a result of this process, those threats which have been assessed as requiring some degree of preparedness, response, and recovery will be identified and addressed within the scope of this program. This document outlines an IMS approach to addressing the program objectives where applicable through a systematic Plan, Do, Check, Act process. The Plans must address the following objectives where applicable: Identification and classification of hazardous conditions and events. Development of procedures describing the response to hazardous conditions and events and recovery from the consequences of those events. Establishment of response organizations. Establishment of response facilities and equipment. Establishment of Recovery Organization. Communication to the applicable stakeholders (employees, public, regulatory agencies) as appropriate. Evaluation of program effectiveness. The following sub-sections identify the key elements of this program, the associated requirements and the approaches used to satisfy these requirements."	
3.9.	Documentation of the plant's organizational structure and of the arrangements for discharging responsibilities shall be made available to the plant staff and, if required, to the regulatory body. The structure of the operating	BP-MSM-1, Management System Manual, Sec 4.1.5 states: "An Approved Reference Chart of the organization structure is maintained. It is derived from information contained in the SAP database (the official system of record) and defines the organizational names, positional/role titles, reporting structure, key responsibilities and associated information. This chart is found on the Human Resources Intranet page. For each organization unit defined in the Approved Reference Chart, there are related roles, authorities and responsibilities defined in BP-MSM-1 Sheet 0002, Management System Manual Approved	C

Article No.	Article Requirement	Assessment	Compliance Category
	organization shall be specified so that all roles that are critical for safe operation are specified and described. Proposed organizational changes to the structure and associated arrangements, which might be of importance to safety, shall be analysed in advance by the operating organization. Where so required by the State's regulations, proposals for such organizational changes shall be submitted to the regulatory body for approval.	Reference Chart Authorities and Responsibilities Sheet 0002 or in Organization Manuals." BP-MSM-1, Management System Manual, Page 1 indicates that the MSM requires CNSC Acceptance/Notification. BP-MSM-1, Sheet 0002, BSM - Approved Reference Chart Authorities and Responsibilities, Sheet 0002, provides approved reference charts, authorities and responsibilities necessary to support the MSM. It is available to all employees on the Bruce Power intranet. BP-PROG-01.02, Bruce Power Management System (BPMS) Management, 4.2.2 The Organization is Defined and Understood BP-MSM-1 SHT 0001 identifies Functional Areas and Programs, the Program Owners and Program Approvers while BP-MSM-1 SHT 0002, MSM - Approved Reference Chart Authorities and Responsibilities - Sheet 0002 documents the authorities and responsibilities of each organization unit for Section Manager and above. Changes to these documents are initiated as a result of Management of Change activities per BP-PROC-00001, Organization Structure Change Management. The Bruce Power corporate organization structure is established by the President and Chief Executive Officer and documented in the BP-MSM-1. Section Managers and above have their functional responsibilities and authorities documented in BP-MSM-1 SHT 0002. Organizations at Bruce Power are responsible to provide assurance that the Pressure Boundary activities are conducted in accordance with applicable codes and standards and requirements of Bruce Power's Pressure Boundary Quality Assurance Program (BP-PROG-00.04), defined in the Configuration Management Functional Area. Financial authorities are defined in BP-PROC-00031, Organizational Authority Register. The Financial Management Functional Area is accountable for processes which establish and maintain the Organizational Authority Register. Lines of communication, interfaces between internal and external organizations (and changes thereto) and responsibilities of personnel are further defined and documented in Programs, General Procedures and Station System procedures. The President and Chief Executive Officer is accountable to ensure that the organizational structure responsible for the monitoring and assessing of the effectiveness of the Management System reports to a management level such that the required authority and organizational freedom are provided and costs and schedule considerations do not override quality	

Article No.	Article Requirement	Assessment	Compliance Category
		requirements. This ensures that persons performing, verifying, and auditing work are appropriately independent. Section 4.5.2 Changes are Controlled says: At Bruce Power, significant changes are expected to be properly identified, justified, planned, reviewed and approved without compromising nuclear safety. All Functional Areas shall consider change control and part of their Program Suite development, with some Functional Areas developing specific procedures as necessary to manage changes within their processes and activities. Functional Areas that have established procedures to control changes include but are not limited to BPMS, Information Technology, Configuration Management Engineering, and Project Management and Construction. BP-PROC-00703 is an implementing procedure of BP-PROG-01.02 is cited in the License Condition Handbooks. Change Management Guidance (BP-PROC-00703) Bruce Power is able to enhance organizational effectiveness by providing a clear and standardized approach towards defining, justifying and managing change. BP-PROC-00703, Change Management Guidance, provides a consistent approach and tools for effectively managing the change process. It directs the change proposer to the implementing or interfacing procedures which, whether used individually or collectively, detail the steps necessary to manage and document changes.	
Requirement 4: Staffing of the operating organization	The operating organization shall be staffed with competent managers and sufficient qualified personnel for the safe operation of the plant.	BP-PROG-02.04, Worker Development and Performance Management, sec 1.0 states: "This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with the management of worker development and performance. This includes the establishment and communication of our commitments to nuclear safety: Reactor safety, industrial safety, radiation safety and environmental safety. Worker development and performance is managed through the establishment of personal performance plans linked to business plans, the provision of timely and high quality feedback through performance coaching, informal reviews and formal appraisals, and by giving appropriate recognition.	C

Article No.	Article Requirement	Assessment	Compliance Category
		The elements of this program are intended to satisfy the following clauses of CSA N286-05: Clause 5.3 - Personnel are competent at the work they do. Clause 5.4 - Personnel know what is expected of them." It should be noted that section 2.0 Exceptions state the following: None- While the references in this document are to workers, they apply equally to managers as well as individual contributors at all levels. B-HBK-08130-00001, GOSP IMPLEMENTATION HANDBOOK, Sec 4.3.1, discusses 4.3.1 Responsibilities of the CFAM 4.3.1.1 CFAM responsibilities as part of the "Plan" step include: • Ensuring the organizational requirements (e.g., staffing, succession planning, and structure) to meet the Functional Area needs are defined and support the achievement of excellence.	
3.10.	The operating organization shall be responsible for ensuring that the necessary knowledge, skills, attitudes and safety expertise are sustained at the plant, and that long term objectives for human resources policy are developed and are met.	BP-PROG-02.04, Worker Development and Performance Management, sec 1.0 states: "This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with the management of worker development and performance. This includes the establishment and communication of our commitments to nuclear safety: Reactor safety, industrial safety, radiation safety and environmental safety. Worker development and performance is managed through the establishment of personal performance plans linked to business plans, the provision of timely and high quality feedback through performance coaching, informal reviews and formal appraisals, and by giving appropriate recognition. The elements of this program are intended to satisfy the following clauses of CSA N286-05: Clause 5.3 - Personnel are competent at the work they do. Clause 5.4 - Personnel know what is expected of them."	C
3.11.	The organization, qualifications and number of operating	BP-PROG-12.01 Conduct of Plant Operations	C

Article No.	Article Requirement	Assessment	Compliance Category
	personnel shall be adequate for the safe and reliable operation of the plant in all operational states and in accident conditions. Succession planning shall be an established practice for the operating personnel. The recruitment and selection policy of the operating organization shall be directed at retaining competent personnel to cover all aspects of safe operation. A long term staffing plan aligned to the long term objectives of the operating organization shall be developed in anticipation of the future needs of the operating organization for personnel and skills.	4.2 Operator Staffing Hiring of operating staff as per BP-PROG-02.01, Worker Staffing, and their deployment to operating departments shall be done in a manner that ensures the safe operation of the plant and meets regulatory complement requirements. The training program will ensure personnel are qualified to perform operations activities. The training of all operations staff will be performed in accordance with Bruce Power training procedures as governed by BP-PROG-02.02, Worker Training and Qualification. 4.2.1 Station Complement The normal scheduled, and minimum shift complements for each station operation and for site shall be specified and adhered to ensure safe operation and compliance with the station license. Staff must be qualified and fit for duty to be credited as complement, DIV-OPA-00001, DIV-OPB-00001. DIV-OPA-00001 Station Shift Complement - Bruce A implements the requirements of BP-OPP-00002, Operating Policies and Principles - Bruce A, 01.5 Station Staffing. The basis for the minimum shift complement is given by NK21-REP-09034-00006, Analysis of Resource Requirements to Respond to Abnormal Incidents at Bruce A. BP-PROG-02.01, Worker Staffing Sec 1.0 states: "This program document defines the fundamental business need, functional requirements, constituent elements, and key responsibilities associated with the Worker Staffing Process. The objective of Worker Staffing is to recruit, orient, and deploy staff that possess the competencies required for maintaining staffing levels consistent with the requisite organization structure, and includes the subsequent release of staff. This program outlines the required expectations and guidelines to ensure that activities associated with the recruitment, orientation, deployment, and departure of Bruce Power Employees are conducted in a manner consistent with the established values. This includes our commitments to nuclear safety: reactor safety, industrial safety, radiation safety and environmental safety. It applies to the following groups of Bruce Power Employees: • Regular Employees	

Article No.	Article Requirement	Assessment	Compliance Category
		• Temporary Employees • Contract Employees • Students The elements of this program are intended to satisfy the following clauses of N286-05: • Clause 5.2 - The organization is defined and understood. • Clause 5.3 - Personnel are competent at the work they do. As described in section 4.2 Organizational Approval to Hire, the divisional and corporate workforce plans are developed by Divisional Vice Presidents, Divisional Single Points of Contacts (SPOCs) in cooperation with Human Resources. As stated in section 7.2, the Executive Team is responsible for approving the corporate workforce plan, which includes divisional and departmental hiring plans, through the business planning process. B-HBK-08130-00001, GOSP IMPLEMENTATION HANDBOOK, Sec 4.3.1, 4.3.1 Responsibilities of the CFAM 4.3.1.1 CFAM responsibilities as part of the "Plan" step discusses Ensuring the organizational requirements (e.g., staffing, succession planning, and structure) to meet the Functional Area needs are defined and support the achievement of excellence. B-HBK-09500-00003, TRAINING PERFORMANCE OBJECTIVES AND CRITERIA, Sec 4.0 States: "4.0 PART B - CNSC PERFORMANCE OBJECTIVES AND CRITERIA 4.3 OBJECTIVE 3 - An analysis of the job determines the job performance requirements and serves as the basis for the design and development of the training program. Criteria C3.2 The analysis identifies the tasks or job functions requiring initial training and those requiring	

Article No.	Article Requirement	Assessment	Compliance Category
		continuing training, with due consideration given to tasks performed during non-routine and emergency conditions."	
3.12.	The shift team shall be staffed to ensure that sufficient authorized operators are present to operate the plant in accordance with the operational limits and conditions. The shift staffing patterns, shift cycles and controls on working hours shall provide sufficient time for the training of shift personnel. Distractions to control room operators shall be minimized. To avoid overburdening control room operators and to allow them to focus on their responsibilities for safety, activities shall be scheduled to reduce simultaneous activities as far as possible.	BP-PROG-12.01, CONDUCT OF PLANT OPERATIONS, Sec 4.2.1 states: "4.2.1 Station Complement The normal scheduled, and minimum shift complements for each station operation and for site shall be specified and adhered to ensure safe operation and compliance with the station license. Staff must be qualified and fit for duty to be credited as complement, DIV-OPA-00001, DIV OPB 00001" DIV-OPA-00001, Station Shift Complement - Bruce A Sec 1.0 states: "This procedure applies to the regular (A, B, C, D, E) shift crews only. The procedure defines the normal, minimum scheduled and minimum shift complements for operation of Bruce A, in order to ensure safe operation of the nuclear units, both during normal conditions and in the event of a transient that could affect reactor safety. Complements are given for four units operating. This document implements the requirements of BP-OPP-00002, Operating Policies and Principles - Bruce A, 01.5 Station Staffing. The basis for the minimum shift complement is given by NK21-REP-09034-00006, Analysis of Resource Requirements to Respond to Abnormal Incidents at Bruce A." BP-PROC-00561 Operator Fundamentals, Appendix A Operator Fundamental Behaviours requires: • Control Room Shift Supervisor and Field Shift Operating Supervisor to maintain a high degree of professionalism in the Control Room to minimize distractions to Operators • The Shift Manager to manage scheduled and emergent activities to prevent crew overload or distractions. GRP-OPS-00038, Bruce A and B Operations Standards And Expectations, Sec 4.2 states:	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.2 Crew Supervision Expectations 3. Work Management (see also Section 4.37) Operations Managers and Supervisors shall maximize the performance of work by performing the following: d) The Control Room Shift Supervisor has the primary responsibility for the conduct of work in the Main Control Room and shall provide an environment such that the Control Room Operators are not distracted from their duties, ensure the workload is manageable and ensure that human performance tools are used to minimize errors. 4. Operator Development f) Supervisors shall ensure their Operators attend scheduled training, monitor the performance improvement subsequent to the training and provide feedback to the Training Department on any shortfalls."	
3.13.	A staff health policy shall be instituted and maintained by the operating organization to ensure the fitness for duty of personnel. Attention shall be paid to minimizing conditions causing stress, and to setting restrictions on overtime and requirements for rest breaks. The health policy shall cover the prohibition of alcohol consumption and drug abuse.	BP-MSM-1 Appendix A sets forth Bruce Power's health and safety policy as follows: Occupational Health and Safety Policy Bruce Power's number one value is Safety First. This is fundamental to our success and is essential to achieving our long-term business goals. A strong safety culture and healthy workplace environment are at the heart of everything we do. Bruce Power is committed to safety in its pursuit of performance objectives. We minimize risk to the public, visitors, contractors and our employees by integrating robust and effective hazard management into our business planning and work activities. Our goal of zero occupational injuries and illnesses reflects our steadfast commitment to the prevention of all occupational injuries and illnesses. Our Occupational Health and Safety (OH&S) managed system provides a framework which	C

Article No.	Article Requirement	Assessment	Compliance Category
		regularly realigns our OH&S objectives and programs to ensure continual improvement. In striving for excellence, legal requirements are considered the minimum standard. We adopt proven and effective best-in-class practices to provide enhanced safeguards vital to sustainable top quartile performance. We comply with these, as well as other OH&S requirements to which we subscribe. All employees' participation in identifying and effectively resolving OH&S issues is crucial to successfully upholding health and safety in the workplace. At Bruce Power, safety is everyone's responsibility. BP-PROG-12.01, Conduct of Plant Operations States: "4.2.1 Station Complement The normal scheduled, and minimum shift complements for each station operation and for site shall be specified and adhered to ensure safe operation and compliance with the station license. Staff must be qualified and fit for duty to be credited as complement, DIV-OPA-00001, DIV-OPB-00001." NK21-CORR-00531-10878, Subject: Type II Compliance Inspections: Hours of Work & Fitness for Duty, New Action Item 1307-4408 Sec 4.1.3 states: "4.1.3 Analysis Fitness for Duty Bruce Power uses the following procedures and form for managing Fitness for Duty: BP-PROC-00610 'Fitness for Duty' outlines Bruce Power's process for management of fitness for duty issues. GRP-OPS-00055, 'Fitness for Duty Considerations for Shift Complement Staff Held Over for More than 13 Hours' provides guidance for supervisors to follow when workers are held over from their regular shift to maintain Minimum Shift Complement. FORM-12987, 'Fitness for Duty Checklist' is referenced in GRP-OPS-00055 and BP-PROC-00610. It is used to assess any worker for a variety of impairments which could affect their	

Article No.	Article Requirement	Assessment	Compliance Category
		performance (i.e. stress, drugs and alcohol). 4.2.4 Fitness for Duty Considerations for Shift Complement Staff Held Over for More Than 13 Hours Guidance shall be provided for supervisors to follow when workers are held over from their regular shift in order to ensure compliance with the requirements for Station Minimum Shift Complement. These shall include direction for recognizing fatigue as well as mitigating strategies to ensure safe and reliable plant operation. GRP-OPS-00055" BP-PROC-00005, Limits to Hours of Work, Sec 1.0 and 4.1.3 state: "1.0 Purpose In recognition of Bruce Power's value of Safety First and the potential impact shift work may have on safety, this procedure identifies the process for monitoring and controlling the hours of work for Bruce Power employees. This procedure establishes a framework to facilitate compliance with the regulatory expectations of the Canadian Nuclear Safety Commission (CNSC), as well as any applicable legislative requirements such as those set out in the Employment Standards Act (ESA), regarding hours of work and any agreements between Bruce Power and the unions. An individual employee may be subject to some or all of these requirements depending on their position within the company and circumstances surrounding the work they perform. 4.1.3 Limits Applicable to All Employees Governed Under the ESA All employees are subject to the ESA and must comply with the following provisions. All hours worked, whether scheduled or unscheduled, must be charged against the employee's daily/weekly/yearly limits. ESA limits for hours of work apply to all employees including those covered under the additional limits specified in Section 4.1.5. Some clarification of Tempus is required: Tempus cannot determine if the employee has had the required 11 consecutive hours off if the employee has been sent home during the day and returns to work later. It is the manager's responsibility to ensure that the employee receives the required time off. Failure to provide the required time off is a violation of the procedure and will be reported. Tempus and various supporting documents refer to working 13 hours per day and 65 hours per	

Article No.	Article Requirement	Assessment	Compliance Category
		week. These hours were chosen in order to facilitate electronic monitoring of hours of work and to accommodate for meals and breaks. This does not mean that employees are permitted to work 13 hours; they must have a meal break and proper break time during the day such that actual time worked does not exceed 12 hours per day and 60 hours per week unless an exception to these limits apply as described below." BP-PROG-02.01, Worker staffing, Sec 4.4.2 states: "4.4.2 Limits of Hours of Work In recognition of Bruce Power's value of Safety First and the potential impact shift work may have on safety, Bruce Power has implemented a process for monitoring and controlling the hours of work for all employees (see BP-PROG-02.06, Worker and Labour Relations). A framework has been put in place to facilitate compliance with the regulatory expectations of the Canadian Nuclear Safety Commission (CNSC), as well as any applicable legislative requirements such as those set out in the Employment Standards Act (ESA), regarding hours of work and any agreements between." GRP-OPS-00055, Fitness for Duty Considerations for Shift Complement Staff Held Over for More Than 13 Hours, Sec 4.2.1 states: "4.2.1 Overall Limitations to Hours of Work Regardless of Cause The absolute limit for an employee to be on duty without at least a 1 hour rest period is 16 hours. After this point, the ANO shall be considered as unfit for duty and any additional assignment of and for this worker shall not occur until he/she has taken defined sleep breaks. Refer to Appendix A for Rest Area details."	
4.		Management of Operational Safety	NA
Requirement 5: Safety policy	The operating organization shall establish and implement operational policies that give safety the highest priority.	BP-MSM-1, Management System Manual", Sec 1.3.1, states: 1.3.1 Safety First We embrace and practice strong nuclear safety principles recognizing that reactor safety,	C

Article No.	Article Requirement	Assessment	Compliance Category
		industrial safety, radiation safety, and environmental safety are essential to the successful achievement of our long-term goals and key to our reputation. We: Assure Safety First before proceeding with any activity. Accept responsibility for our own and each other's safety. Work to minimize radiation dose to As Low As Reasonably Achievable (ALARA). Identify and correct safety concerns and do so with a sense of urgency. Ensure every recognized safety standard is achieved without shortcut. Anticipate hazards and manage risk through thorough planning and preparation. Embrace the Human Performance tools to minimize errors and prevent events." BP-PROG-00.07, Human Performance Program Sec 1.0 states: "Bruce Power's management model for achieving excellence describes our vision, values, key results areas, policies, programs and procedures. It defines how we execute, how we manage performance, and how we assess results. Central to this is fostering a healthy Safety Culture and being recognized for excellence in all aspects of nuclear safety including reactor safety, radiation safety, industrial safety and environmental safety management. The purpose of the Bruce Power Human Performance Program is to achieve excellence in Human Performance. In so-doing, the Human Performance Program meets N286-05 Management System Requirements for Nuclear Power Plants in particular generic requirements 5.3-5.6. The Human Performance Program also supports INPO 12-012 Traits of a Healthy Nuclear Safety Culture (e.g., Individual Commitment to Safety). BP-PROG-06.01, CNSC License Acquisition, Sec 01, states: "This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with acquisition of licences from the Canadian Nuclear Safety Commission (CNSC) in accordance with the Nuclear Safety and Control Act (NSCA), applicable regulations and other CNSC requirements and expectations. This element of the Bruce Power management system establishes processes that are necessary	

Article No.	Article Requirement	Assessment	Compliance Category
		to ensure business and operating objectives are achieved within a framework where safety of the reactors is the paramount objective. This framework is built on Bruce Power's fundamental safety culture principles: • Reactor safety • Industrial safety • Environmental safety • Radiological safety Once acquired, the CNSC licences issued to Bruce Power establish the scope of the licensed activities and the licence conditions applicable to those activities."	
4.1.	The operational policy established and implemented by the operating organization shall give safety the utmost priority, overriding the demands of production and project schedules. The safety policy shall promote a strong safety culture, including a questioning attitude and a commitment to excellent performance in all activities important to safety. Managers shall promote an attitude of safety consciousness among plant staff [2].	This requirement is partially addressed in detail in above requirement (Article 4.0). BP-PROG-15.01, Nuclear Oversight Management, Sec 1.0 states: "The purpose of this Program is to describe the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with the Nuclear Oversight Management process. It identifies the processes required to independently oversee the functioning of Bruce Power's Management System. This Program contributes to the development and growth of Nuclear Safety Culture by communicating the Nuclear Safety message, setting the example for nuclear safety and demonstrating this commitment through words and actions." BP-PROG-01.07, Corrective Action Sec 4.5 states: "4.5 Traits for a Healthy Nuclear Safety Culture The health of a facility's safety culture depends on the degree to which the employees internalize traits and attributes of a healthy nuclear safety culture. The basic traits and attributes embraced by this Human Performance Program match those listed in INPO 12-012. These traits will be reflected in the values, assumptions, behaviors, beliefs, and norms of the Bruce Power organization and its members. The following traits (refer to INPO 12-012), when embraced, positively influence the organization's shared assumptions, values, beliefs, behaviors and group norms that describe how things are done around here; thus contributing to a more Healthy Nuclear Safety Culture:	C

Article No.	Article Requirement	Assessment	Compliance Category
		1. Personal Accountability. 2. Questioning Attitude. 3. Effective Safety Communication. 4. Leadership Safety Values and Actions. 5. Decision-Making. 6. Respectful Work Environment. 7. Continuous Learning. 8. Problem Identification and Resolution. 9. Environment for Raising Concerns. 10. Work Processes." GRP-OPS-00038, Bruce A and B Operations Standards and Expectations, sec 4.27 states: "4.27 Questioning Attitude Expectation Safe operation of the facility takes precedence over all other considerations, including economic and competitive pressures. Nuclear and industrial safety is maintained at the forefront of all decisions. Questioning attitudes will be used at appropriate opportunities." BP-MSM-1, Management System Manual, Sec 7.3.4 states: "The NSRB has the responsibility for considering and advising the Boards the extent to which Bruce Power affairs are being conducted in a manner that promotes reactor, radiological, industrial and environmental safety and for continuing to emphasize the long-term effort required to improve safety culture permanently, including changing management behaviours and demonstrating leadership." GRP-OPS-00038, Bruce A And B Operations Standards and Expectations, Sec 4.5 states:	

Article No.	Article Requirement	Assessment	Compliance Category
		"4.5 Operator Behaviours Expectation Safety is the primary focus in all aspects of operation of the plant. All Operators are expected to behave in a professional manner. Operations are performed with thoughtful adherence to plant procedures and behaviours associated with Operations Fundamentals. Production and schedule pressures are not allowed to override personnel, plant or public safety concerns. Prompt conservative action must be taken when conditions necessitate. Adherence to these standards is required at all times, even if a job is considered repetitive and/or low risk."	
4.2.	The safety policy shall stipulate clearly the leadership role of the highest level of management in safety matters. Senior management shall communicate the provisions of the safety policy throughout the organization. Safety performance standards shall be developed for all operational activities and shall be applied by all site personnel. All personnel in the organization shall be made aware of the safety policy and of their responsibilities for ensuring safety. The safety performance standards and the expectations of the management for safety performance shall be clearly communicated to all personnel, and it shall be ensured that they are understood by all those involved in their implementation.	See above Articles 3.13, 4.0 and 4.1 for a detailed assessment of safety policies. BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 2.1 states: "2.1 How the BPMS Works The BPMS describes the way we manage our business. It is described at a high level in this document. It is the leadership "road map" or direction that defines how all aspects of our business fit together in an integrated manner and drives us towards excellence. Nuclear Safety is a primary consideration for Bruce Power; therefore our management system must support the enhancement and improvement of safety culture and the achievement of high levels of safety as well as business performance. The BPMS is designed to ensure the Bruce Power leadership team can consistently deliver expected results and satisfy stakeholders such as the regulator, the public, its shareholders and employees. It ensures that Bruce Power meets the stipulations of its operating licenses, other applicable codes, standards, legal and business requirements. The BPMS covers five components, each described in more detail in this manual, and applies to the entire business, at all locations managed by the organization. These components, which form the basis of the structure of this document, are: Strategic Direction. Plan - Policy, Program and Process Controls. Do - Process Management. Check - Monitoring for Results. Act - Continuous Learning	C

Article No.	Article Requirement	Assessment	Compliance Category
		Leadership and Organizational Accountability." BP-PROG-15.01, Nuclear Oversight Management, Sec 1.0 states: "The purpose of this Program is to describe the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with the Nuclear Oversight Management process. It identifies the processes required to independently oversee the functioning of Bruce Power's Management System. This Program contributes to the development and growth of Nuclear Safety Culture by communicating the Nuclear Safety message, setting the example for nuclear safety and demonstrating this commitment through words and actions. This is accomplished by the Planning, Scheduling, Conducting, Reporting and Overall Evaluation of Audits and Assessments." Employees receive safety related training as part of the initial general employee training under TQD-00010 General Employee Training: PEL 67430 – Welcome to Bruce Power and the Nuclear Industry, held during an employee's first week of employment wherein individuals are introduced to multiple topics and programs ranging from basic safety to CANDU basics to Human Performance awareness. Covers the following topics: Introduction To CANDU Orange Qualification Facility Tour - Bruce A Code Of Conduct WHIMS Environmental Awareness Generic Procedure Usage Generic Safety Rules Generic PEL 69177 – General Employee Training – Year One, held within an employee's first year of employment is designed to expand on their knowledge of the procedures, processes and	

Article No.	Article Requirement	Assessment	Compliance Category
		applications utilized at Bruce Power, including use of Human Performance tools, hazard recognition, and nuclear safety culture. GRP-OPS-00038, Bruce A And B Operations Standards and Expectations states: "4.24 Pre-Job Briefing and Post-Job Debriefings Expectation Pre-Job Briefings will be completed for assigned tasks to ensure that all participants have the knowledge and information necessary to perform assigned tasks successfully. Staff engagement during Pre-Job Briefings is important to gain full value from this human performance tool. In addition to formal operating experience, experienced staff contribute invaluable experiences that can enhance the briefings. Workers need to look for error likely situations and critical steps and proactively recommend error prevention tools during the briefings. Post-Job Debriefings will be completed as necessary to ensure lessons learned are effectively implemented. For use of this tool, refer to BP-PROC-00617, Human Performance Tools For Workers. The PJB Database, available through the Ops Support website, allows for the creation, retention and capturing of lessons learned." BP-PROC-00617 Human Performance Tools for Workers describes how a graded approach is used to determine the scope and depth of pre-job briefings by considering the likelihood and consequences of error. Appendix B includes a detailed tool description. "4.27 Questioning Attitude Expectation Safe operation of the facility takes precedence over all other considerations, including economic and competitive pressures. Nuclear and industrial safety is maintained at the forefront of all decisions. Questioning attitudes will be used at appropriate opportunities. Questioning Attitude is a Human Performance Tool. Requirements are identified in BP-PROC-00617, Human Performance Tools For Workers. Observation and Coaching Checklist, FORM-12978, CHECKLIST, Questioning Attitude, should be used to regularly assess and reinforce adherence to these expectations."	
4.3.	Key aspects of the safety policy	BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 7.7.1, and Appendix A state:	C

Article No.	Article Requirement	Assessment	Compliance Category
	shall be communicated to external support organizations, including contractors, so that the operating organization's requirements and expectations for the safety related activities of external support organizations, including contractors, will be understood and met.	" Sec 7.7.1; When it becomes necessary to employ the services of, or to buy products from, outside contractors or suppliers, they have a responsibility to ensure that the product or service they provide meet our requirements and perform as expected. The Contract sets the technical specification and boundaries of the Contractor's Quality Assurance (QA) Program. The Contractor must be audited to ensure their QA Program meets the specification and is then approved for use by Bruce Power. When required, a Project Execution Plan which is approved by management will define the boundaries and identify the affected and required procedures. This will set the environment that allows for the contractor to follow Bruce Power procedures where identified and/or their own procedures as per the individual contract. Appendix A; Contractor Management Bruce Power shall ensure safe, efficient and effective utilization of contractors performing, supporting and/or overseeing projects or other work activities both on-site and off-site for Bruce Power. This shall be done in a manner that ensures adherence to regulatory requirements, contractual documents and prescribed procedures as well as maximizing performance and project management effectiveness within planned budgets and schedules."	
4.4.	The safety policy of the operating organization shall include commitments to perform periodic safety reviews of the plant throughout its operating lifetime in compliance with the regulatory requirements. Operating experience and significant new safety related information from relevant sources, including information on agreed corrective actions and on necessary improvements that have been implemented, shall be taken into account (see also Requirement 12).	NK21-CORR-00531-10576, Application Requirements for Renewal of Power Reactor Operating Licences for Bruce Nuclear Generating Stations A and B, states: "The purpose of this letter is to respond to Reference 1 by providing a summary of how Bruce A and B plant condition assessments will be treated in the Bruce Power Licence Renewal submission as well as Bruce Power's plans to implement a full Periodic Safety Review process. As previously discussed with CNSC staff, Bruce Power is committed to the implementation of a Periodic Safety Review (PSR) process in support of long term operation of Units 1 through 8, with the first full PSR submission planned for no later than 2019. The scope of the Periodic Safety Review will be based on IAEA Specific Safety Guide SSG-25, "Periodic Safety Review for Nuclear Power Plants", taking the Integrated Safety Review process as described in CNSC Regulatory Document RD-360 "Life Extension of Nuclear Power Plants" into consideration. As part of an Asset Management Initiative under way since 2009 we have been completing the plant condition assessments necessary to support this work. In conjunction with the renewal process for nuclear power reactor operating licences PROL 15.00/2014 and PROL 16.00/2014, which are expected to cover the period from November 2014 until October 2019 inclusive, safety significant elements of a full Periodic Safety Review will be assessed and compiled for submission, along with a Safety Basis Report covering a minimum	C

Article No.	Article Requirement	Assessment	Compliance Category
		five year time period. The submission will demonstrate the continuing safety case for operation of Units 1 through 8 until 2019, while the comprehensive Periodic Safety Review methodology is developed and the full set of safety factor assessments completed. As part of the Periodic Safety Review Initiative an integrated safety basis will be established and regularly reviewed to identify potential improvements for evaluation." Use of experience from other plants and research findings and associated improvements are evaluated as part of the periodic safety reviews.	
4.5.	The safety policy of the operating organization shall include a commitment to achieving enhancements in operational safety. The strategy of the operating organization for enhancing safety and for finding more effective ways of applying and, where feasible, improving existing standards shall be continuously monitored and supported by means of a clearly specified programme with clear objectives and targets.	Assessed in detail under Requirement 5 and Articles 3.13, 4.1, 4.2 and 4.4: BP-MSM-1, Management System Manual, Sec 2.1, 5.0, 5.4 and Appendix A state: "2.1 How the BPMS Works The BPMS is designed to ensure the Bruce Power leadership team can consistently deliver expected results and satisfy stakeholders such as the regulator, the public, its shareholders and employees. It ensures that Bruce Power meets the stipulations of its operating licenses, other applicable codes, standards, legal and business requirements. 5.0 Check - Monitoring For Results Monitoring for Results outlines how we hold ourselves accountable for business plan results, achieving strategic objectives, meeting regulatory requirements and identifying opportunities for improvement. Key features include: •Performance Monitoring. •Management Meetings. •Corrective Actions. •Benchmarking and Operating Experience. •Assessments. 5.4 Benchmarking and Operating Experience We seek out leading practice and determine how to apply it at Bruce Power to enable continuous improvement. The "Operating Experience" process provides for evaluating and disseminating in-house and	C

Article No.	Article Requirement	Assessment	Compliance Category
		industry operating experience information. This information is sought by and supplied to appropriate personnel for consideration and initiation of actions to prevent adverse conditions or to improve performance with respect to plant safety, reliability, economy and profitability. Appendix A states: Nuclear Oversight Management Bruce Power shall independently audit, assess, and monitor station operation to ensure this operation is conducted in accordance with required regulations and licensing requirements, as well as management standards and expectations. Bruce Power shall develop and maintain independent systematic oversight evaluations to determine the establishment, implementation and effectiveness of the Management System in achieving the expected results. Bruce Power shall design and develop oversight practices to enhance Bruce Power's reputation in a manner that demonstrates safe reliable plant operation, achieves leading industry practices based on continuous improvements and meeting applicable regulatory/statutory obligations." BP-PROC-00016, Business Assessment Process, Section 4.0 highlights the need for: "…a periodic review of oversight and safety culture findings to contribute to fostering a healthy nuclear safety culture and business excellence."	
Requirement 6: Operational limits and conditions	The operating organization shall ensure that the plant is operated in accordance with the set of operational limits and conditions.	BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Appendix A states: Conduct of Plant Operation Bruce Power shall operate its nuclear plant facilities, systems, and equipment in a manner that ensures compliance with the operating licences, Operating Policies and Principles and other applicable regulations and standards. Nuclear safety shall be a primary consideration of every operational decision. Bruce Power shall establish operations ownership of all activities that affect station operation and the standards for common nuclear work practices used throughout Bruce Power facilities." 1.1 BP-PROG-12.01 Conduct of Plant Operations section 4.3 Plant Operation states the following: Plant operations shall be conducted in a professional manner to ensure safe and reliable	C

Article No.	Article Requirement	Assessment	Compliance Category
		operation of the plant, meeting or exceeding all regulatory requirements, industry standards, and industry good practices. Plant operations shall be conducted within the bounds of the Safe Operating Envelope, license requirements, and approved plant procedures during normal and abnormal conditions. The requirements for plant operations are implemented by the suite of procedures listed in Section 5.3, item 3, Implementing Documents, Plant Operation. Bruce Power Operating Policies and Principles BP-OPP-00002, states the following: Any operating conditions or restrictions included in the Operating Licence for Bruce Nuclear Generating Station A shall be observed as part of the Operating Policies and Principles. BP-OPP-00002 sets out the system and component operating limits to assure compliance with the PROL. Compliance with these limits is integrated in the operating procedures and surveillance and testing requirements. Bruce A has recently completed its baseline Safe Operating Envelope (SOE) project which consisted of documenting the limits and conditions derived from the safety analysis in Operational Safety Requirements (OSRs), completing the corresponding Instrument Uncertainty Calculations (IUCs), and performing Gap Assessments to verify the requirements are completely and accurately reflected in the station operating documentation. The baseline project and subsequent programmatic SOE activities aim to ensure that the operating limits and conditions in station operating documentation remain aligned with safety analysis upon which the station is licensed as required by the relevant codes and standards in particular CSA N290.15-10, "Requirements for the safe operating envelope of nuclear power plants" which is expected to be incorporated into the new PROL. The SOE project is being implemented using the following procedures: BP-PROC-00363, “Nuclear Safety Assessment” DPT-NSAS-00012, “Preparation and Maintenance of SOE Requirements” DPT-NSAS-00012 - Preparation and Maintenance of Operational Safety Requirements describes the process, roles and responsibilities of associated personnel for the preparation and revision of Operational Safety Requirements (OSR) which document those aspects of the Safe Operating Envelope (SOE) that are derived from the nuclear safety analysis. The procedure is consistent with the objectives and principles described in the applicable Bruce Power governing documents, applicable CSA Standards and the COG Principles and Guidelines	

Article No.	Article Requirement	Assessment	Compliance Category
		for the Definition and Implementation of the Safe Operating Envelope at CANDU Power Plants in Canada. DPT-RS-00015, "Safe Operating Envelope Gap Assessment" DPT-RS-00015, Safe Operating Envelope Gap Assessment Sec 1.0 states: "1.0 Purpose This procedure provides guidance on how to assess whether station design, operation and maintenance is in compliance with the requirements imposed by the licensing safety analysis as documented in the Operational Safety Requirements (OSR) and supporting Instrument Uncertainty Calculations (IUC) and outlines the roles and responsibilities associated with sustaining SOE compliance. The OSRs and IUCs are living documents that require continuous updates to address changes to the design and safety analyses of the stations. Use of this procedure will assist in the appropriate identification of station operating and maintenance practices required to support compliance to these changes. It will also assist in identifying changes to design, operating and maintenance practices that may impact on compliance with the licensing safety analyses." "4.0 Procedure Description 4.1 General Background An SOE compliance framework has been in place since the plant has been operating. Limits and conditions are typically specified in station operating documentation such as the Operating Policies and Principles (OP&Ps) and Impairment Manuals. These and the plant operating and maintenance practices form the basis for a compliance framework that has worked successfully to ensure that the plant is operating in accordance with the Safety Analysis upon which it licensed. However, a number of weaknesses in past practice had been identified in previous assessments: The SOE project was therefore created to focus on ensuring that the information required by the Operator to ensure conformance with the Safety Analysis upon which the plant is licensed has been correctly, completely and consistently defined and reflected in station operating documentation. As the first project deliverable, the information that defines the licensing safety analysis credits, assumptions and numerical limits, and the associated conditions of operability (impairments) and required surveillances have been consolidated into a set of documents for each station,	

Article No.	Article Requirement	Assessment	Compliance Category
		otherwise known as Operational Safety Requirements (OSRs) documents and supporting Instrument Uncertainty Calculations (IUCs). The Operational Safety Requirements (OSRs) documents are structured on a station system or functional basis to facilitate use by the Operator, rather than on the accidents basis as used by the licensing safety analysis the OSRs are based on. The documents define the SOE requirements in terms that establish the linkage to the safety analysis source documents that comprise the bases for these limits. They are issued as type "MAN" controlled documents under the system USI. The process, roles and responsibilities associated with the preparation and maintenance of OSR documentation are covered by DPT-NSAS-0012, Preparation and Maintenance of Operational Safety Requirements.	
4.6.	The operational limits and conditions shall form an important part of the basis for the authorization of the operating organization to operate the plant. The plant shall be operated within the operational limits and conditions to prevent situations arising that could lead to anticipated operational occurrences or accident conditions, and to mitigate the consequences of such events if they do occur. The operational limits and conditions shall be developed for ensuring that the plant is being operated in accordance with the design assumptions and intent, as well as in accordance with its licence conditions.	The basis for operational limits and conditions have been assessed in detail in 'Requirement' above BP-MSM-1 Section 4.1.2 Operating Policies and Principles says: Supplementary to the Policy Statements are the Operating Policies & Principles that have been established as enabling requirements to the Bruce A and Bruce B Power Reactor Operating Licences, and the Central Maintenance and Laundry Facility Waste Nuclear Substance Licence. OP&P documents are governed by the MSM. They define the operating boundaries within which the facility may be safely operated and, as a result, they contribute to the establishment of requirements, methods, procedures, terms, conditions, limits and interfaces for processes and documents within the Management System. BP-PROG-01.02, Bruce Power Management System (BPMS) Management states: Nuclear Safety is a primary consideration for Bruce Power therefore our management system must support the enhancement and improvement of safety culture and the achievement of high levels of safety as well as business performance. The Bruce Power Management System (BPMS) is described in BP-MSM-1, Management System Manual, and is made up of the Management System Manual and all the Programs that support it, including this one. The BPMS Management Program establishes the governance, provides oversight, support and enables the maintenance of an integrated management system framework for Bruce Power. This Program supports the implementation of the BPMS in such a way that it is known, understood and followed. This Program establishes the expectation that BPMS Functional Areas follow a plan-do-check-act cycle in their Program development and adopt an integrated approach to requirements management, while ensuring safety is the paramount consideration for guiding decisions and actions.	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00363, Nuclear Safety Assessment, Sec 4.0 states: "4.0 Procedure Description NSA is the systematic process carried out, throughout the design modification process or in addressing emergent issues (e.g., plant aging) that may affect the Design Basis or the Safety Report Basis, to ensure that all necessary nuclear safety requirements are defined for the actual or proposed design of the plant. The NSA also considers very unlikely severe accidents that may result in major radioactive releases to ensure that their likelihood of occurrence remains extremely low. NSA integrates safety analysis, PRA and CSE. BP-PROC-00335, Design Management (interfacing document) and BP-PROC-00363, Nuclear Safety Assessment (this procedure) are fundamentally iterative processes that provide assurance that the plant Design Basis as described in design documentation and the safety analysis as described in the SR agree and provide a consistent basis for safe operation. This iterative process continues until a design solution has been reached that meets all safety requirements including those that may evolve during the course of design. NSA is undertaken to address: •Proposed or planned changes, i.e., design changes, changes to operating procedures, changes to maintenance requirements, changes to surveillance requirements, or plant status changes. •Emergent issues concerning plant design or operation, or the adequacy of applicable NSAs."	
4.7.	The operational limits and conditions shall reflect the provisions made in the final design as described in the safety analysis report. The operational limits and conditions shall be submitted to the regulatory body for assessment and approval before the commencement of operation, if so required by the regulatory body. All operational limits and conditions shall be substantiated by a written	Also assessed in detail under Requirement and Article 4.6 above. BA-LCH-R8, Sec 3.1 states: "3.1 Maintaining Operating Policies and Principles (OP&Ps) The current documentation (i.e. Bruce Power's OP&Ps) does not contain a comprehensive set of operating limits and conditions. Bruce Power is moving towards the implementation of a Safe Operating Envelope (SOE) program which will provide the comprehensive identification of all operating limits and conditions in compliance with the requirements of CSA N290.15. Operating limits are considered to be fundamental to the licensing of a station to operate. Some limits are included directly in the licence and currently include the fuel bundle, fuel channel and reactor power limits listed in Appendix B of the PROL. The boundary of authorization from the	C

Article No.	Article Requirement	Assessment	Compliance Category
	statement of the reason for their adoption.	operational perspective will be the SOE limits and conditions as defined by CSA standard N290.15. Bruce Power can use processes to return the facility to an analyzed state (e.g., carry out assessments to demonstrate that the facility is brought back into an analyzed state) without shutting down as long as a safe configuration of the nuclear facility is maintained. If Bruce Power discovers that current operation no longer falls within an analyzed state, Bruce Power must promptly determine the quickest safe method of returning the plant to an analyzed state, and then implement the necessary changes. Compliance Verification Criteria: Bruce Power has indicated that the project portion of the SOE baseline implementation is considered complete. Any outstanding issues will be moved to the maintenance phase of SOE sustainability which is currently in development. Changes to the SOE which are in the safe direction only require notification to the Commission, or a person authorized by the Commission, prior to implementation. However, SOE changes that may reduce margins require CNSC staff consent prior to implementation."	
4.8.	The operational limits and conditions shall be reviewed and revised as necessary in consideration of experience, developments in technology and approaches to safety, and changes in the plant.	Refer to assessment of 'Requirement' and Articles 4.6 and 4.7 above. DPT-NSAS-00012, "Preparation and Maintenance of SOE Requirements" DPT-NSAS-00012 - Preparation and Maintenance of Operational Safety Requirements describes the process, roles and responsibilities of associated personnel for the preparation and revision of Operational Safety Requirements (OSR) which document those aspects of the Safe Operating Envelope (SOE) that are derived from the nuclear safety analysis. The procedure is consistent with the objectives and principles described in the applicable Bruce Power governing documents, applicable CSA Standards and the COG Principles and Guidelines for the Definition and Implementation of the Safe Operating Envelope at CANDU Power Plants in Canada. DPT-RS-00015 R000, Safe Operating Envelope Gap Assessment Sec 1.0 states: "This procedure provides guidance on how to assess whether station design, operation and maintenance is in compliance with the requirements imposed by the licensing safety analysis as documented in the Operational Safety Requirements (OSR) and supporting Instrument Uncertainty Calculations (IUC) and outlines the roles and responsibilities associated with	C

Article No.	Article Requirement	Assessment	Compliance Category
		sustaining SOE compliance. The OSRs and IUCs are living documents that require continuous updates to address changes to the design and safety analyses of the stations. Use of this procedure will assist in the appropriate identification of station operating and maintenance practices required to support compliance to these changes. It will also assist in identifying changes to design, operating and maintenance practices that may impact on compliance with the licensing safety analyses." NK21-CORR-00531-11391, BA-LCH-R8, Sec 3.1 and 3.2 state: "3.1 Maintaining Operating Policies and Principles (OP&Ps) Operating limits, as well as procedural and administrative limitations for safety systems and safety-related systems shall be specified in the operating policies and principles. Operation in states not considered in, or bounded by the safety analysis is not permitted. 3.2 Compliance Verification Criteria: Changes to the limits that require a licence amendment are those specified in Appendix B. Changes to the limits that require written consent by a person authorized by the Commission, refer to those stated in the Bruce Power OP&P document, BP-OPP-00002, submitted as part of the licence renewal application. Changes made to Bruce Power's OP&P document that require CNSC consent are changes that could have an overall impact on the fundamental philosophy of nuclear safety which are not made in the conservative direction (changes made in the conservative direction require prior written notification only). This includes any change that will: 1. Impact on Defense in Depth; 2. Reduce the ability to adequately control, cool and contain the reactor; 3. Cause hazards or risks different in nature or greater in probability or magnitude than those stated in the design and analysis of the plant; as per the credited design in the safety analysis." DPT-RS-00015, Safe Operating Envelope Gap Assessment Sec 4.2.1 states: "4.2.1 OSR Compliance Guidelines For each SOE system, the Operational Safety Requirements specifies three related compliance requirements and the guidelines for these will be discussed separately in this section. These compliance requirements are:	

Article No.	Article Requirement	Assessment	Compliance Category
		The Safety Analysis Limits for the system, parameter or component with reference to the relevant analysis documentation. The Surveillance Requirements which confirm compliance with the Safety Analysis Limits. The Operability Conditions that result when an SOE parameter, system or component is found to be outside the Safety Analysis Limits.	
4.9.	The operational limits and conditions shall include requirements for normal operation, including shutdown and outage stages, and shall cover actions to be taken and limitations to be observed by the operating personnel.	DPT-NSAS-00012 - Preparation and Maintenance of Operational Safety Requirements As described in DPT-NSAS-00012, the Operational Safety Requirements (OSR) document is the "operationalization" of the nuclear safety requirements for a given system. In other words, it translates the requirements expressed either explicitly or implicitly in the safety analyses, which are typically organized according to accident type, into system based requirements which can be more easily understood and implemented by site staff. As such, normal operation, including shutdown and outage stages is covered. OSRs include safety analysis limits, operability conditions and surveillance requirements. Actions to be taken by the operating personnel are included in BP-OPP-0002, operating procedures, SST specifications NK21-OM-03500.1 Impairments of Special Safety Systems and Other Safety Related Systems and NK21-OM-03672 Safety Related System Impairments Manual. DPT-RS-00015, Safe Operating Envelope Gap Assessment, Sec 4.2.1.2 states: "4.2.1.2 OSR Surveillance Requirement (SR) Compliance Surveillance Requirements (SR) refer to the component/system level testing and monitoring activities required to verify that the subsystem/component meets its performance requirements. The requirements specify minimum hardware operability limits, parameter values and automatic initiation setpoints consistent with the Safety Analysis Limits. Where a Surveillance Requirement relies on installed plant instrumentation to monitor conformance to the Safety Analysis Limits (SALs), applicable instrument errors and uncertainties need to be considered in order to account for expected deviations that may have an adverse impact on instrument performance. Compliance to the Surveillance Requirements for a system means that there are auditable compliance tests or monitoring activities (with appropriate allowance for instrument errors and uncertainties) that can be carried out by the Operator such that the SALs are satisfied. It is not a	C

Article No.	Article Requirement	Assessment	Compliance Category
		requirement to comprehensively list all potential compliance documents, but to ensure that a primary compliance surveillance exists that adequately satisfies the Surveillance Requirement. The primary compliance surveillance should be a controlled document or controlled process in order to ensure that any changes would be appropriately assessed for impact on SOE compliance."	
4.10.	The operational limits and conditions shall include the following: (a) Safety limits; (b) Limiting settings for safety systems; (c) Limits and conditions for normal operation; (d) Surveillance and testing requirements; (e) Action statements for deviations from normal operation.	Refer to statement of Requirement, Articles, 4.6, 4.7 and 4.8, previously for (a) to (d)). NK21-OM-03672, Safety Related System Impairments, Sec 1.0 and 1.4 state: "Purpose: This manual is written to provide operating staff with guidance and criteria for identifying, classifying and responding to impairments of the four Special Safety Systems and various Safety Support Systems. Prompt action in this area will contribute to maximizing availability of respective systems and in turn reduce adverse consequences in the event of a serious process upset. The provisions in this manual are written to cover impairments identified during normal station operation. 1.4 Priority of Response During Transients A failure of a Safety Related System to operate as designed during a process upset, or a process upset caused by an impairment of a Safety Related System shall be addressed using appropriate transient response procedures. The actions in this manual would only be implemented once unit(s) has been placed in a safe and stable state." DPT-RS-00015, Safe Operating Envelope Gap Assessment, Sec 4.2.1.2 states: "4.2.1.2 OSR Surveillance Requirement (SR) Compliance Surveillance Requirements (SR) refer to the component/system level testing and monitoring activities required to verify that the subsystem/component meets its performance requirements. The requirements specify minimum hardware operability limits, parameter values and automatic initiation setpoints consistent with the Safety Analysis Limits. Where a Surveillance Requirement relies on installed plant instrumentation to monitor conformance to the SAL, applicable instrument errors and uncertainties need to be considered in order to account for expected deviations that may have an adverse impact on instrument performance. Compliance to the Surveillance Requirements for a system means that there are auditable	C

Article No.	Article Requirement	Assessment	Compliance Category
		compliance tests or monitoring activities (with appropriate allowance for instrument errors and uncertainties) that can be carried out by the Operator such that the SALs are satisfied. It is not a requirement to comprehensively list all potential compliance documents, but to ensure that a primary compliance surveillance exists that adequately satisfies the Surveillance Requirement. The primary compliance surveillance should be a controlled document or controlled process in order to ensure that any changes would be appropriately assessed for impact on SOE compliance."	
4.11.	Operating personnel who are directly responsible for the conduct of operations shall be trained in and shall be thoroughly familiar with the operational limits and conditions in order to comply with the provisions contained therein.	BP-PROG-12.01 Conduct of Plant Operations states the following: 4.1 Operator Documentation Operations Documentation includes: • Operating procedures (Operating Manuals, Operating Memos, Alarm Response Manuals, Safety System tests, etc.). • Operational flowsheets. Procedures for the safe and reliable operation of plant equipment shall be prepared, approved, controlled and readily available to the operating staff. These procedures shall be prepared for all anticipated normal, abnormal and emergency conditions. All operating procedures shall be created as controlled document, in accordance with the requirements of BP-PROG-03.01, Document Management to ensure document lifecycle management requirements are met. (BP-PROC-00068, Controlled Document Life Cycle Management). 1.2 4.2 Operator Staffing Hiring of operating staff as per BP-PROG-02.01, Worker Staffing, and their deployment to operating departments shall be done in a manner that ensures the safe operation of the plant and meets regulatory complement requirements. The training program will ensure personnel are qualified to perform operations activities. The training of all operations staff will be performed in accordance with Bruce Power training procedures as governed by BP-PROG-02.02, Worker Training and Qualification.	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-02.02, Worker Training and Qualification states: "1.0 Purpose The purpose of the Worker Learning and Qualification program is to enable personnel to competently and safely operate, maintain and improve the performance of our Stations. Learning includes: 1. The training elements that support Worker Qualifications that grant working rights. 2. Training elements that support Professional Development. Qualification includes all qualifications approved to be included within Training Qualification Documents (TQDs). The Worker Learning and Qualification program satisfies the worker Qualification and worker Training requirements of applicable legislation (e.g., acts and regulations), licenses, certifications, and codes and standards commensurate with Bruce Power's business needs including commitments made in our PROL application and requirements included in our PROL. The Worker Learning and Qualification program ensures conformance with clause 5.3 of N286-05, Management System Requirements for Nuclear Power Plants, which states that personnel must "be competent at the work that they do". The Worker Learning and Qualification program sets the standard for the entire company on how to ensure that personnel are competent at the work that they do."	
4.12.	The operating organization shall ensure that an appropriate surveillance programme is established and implemented to ensure compliance with the operational limits and conditions, and that its results are evaluated, recorded and retained.	GRP-OPS-00047 Operator Routines and Inspections - Bruce A And Bruce B and BP-PROC-00268, Safety System Testing (SST) Program Procedures establish the scope and requirements for SSC surveillance. GRP-OPS-00047 Operator Routines and Inspections - Bruce A And Bruce B states the following: Operator Field Inspections (OFI)s and Routines are key to Monitoring and are fundamental in ensuring that process systems and components are operating properly, parameter values are within limits, poised systems are available to operate properly, and overall unit conditions are maintained to a high standard. Approved inspection sheets help ensure that inspections are done consistently and to a high standard. This procedure defines what Routines and OFIs are, how they are initiated, changed, scheduled, conducted, and documents the process, standards and requirements for their completion at	C

Article No.	Article Requirement	Assessment	Compliance Category
		Bruce A and Bruce B. PROC-00268, Safety System Testing (SST) Program Procedures, section 1.0 states the following: This site procedure defines the Safety Related System Testing (SST) program and lists the roles and responsibilities of stakeholders in relation to the testing requirement of Safety Related Systems. The SST program has been designed to meet the following primary objectives: 1. Demonstrate that the special safety, safety support and standby safety systems meet their design targets for equipment reliability. 2. Ensure that the requirements of Operating Policies and Principles (OP&P's) are met. 3. Notify the Canadian Nuclear Safety Commission (CNSC), as per the Operating License, of Safety Related System component failures and impairments discovered by the testing program in accordance with S-99, Reporting Requirements for Operating Nuclear Power Plants. 4. Provide meaningful failure rate data on Safety Related System operation. The SST program forms part of the integrated and coordinated Equipment Reliability Program (BP-PROG-11.01) through Performance Monitoring (BP-PROC-00781) based on the INPO Equipment Reliability Process description (AP-913). BP-PROC-00781, Performance Monitoring Sec 1.0 states: "1.0 Purpose This procedure provides the basis and expectations for the Equipment Performance Monitoring Process at Bruce Power. This process supports the Equipment Reliability Program (BP-PROG-11.01). The scope of which Structures, Systems and Components (SSCs) are included in the performance and condition monitoring program is identified by assessing the criticality of the SSC. This is done by applying the appropriate screening criteria to the function of the SSC and assessing the impact of SSC failure on plant safety, reliability or economics via BP-PROC-	

Article No.	Article Requirement	Assessment	Compliance Category
		00778, Scoping & Identification of Critical SSCs. BP-PROC-00781 describes the process for establishing performance criteria and monitoring parameters for important structures, important system functions and critical components and program performance. This procedure describes the: Monitoring and trending of system performance. Monitoring and trending of component performance. Monitoring and trending of program performance. Trending of predictive maintenance results. Use of operator rounds monitoring. Monitoring of safety system test (SSTs) results. Monitoring by Responsible System Engineers/Station Component Engineers walkdowns. Performance monitoring results are recorded in System Health Reports, Component Health Reports (SHRs/CHRs) or Program Health Reports. The development and implementation of long term equipment health plans is described. This procedure is applicable to all personnel who execute the role of system, component and/or program engineers."	
4.13.	The plant shall be returned to a safe operational state when an event occurs in which parameters deviate from the limits and conditions for normal operation. Appropriate remedial actions shall be taken. The operating organization shall undertake a review and evaluation of the event. The regulatory body shall be notified in accordance with the established event reporting	BP-PROG-12.01 and its associated documentation (Operating Procedures, Alarm Response Manual, NK21-OM-03500.1, Impairments of Special Safety Systems and Other Safety Related Systems, NK21-OM-03672 Safety Related System Impairments Manual and NK21-OM-09034 Abnormal Incidents Manual) describe the requisite actions required to return the plant to a safe operational state. NK21-OM-03672, Safety Related System Impairments Manual Sec 1.1 states: "1.1 Impairment Identification and Confirmation The majority of Safety Related Systems (included in this manual) are in a poised state during normal station operation. While some conditions would be observable, other impairments of these systems could remain dormant. It is important there is an on-going surveillance program to	C

Article No.	Article Requirement	Assessment	Compliance Category
	system.	determine degree of operability exists. The following four methods are used to identify impairments: While each of these methods, on its own, can identify possible impairments, they may not be able to confirm the impairment. It is important to confirm existence of an impairment to ensure actions taken are appropriate. For example, some SSTs can identify the possibility of a trip parameter being outside the limit. This cannot normally be confirmed if deviation is small due to limitations of test method. Further investigation is required by, i.e. calibration, to confirm sensing loop accuracy. 1. Panel and Field Monitoring Monitoring of system parameters and equipment conditions is an on-going function of the Control Room and Field Operators. Vigilance in monitoring will identify degrading conditions possibly before more serious impairments occur. 2. Annunciation Annunciation supplements system monitoring, detects adverse conditions and alerts the Operator. Maintaining an effective annunciation system is an important activity to ensure prompt identification of adverse system conditions. 3. Predefined Maintenance The Predefined Maintenance Program consists of periodic scheduling of preventive maintenance tasks, such as, detector calibrations to ensure measurements are accurate. 4. Safety System Tests (SSTs) The purpose of SSTs is to confirm normally poised (i.e. not operating) equipment will operate as required on demand. Testing identifies failed equipment and enables priority repairs to restore operability. Testing also provides reliability data to demonstrate availability targets are met. SSTs will be scheduled by the Reactor Safety Support section and must be completed within the prescribed period. Scheduled tests are not considered as discretionary. Tests are important, not only to prove equipment is operable, but also provide data about how long equipment might have been inoperable. Surveillance tests will also be performed following maintenance to confirm system operability. “For Level 1 or 2 impairments, actions are required to restore operation within the SOE or to place the unit in state for which the violated limit(s) no longer apply. This must be done within	

Article No.	Article Requirement	Assessment	Compliance Category
		strict time limits, and is subject to management and CNSC notifications. For Level 3 impairments, actions are required to restore redundancy or margin promptly. Times limits are not specified since reliability analysis are generally used to define repair time consistent with the unavailability requirements for the system. Impairments for safety-related systems are not documented in the IM according to impairment levels but follow the same logic such that more severe the impairment, potential consequences or probability, the more urgent and higher priority are the decision and action times. Implementation of new impairment requirements will require the support of the Reactor Safety Programs section to determine appropriate action and completion times." Reporting and evaluation of all events resulting in adverse conditions is governed by BP-PROC-00060, Station Condition Record Process, Sec 1.0 states: "1.0 Purpose Bruce Power's Management model for achieving excellence describes our vision, values, key result areas, policies, programs and procedures. It defines how we execute, how we manage performance and how we assess results. Central to this is fostering a healthy Safety Culture and being recognized for excellence in all aspects of nuclear safety including reactor safety, radiation safety, personnel safety and environmental safety management. The purpose of the Corrective Action Program is to identify and eliminate or mitigate adverse conditions that could negatively impact nuclear safety, business loss or corporate reputation. The Station Condition Record (SCR) process is used to document adverse conditions, investigation results and corrective actions related to people, plant, environment and process. A consistent reporting and evaluation process for identified adverse conditions, including but not limited to nonconformances, is required to minimize undesirable impacts on nuclear safety, business loss, and corporate reputation. This is accomplished by ensuring the following: • Events, incidents, and error-likely situations are adequately documented. • Cause(s) are determined. • Appropriate corrective action(s) are implemented. • Lessons learned are identified for communication to internal and external organizations.	

Article No.	Article Requirement	Assessment	Compliance Category
		For nonconformances which could but have not yet resulted in a nonconforming item, BP-PROC-00060 applies rather than BP-PROC-00252, Control of Nonconforming Items. An SCR is required, but the Tagging and Segregation steps do not apply. In this case, it is very important to control the nonconformance to ensure that no nonconforming item is produced. This might include actions like quarantining a procedure, ceasing work using faulty equipment or process, ensuring that non-qualified staff do not work on tasks requiring qualification, etc. The means taken to control the nonconformance should be described in the SCR." As part of the SCR process the FLM will: -Determine the Significance Level of the SCR. Appendix C, Categorizing Significance Levels of SCRs, provides guidance to determine Significance Levels. Timely review of the SCR plays a key role in reducing the time at risk. Timelines for the FLM Review of the SCR are: -Significance Level 1 and 2 SCRs, S-99 reportable events and events for which the S-99 reportability cannot be easily determined by the end of the shift or workday and submit SCRs to CAPCO status within 48 hours (2 days). -Significance Level 3, 4 and 5 SCRs, up to 7 days may be taken to allow time to address the condition and document actions taken, and/or to determine what corrective actions are required. -Ensure all the actions taken or required to be taken as per requirements of BP-PROC-00059, Event Response and Reporting are documented in the SCR. Prepare and Submit the draft S-99 Preliminary Report Form to the Duty Manager in accordance with BP-PROC-00059, Event Response and Reporting, if it is reportable under S-99 Clause 6.3.1.BP-PROC-00165 Reporting CNSC- Power Reactor Operating Licences provides specific guidance for S-99 reporting.	
4.14.	A process shall be established to ensure that deviations from operational limits and conditions are documented and reported in an appropriate manner and that appropriate actions are taken in response. Responsibilities and lines of communication for responding to such deviations shall be clearly specified in	In addition to the process described in Article 4.13 above: BP-PROC-00059, Event Response and Reporting defines the process for preliminary response and reporting to internal contacts and external agencies and to ensure compliance with both Bruce Power and Regulatory requirements. The procedure governing the detailed reporting of events and scheduled reporting to external agencies as described in BP-PROC-00165, Reporting to CNSC – Power Reactor Operating Licences.	C

Article No.	Article Requirement	Assessment	Compliance Category
	writing.	As related to event reporting, Section 1.0 Purpose states the following: The purpose of this procedure is: 1. To establish standardized practices, format and content for all unscheduled formal reports to the CNSC made pursuant to Regulatory Standard S-99, Reporting Requirements for Operating Nuclear Power Plants (hereafter referred to as S-99) associated with the Power Reactor Operating Licences (PROLs) for Bruce A and Bruce B. S-99 specifies four types of unscheduled reports, they are: a) Situations and events that require both preliminary and detailed reports pursuant to S-99, Section 6.3.1. b) The reaching of an action level pursuant to S-99, Section 6.3.2.1. c) Reports on the performance and status of certified personnel pursuant to S-99, Section 6.3.2.2. d) Reports of problems identified by research findings or revised analyses pursuant to S-99, Section 6.3.2.3. DPT-RS-00015, Safe Operating Envelope Gap Assessment, Sec 4.2.1.3 states: "For Level 1 or 2 impairments, actions are required to restore operation within the SOE or to place the unit in state for which the violated limit(s) no longer apply. This must be done within strict time limits, and is subject to management and CNSC notifications. For Level 3 impairments, actions are required to restore redundancy or margin promptly. Times limits are not specified since reliability analysis are generally used to define repair time consistent with the unavailability requirements for the system. Impairments for safety-related systems are not documented in the IM according to impairment levels but follow the same logic such that more severe the impairment, potential consequences or probability, the more urgent and higher priority are the decision and action times. Implementation of new impairment requirements will require the support of the Reactor Safety Programs section to determine appropriate action and completion times." BP-PROC-00014, Technical Operability Evaluation, Sec 1.0 and 7.4 state: "1.0 Purpose This procedure provides a uniform process for identifying and evaluating degraded station conditions when the ability of Structures, Systems or Components (SSC) to carry out their	

Article No.	Article Requirement	Assessment	Compliance Category
		safety-related functions, comes into question. A formal Technical Operability Evaluation (TOE) provides a substantiated engineering verification that an SSC is capable of fulfilling its minimum credited safety function(s) or a determination that an SSC is not capable of fulfilling its minimum credited safety function(s). A TOE determination may be used to provide a basis for continued operation of a reactor unit, but the primary objective of performing a TOE is to verify operability of the SSC. 7.4 TOE Owner 7.4.1 Responsible for evaluation of a specific TOE including recommendations for TOE corrective and compensatory actions and follow-up activities, including reporting, tracking and TOE closure. As part of the responsibility for tracking the TOE, the TOE Owner must ensure that any conditions that could change in the future, and potentially invalidate the TOE disposition, are clearly identified. This concern regarding changing conditions is especially applicable to safety analysis assumptions."	
4.15.	The operating organization shall not intentionally exceed the operational limits and conditions. Where circumstances necessitate plant operation outside the operational limits and conditions, clear formal instructions for such operations shall be developed, on the basis of safety analysis, if applicable. These instructions shall include instructions for returning the plant to normal operation within the operational limits and conditions. The instructions shall also include specification of the arrangements for approval by the operating organization and the regulatory body, as appropriate, of the changed operational limits and conditions, prior to operation	Introduction to BP- OPP-0002 Operating Policies and Principles- Bruce A states the following: “The Operating Policies and Principles are defined to clearly outline operating boundaries within which the station may be operated safely. Within these boundaries, detailed operating procedures are written for clearly defined operating requirements. Procedures are also written for abnormal or emergency conditions which may be accurately defined. As operating experience accumulates, it may be necessary to revise these detailed procedures to improve the quality, simplicity, and efficiency of station operation. Revision of the detailed procedures may be carried out quickly within the boundaries established in the Operating Policies and Principles. Unexpected situations may also be handled, again within the defined boundaries, so as to minimize adverse effects. The Operating Policies and Principles also identify and differentiate between actions where discretion may be applied and where jurisdictional authorization is required. They thus act as an interface between: -The Senior Operations Authority and the CNSC, -The Senior Operations Authority and the Shift Manager, -The Senior Operations Authority and the Control Room Shift Supervisor, -The Shift Manager and the Control Room Shift Supervisor. Under no circumstances will the Operating Policies and Principles be intentionally violated. If conditions are found to exist which contravene Operating Policies and Principles, the affected system shall be placed in the normal configuration or in another safe configuration, or the unit shall be put in a safe state following procedures and practices approved by the Senior	C

Article No.	Article Requirement	Assessment	Compliance Category
	under these changed operational limits and conditions.	Operations Authority. The organizational position fulfilling the role of "Senior Operations Authority" is specified in the Bruce Power organization documents. This position is specifically accountable for ensuring the ongoing safe operation of the station within the safe operating envelope and license requirements." NK21-CORR-00531-11391, BA-LCH-R8, Sec 3.2 states: "3.2 Changes to Operating Policies and Principles Licence Condition: "The licensee shall give written notification to the Commission, or a person authorized by the Commission, prior to implementation of any changes to the operating policies and principles. Any changes to the operating limits referred to in condition 3.1, shall require prior written consent from the commission, or a person authorized by the Commission prior to implementation" Preamble: Changes to the OP&Ps that require written notification prior to implementation refers to the policies and principles which indicate the direction that the licensee has provided to maintain the safe configuration of the nuclear facility. Changes to actual operating limits referred to in licence condition 3.1 require CNSC consent. This will maintain a separation between policies, principles and limits. In particular for this licence condition, consent means that CNSC staff will review that the limits do not exceed the boundaries of the licensing basis. Compliance Verification Criteria: Changes to the limits that require a licence amendment are those specified in Appendix B. Changes to the limits that require written consent by a person authorized by the Commission, refer to those stated in the Bruce Power OP&P document, BP-OPP-00002, submitted as part of the licence renewal application. Changes made to Bruce Power's OP&P document that require CNSC consent are changes that could have an overall impact on the fundamental philosophy of nuclear safety which are not made in the conservative direction (changes made in the conservative direction require prior written notification only). This includes any change that will:	

Article No.	Article Requirement	Assessment	Compliance Category
		1. Impact on Defense in Depth; 2. Reduce the ability to adequately control, cool and contain the reactor; 3. Cause hazards or risks different in nature or greater in probability or magnitude than those stated in the design and analysis of the plant; as per the credited design in the safety analysis."	
Requirement 7: Qualification and training of personnel	The operating organization shall ensure that all activities that may affect safety are performed by suitably qualified and competent persons.	BP-PROG-01.02, Section 4.3.1 Resources are Managed says: The Human Resources Functional Area defines the overall processes and practices associated with the recruitment, selection, deployment and performance management of staff while the Training Functional Area defines the overall processes and practices associated with ensuring staff capabilities are defined and employees and contractors, where appropriate, are qualified. The line is responsible to ensure all staff working under the direction of BPMS processes and supervision are competent (qualified and capable). BP-MSM-1 Sheet 2 contains many statements stating Managers are to ensure that subordinates performing activities are trained and qualified to perform them and to know staff qualification status and ensure personnel complete training in a timely manner. For example, all personnel in the Station Engineering Division/Departments/Sections are appropriately qualified for the tasks assigned to them. BP-PROG-02.01, Worker Staffing, Sec 1.0 States: "1.0 Purpose This program document defines the fundamental business need, functional requirements, constituent elements, and key responsibilities associated with the Worker Staffing Process. The objective of Worker Staffing is to recruit, orient, and deploy staff that possess the competencies required for maintaining staffing levels consistent with the requisite organization structure, and includes the subsequent release of staff. This program outlines the required expectations and guidelines to ensure that activities associated with the recruitment, orientation, deployment, and departure of Bruce Power Employees are conducted in a manner consistent with the established values. This includes our commitments to nuclear safety: reactor safety, industrial safety, radiation safety and environmental safety. It applies to the following groups of Bruce Power Employees:	C

Article No.	Article Requirement	Assessment	Compliance Category
		Regular Employees Temporary Employees Contract Employees Students The elements of this program are intended to satisfy the following clauses of N286-05: Clause 5.2 The organization is defined and understood. Clause 5.3 Personnel are competent at the work they do." BP-PROC-00166, General Procedure and Process Requirements Section 4.4.24.3 Description of Process Steps and/or Instructions says: For PBQA related procedures, the Document Preparer shall describe how activities are to be performed, e.g., with step by step instructions. Define any qualification or training requirements associated with the procedure, specific sections or steps, or particular responsibilities. Similarly, Section 4.4.24.2 Identification of Prerequisites Section says: Prerequisites identify actions, conditions or events that shall already have been satisfied before the procedure can be started… Prerequisites describe, but are not limited to, the following: • Availability of special tools, equipment, materials or qualified personnel required to support the procedure. BP-PROG-00.04, Pressure Boundary Qualification Program Section 4.0 is on Training and Qualification of Personnel. Qualification requirements are dispersed throughout the document. BP-PROG-12.05, Section 4.2, Radiation Protection Qualifications and Training and Section 4.1.1.1 covers the Authorized Health Physicists training qualifications. This document also interfaces with BP-PROG-02.02 Worker Training and Qualification and BP-RPP-00006, Radiation Protection Qualification.	
4.16.	The operating organization shall clearly define the requirements for	BP-PROG-02.02, Worker Learning and Qualification Sec 1.0 and 5.1 state:	C

Article No.	Article Requirement	Assessment	Compliance Category
	qualification and competence to ensure that personnel performing safety related functions are capable of safely performing their duties. Certain operating positions may require formal authorization or a licence.	"1.0 Purpose The purpose of the Worker Learning and Qualification program is to enable personnel to competently and safely operate, maintain and improve the performance of our Stations. Learning includes: 1. The training elements that support Worker Qualifications that grant working rights. 2. Training elements that support Professional Development. Qualification includes all qualifications approved to be included within Training Qualification Documents (TQDs). The Worker Learning and Qualification program satisfies the worker Qualification and worker Training requirements of applicable legislation (e.g., acts and regulations), licenses, certifications, and codes and standards commensurate with Bruce Power's business needs including commitments made in our PROL application and requirements included in our PROL. The Worker Learning and Qualification program ensures conformance with clause 5.3 of N286-05, Management System Requirements for Nuclear Power Plants, which states that personnel must "be competent at the work that they do". The Worker Learning and Qualification program sets the standard for the entire company on how to ensure that personnel are competent at the work that they do. 5.1 Relevant Statutory, Regulatory and Licensing Requirements This program is intended to satisfy relevant statutory, regulatory and licensing requirements as specified in the following documents: Nuclear Safety and Control Act, 1992 • Class 1 Nuclear Facilities Regulation, SOR/2000-204 • Bruce A and Bruce B Nuclear Power Reactor Operating Licenses, License Condition handbook • CSA N285.0, Requirements for Pressure Retaining Systems and Components in CANDU Nuclear Power Plants and the associated ASME B&PV Code, Section 3, Division 1, Article NCA4000 and NQA-1 Section 2 • CSA N286-05, Management System Requirements for Nuclear Power Plants, Clauses 0.2, 0.3, 0.4, 5.3, 5.4 and 5.5	

Article No.	Article Requirement	Assessment	Compliance Category
		• CSA N293-07, Fire Protection CANDU Nuclear Power Plants, Clauses 8.2.1.2 and 8.2.1.4 • CNSC Regulatory Document RD-204, Certification of Persons Working at Nuclear Power Plants, dated February 2008 • CNSC Document, Requirements for the Re-qualification Testing of Certified Shift Personnel at Canadian Nuclear Power Plants, dated May 2009 • CNSC-EG1, Requirements and Guidelines for Written and Oral Certification Examinations for Shift Personnel at Nuclear Power Plants, dated July 2005 • CNCS-EG2, Requirements and Guidelines for Simulator-Based Certification Examinations for Shift Personnel at Nuclear Power Plants, dated June 2004 • The Amended Certificate of Approval Industrial Sewage Works # 4142-6X5SNY or PASSPORT reference NK37-CORR-00541-00266 which takes its governance from the Ontario Water Resources Act" B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 1.0 and Sec 3.5 states: "1.0 Introduction The training performance objectives and criteria included in this document are standards for training intended to promote excellence in support of operating our nuclear generating stations. These objectives and criteria provide written guidance against which the performance of our plants can be assessed. The training performance objectives describe the expected results of effective programs and activities. Supporting criteria are principles or methods that support the objectives. It is the intention of the company to fully meet all supporting criteria of Bruce Power Objectives 1, 2 & 6. Since Objectives 3, 4 & 5 are training program specific, it is unnecessary for all individual criteria associated with these objectives to be met, provided that the objective itself is satisfied. 3.5 Objective 5 - Conduct of Training and Trainee Evaluation Training is conducted using methods and settings that support trainee attainment of job related knowledge and skills. Achievement of learning is confirmed with reliable and valid evaluation methods.	

Article No.	Article Requirement	Assessment	Compliance Category
		Criteria 5.3 The control room simulator is used to train and evaluate individual licensed operator and control room crew performance."	
4.17.	Suitably qualified personnel shall be selected and shall be given the necessary training and instruction to enable them to perform their duties correctly for different operational states of the plant and in accident conditions, in accordance with the appropriate procedures.	See article 4.16 above: BP-PROG-08.01, Emergency Management Program Sec 4.13 states: "4.13 Emergency Response Training The development and delivery of ERO training and qualification for the various response roles uses the approaches identified in BP-PROG-02.02, Worker Learning and Qualification. All training and qualification required for all positions within the response organization are outlined in TQD-00005, Emergency Response Organization Training and Qualification Description." BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "4.1.2.3 Training TQD-00005, ERO Training and Qualification describe the program that is used to qualify and train personnel appointed to the ERO. This program was developed using the Systematic Approach to Training (SAT) per the requirement identified in BP-PROG-02.02, Worker Learning and Qualification Program. A General Employee Training (GET) program is provided and includes emergency response training. GET training is delivered to all employees requiring unescorted access to the nuclear facility so they are knowledgeable in the emergency response actions required of them. Various drills and exercises that require general staff involvement occur during the year to fortify and verify the correct response from staff at the site. Other venues that reinforce the required emergency action from general employees at site include safety awareness meetings and line supervision briefings. Emergency tones are broadcast and tested routinely at all locations 4.13.1 Implementation Staff will receive the orientation and/or training, and practice to ensure that they are prepared to execute their designated role in response to those events for which response plans and procedures were created and issued. The development and delivery of staff training and qualification for the various response roles uses the approaches identified in BP-PROG-02.02, Worker Learning and Qualification."	C

Article No.	Article Requirement	Assessment	Compliance Category
		B-HBK-09500-00003, Training Performance Objectives and Criteria, Section 4.3 states: "4.3 Objective 3 - An analysis of the job determines the job performance requirements and serves as the basis for the design and development of the training program. Criteria C3.2 The analysis identifies the tasks or job functions requiring initial training and those requiring continuing training, with due consideration given to tasks performed during non-routine and emergency conditions."	
4.18.	The management of the operating organization shall be responsible for the qualification and the competence of plant staff. Managers shall participate in determining the needs for training and in ensuring that operating experience is taken into account in the training. Managers and supervisors shall ensure that production needs do not unduly interfere with the conduct of the training programme.	Also assessed in article 4.16 above: B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 3.2 and 3.4 state: "3.2 Objective 2 - Management of Training Processes and Resources Management is committed to and accountable for development and sustaining training programs that meet station needs. Resources and an infrastructure of training processes are applied consistent with these needs to support training program sustainability. Criteria 2.4 Managers and job incumbents participate in curriculum development and training program effectiveness reviews to verify training achieves expected results." 3.4 Objective 4 - Continuing Training Continuing training uses a systematic approach to training to refresh and improve the application of knowledge and job related skills and to meet management expectations for personnel and plant performance. Criteria 4.2 Lessons learned from operating experience are included in continuing training to increase depth of understanding and application of knowledge and skills to job performance. 4.1 Objective 1 - Training Programs are effectively organized, directed and supported. Criteria C1.2 Adequate funding and staff are made available to support effectively all the required	C

Article No.	Article Requirement	Assessment	Compliance Category
		training programs and activities. C1.8 Line management ensures that personnel attend the required training." BP-PROG-01.06, Operating Experience Program, Sec 1.0 states: "The objective of the Bruce Power Operating Experience Program is to define the processes used to identify and capture lessons learned from sources within Bruce Power, and external to Bruce Power, in order to continuously improve performance by making improvements to Processes/Procedures, Training, or System/Equipment Design. This fosters a healthy nuclear safety culture in all aspects including reactor safety, radiation safety, industrial safety and environmental safety management." Furthermore other documents and clauses in the BP-PROG-02.02 Worker Learning and Qualifications hierarchy include: B-HBK-09500-00003, Training and Performance Objectives & Criteria OBJECTIVE 1 - Training for Performance Improvement Criteria 1.1 Corporate and plant strategic goals address the training and resources needed to support performance and workforce projections. These goals are integrated through plans and training schedules. Criteria 1.2 Department managers identify the training support necessary to the achievement of performance improvements. OBJECTIVE 2 - Management of Training Processes and Resources Management is committed to and accountable for development and sustaining training programs that meet station needs. Resources and an infrastructure of training processes are applied consistent with these needs to support training program sustainability. Criteria 2.4 - Managers and job incumbents participate in curriculum development and training program effectiveness reviews to verify training achieves expected results. OBJECTIVE 6 - Training Effectiveness Evaluation Evaluation methods are used systematically to assess training effectiveness and modify training to improve personnel and plant performance.	

Article No.	Article Requirement	Assessment	Compliance Category
		Criteria 6.2 Management monitors and evaluates training process and delivery to identify training program strengths and areas needing improvements. Criteria 6.4 Management and incumbents participate in post-training assessments to gauge training effectiveness. Training effectiveness measures such as job performance, management observations, trend indicators, and feedback from supervisors, the trained personnel, and job incumbent peers support these assessments. BP-PROC-00595, Training Fundamentals 4.2 Implementation Implementation of sound fundamentals requires that supervisors and managers ensure effective performance of fundamentals by: • Observing work practices first-hand. • Providing on-going communication and feedback using observations, Travelling File entries, and daily interface. • Identifying and evaluating event precursors, indicators, and trends from diverse sources such as Travelling Files, Corrective Action Program (CAP), Scorecards; and then take proactive corrective actions as required. • Delivery of formal training. • Conducting fundamental self-assessments. Appendix B: Training Fundamentals Human Performance Program (BP-PROG-00.07) • Apply Operating Experience (OPEX) into training events. BP-PROC-00512, Certification Training - Training Design for Certification Training Programs	

Article No.	Article Requirement	Assessment	Compliance Category
		4.2 Verify Curriculum Outlines 4.9 Training Development Plan The lead training developer (training SME) will prepare a training development plan for each facility and position-specific training program. As a minimum, the development plan will include the grouped and sequenced module design documents as well as a simple milestone bar chart (e.g., Gantt chart) to indicate major development activities. The development plan will be reviewed on a regular basis with the Certification Training Section Managers and the TPRC Chair to ensure program requirements are met.	
4.19.	A suitable training programme shall be established and maintained for the training of personnel before their assignment to safety related duties. The training programme shall include provision for periodic confirmation of the competence of personnel and for refresher training on a regular basis. The refresher training shall also include retraining provision for personnel who have had extended absences from their authorized duties. The training shall emphasize the importance of safety in all aspects of plant operation and shall promote safety culture.	BP-PROG-02.02, Worker Learning and Qualification, Sec 4.4 states: "4.4 Bruce Power TPO&C 4: Continuing Training Continuing training uses a systematic approach to training to refresh and improve the application of knowledge and job related skills and to meet management expectations for personnel and plant performance. In addition to the criteria associated with this performance objective, the general requirements regarding training for Performance improvement include: Continuing training shall have a minimum three-year planning period updated annually. A minimum of four days Continuing Training per year shall be allocated for performance improvement associated with key qualification holders. Continuing Training days shall be block-scheduled in advance to allow for annual resource planning. Correct responses for required evaluations shall be reviewed with trainees before they return to the workplace. Trainees who fail formal training evaluations during continuing training shall complete remedial training prior to being re-qualified. Re-qualification shall not be granted until trainees successfully complete their remedial training. Continuing Training programs are implemented via the procedures listed in Section 5.3. The Continuing Training and Qualification performance objective relates to the Do phase of the	C

Article No.	Article Requirement	Assessment	Compliance Category
		Plan-Do-Check-Act cycle of N286-05. The implementing procedures referenced in this section describe the processes used to maintain staff as qualified per the standards imposed by different training programs." B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 3.2 and 3.3 state: "3.2 Objective 2 - Management of Training Processes and Resources Management is committed to and accountable for development and sustaining training programs that meet station needs. Resources and an infrastructure of training processes are applied consistent with these needs to support training program sustainability. Criteria 2.6 Management establishes and reinforces expectations for trainees regarding attendance, performance, remediation, and timely makeup. 3.3 Objective 3 - Initial Training and Qualification The initial training program uses a systematic approach to training to provide personnel with the necessary knowledge and skills to perform their job assignments independently. Criteria 3.8 Personnel, including contracted and non-plant personnel, satisfy established training and qualification requirements prior to being assigned to work independently." B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 1.0 and 2.0 state: "1.0 Introduction The training performance objectives and criteria included in this document are standards for training intended to promote excellence in support of operating our nuclear generating stations. These objectives and criteria provide written guidance against which the performance of our plants can be assessed. The training performance objectives describe the expected results of effective programs and activities. Supporting criteria are principles or methods that support the objectives. It is the intention of the company to fully meet all supporting criteria of Bruce Power Objectives 1, 2 & 6. Since Objectives 3, 4 & 5 are training program specific, it is unnecessary for all individual criteria associated with these objectives to be met, provided that the objective itself is satisfied.	

Article No.	Article Requirement	Assessment	Compliance Category
		2.0 Expectations for Use 1. Bruce Power will use the INPO Accreditation Self Evaluation Report (ASER) format to document self-assessment. Objectives 1, 2, 5 and 6 which are not program specific will be assessed in 2012 and 2013. Objectives 3 and 4 will be assessed in 2013 and 2014. 2. Bruce Power will use the INPO Assessment Guide for independent review after the self-assessments are complete. 3. This document is a controlled document that identifies our Performance Objectives and Criteria as well as outlines how each CNSC PO&C for Training relates to Bruce Power's PO&Cs and associated documentation. As per the requirements of MSM-1, this document will be included in the revised document hierarchy for BP-PROG-02.02, Worker Learning and Qualification." BP-PROC-00576, Certification Training - Conduct of Continuing Training and Re-Certification Testing, Sec 5.2 states: "5.2 Continuing Training Qualifications There are six continuing training qualifications specific to this TQD. The program element (PEL) requirements for these qualifications include the following types of PELs: 1. Classroom continuing training blocks (fixed content). 2. Technical update continuing training (flexible content). 3. Conduct of operations continuing training (flexible content). 4. Generic classroom continuing training (flexible content). 5. Type A simulator continuing training events (fixed content). 6. Type B simulator continuing training events (fixed content). 7. Type E simulator continuing training events (flexible content elective). 8. CNSC certificate (all certified positions). The specific program elements required for achieving and maintaining these qualifications are shown in the diagrams that follow and are described in Appendix 3."	

Article No.	Article Requirement	Assessment	Compliance Category
4.20.	Performance based programmes for initial and continuing training shall be developed and put in place for each major group of personnel (including, if necessary, external support organizations, including contractors). The content of each programme shall be based on a systematic approach. Training programmes shall promote attitudes that help to ensure that safety issues receive the attention that they warrant.	BP-PROG-02.02, Worker Learning and Qualification Sec 3.1.16, 4.0 and 4.4 state: 3.1.16 A Systematic Approach to Training ensures identified training needs are analyzed and appropriate performance based training is designed, developed, implemented and evaluated. 4.0 Program Description 3. Require the training elements that support Worker Qualifications approved for inclusion within the following list of Training and Qualification Descriptions (TQDs) be created, managed and conducted in a manner that fully meets the intent of the Bruce Power Training Performance Objectives and Criteria TPO&Cs. The qualifications within these TQDs are considered key qualifications. TQD-00009 for Engineering Support personnel. TQD-00012, -00013, -00014, and -00015 associated with Certified Operator Training. TQD-00019, -00030, -00031, and -00032 associated with Nuclear Operator Training. TQD-00022 for Control Maintenance personnel. TQD-00023 for Mechanical Maintenance personnel. TQD-00036 for Chemical Technologists and Responsible System Chemists. TQD-00046 for Radiation Protection Technicians. TQD-00075 for Health Physicists, Authorized/Responsible Health Physicists 4.4 Bruce Power TPO&C 4: Continuing Training Continuing training uses a systematic approach to training to refresh and improve the application of knowledge and job related skills and to meet management expectations for personnel and plant performance." Also assessed in detail in Articles 4.16, 4.17, 4.18 and 4.19 above: B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 4.1 states:	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.1 Objective 1 - Training Programs are effectively organized, directed and supported. Criteria C1.1 Approved policies and procedures define a framework for establishing, conducting and maintained training programs in accordance with the principles of a systematic approach to training. C1.4 All positions have clearly defined and documented entry-level qualification requirements, and well documented initial and continuing training programs. C1.5 There is a formal procedure for verifying that contractors, temporary personnel or other non-facility personnel are appropriately qualified for the work to which they are assigned."	
4.21.	The training programmes shall be assessed and improved by means of periodic review. In addition, a system shall be put in place for the timely modification and updating of the training facilities, computer models, simulators and materials to ensure that they adequately reflect current plant conditions and operating policy, and that any differences are justified.	BP-PROG-02.02, Worker Learning and Qualification, Sec 4.2 and 4.6 state: "4.2 Bruce Power TPO&C 2: Management of Training Processes and Resources Management is committed to and accountable for development and sustaining training programs that meet station needs. Resources and an infrastructure of training processes are applied consistent with these needs to support training program sustainability. In addition to the criteria associated with this performance objective, the general requirements regarding training for performance improvement include: Training development activities address both the development and purchase of training products. Training material shall be based upon approved learning objectives. Training material shall be created, maintained, controlled and tracked by the Training Division." B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 4.1 states: "4.1 Objective 1 - Training Programs are effectively organized, directed and supported. Criteria C1.1 Approved policies and procedures define a framework for establishing, conducting and maintained training programs in accordance with the principles of a systematic approach to training. C1.2 Adequate funding and staff are made available to support effectively all the required	C

Article No.	Article Requirement	Assessment	Compliance Category
		training programs and activities. C1.3 Instructional facilities such as classrooms, laboratories and workshops meet the training needs. “4.6 Bruce Power TPO&C 6: Training Effectiveness Evaluation In addition to the criteria associated with this performance objective, the general requirements regarding training for performance improvement include: Training evaluations shall include periodic evaluations of Training Programs, In-Training Feedback and Focus Area Self-Assessments. The Training Division shall be responsible for preparing appropriate training related metrics and making them available to Training Managers, training oversight committees, and line managers." SEC-SIMM-00001, Simulator Validation, Sec 1.0 and 4.3.3 state: "1.0 Purpose 3. Continuing Training of all certified staff at Bruce Power Nuclear Stations. Refer to TQD-00014, Certified Staff Continuing Training and Re-Certification Training and Qualification and DPT-TRG-00014, Simulator-Based Assessment of Certified Staff. 4.3.3 Validation of Scope of Simulation 1. Annually or as required, Simulator Support Section staff shall validate simulator physical fidelity to verify that the following physical configuration characteristics of the simulators correspond faithfully to its reference units as required by the training requirements (Section 4.2.2 [1] and 4.2.2 [2]). 2. Discrepancies between the training requirements and existing simulator capability shall be noted and forwarded to the appropriate Certification Training Section Manager (or delegate)."	
4.22.	Operating experience at the plant, as well as relevant experience at other plants, shall be appropriately incorporated into the training programme. It shall be ensured that training is conducted	Also assessed in article 4.18 above. BP-PROC-00062, Processing External and Internal Operating Experience Sec 4.2.10 and 4.2.5 state: "4.2.10 Getting OPEX into Training	C

Article No.	Article Requirement	Assessment	Compliance Category
	on the root cause(s) of the events and on the determination and implementation of corrective actions to make their recurrence less likely.	One of the main objectives of the OPEX Program is to capture OPEX and transfer lessons learned to staff by making updates and/or improvements to training material. The processes for these activities are described in the suite of implementing procedures associated with BP-PROG-02.02, Worker Training and Qualification. Existing training program documentation contains OPEX information in many different forms, however the challenge is to ensure it is kept current as new lessons learned are uncovered, and ensure important lessons are not lost during future revisions (bases capturing). Evaluators of OPEX will: IDENTIFY lesson(s) in OPEX material which may benefit training material. INPUT Training Change Requests to ensure the OPEX is reviewed for incorporating into training. 4.2.5 Root Cause Investigation Lessons Learned Briefings Root Cause Investigations are performed at Bruce Power for more significant adverse conditions as per BP-PROC-00518 Root Cause Investigation. Staff at Bruce Power should be able to easily see what was investigated, the facts involved in the condition, the cause/s of the condition, the actions being taken to prevent recurrence, and the lessons learned from the RCI. Most RCI investigation reports are too detailed, lengthy, and specialized for everyday use. RCI Lessons Learned Briefings are excellent alternatives. They are good sources of information for Pre-Job Briefings, MLM self-assessment, sharing of OPEX between site facilities, resources for training material, and any other improvement or error prevention activity."	
4.23.	All training positions shall be held by adequately qualified and experienced persons, who provide the requisite technical knowledge and skills and have credibility with the trainees. Instructors shall be technically competent in their assigned areas of responsibility, shall have the necessary instructional skills and shall also be familiar with routines and work practices at the workplace. Qualification	BP-PROG-02.02, Worker Learning and Qualification sec 4.3 states: "4.3 Bruce Power TPO&C 3: Initial Training and Qualification Trainers, including contract personnel, shall possess and maintain the technical knowledge appropriate for their positions and the instructional capabilities appropriate for their training function in accordance with TQD-00003, Trainer Training and Qualifications Description, and TQD-00039, Certification Section Instructor Training and Qualification Description."	C

Article No.	Article Requirement	Assessment	Compliance Category
	requirements shall be established for the training instructors.		
4.24.	Adequate training facilities, including a representative simulator, appropriate training materials, and technical and maintenance training facilities, shall be made available for the training of operating personnel. Simulator training shall incorporate training for plant operational states and for accident conditions.	B-HBK-09500-00003, Training Performance Objectives and Criteria, Sec 3.2 and 3.5 state: "3.2 Objective 2 - Management of Training Processes and Resources Management is committed to and accountable for development and sustaining training programs that meet station needs. Resources and an infrastructure of training processes are applied consistent with these needs to support training program sustainability. Criteria 2.2 Resources (staff, facilities, equipment, and materials) effectively support training activities and provide a professional learning environment. 3.5 Objective 5 - Conduct of Training and Trainee Evaluation Training is conducted using methods and settings that support trainee attainment of job related knowledge and skills. Achievement of learning is confirmed with reliable and valid evaluation methods. 5.2 Training activities provide opportunities for hands-on application of knowledge and skills in a learning environment. 5.3 The control room simulator is used to train and evaluate individual licensed operator and control room crew performance. 5.7 Training and evaluation use plant procedures, references, tools, equipment, and conditions of task performance that reflect actual job conditions to the extent practicable." BP-PROG-02.02, Worker Learning and Qualification, Sec 4.3 states: "4.3 Bruce Power TPO&C 3: Initial Training and Qualification Instructional settings shall be appropriate for the type of learning involved and the level of proficiency required." SEC-SIMM-00001, Simulator Validation, Appendix D Required Simulator Capabilities states: "This section was obtained from CNSC document CNSC Examination Guide CNSC-EG2,	C

Article No.	Article Requirement	Assessment	Compliance Category
		Requirements and Guidelines for Simulator-based Certification Examinations for Shift Personnel at Nuclear Power Plants (NK21-CORR-00531-03219/NK29-CORR-00531-04980), Appendix A.3, and has been included for the convenience of the reader. This is considered to be a generic list and may not apply to all stations due to differences in design. These specific exceptions are routinely conveyed to the CNSC during the preparation of simulator-based examinations as required by CNSC-EG2. 1.0 Minimum Acceptable Simulation Capabilities Simulators must be capable of simulating, realistically and in real time, the abnormal, transient and emergency conditions and failures listed below. For conditions and failures, such as pipe breaks, loss of inventory, loss of flow, loss of pressure and loss of vacuum, for which unit response and operator actions are a function of the degree of severity of the condition or failure, the simulator must have adjustable rates for the condition or failure covering a significant portion of its possible range. Additionally, the simulators must be capable of simulating all significant plant maneuvers, including start-ups, and shutdowns."	
Requirement 8: Performance of safety related activities	The operating organization shall ensure that safety related activities are adequately analysed and controlled to ensure that the risks associated with harmful effects of ionizing radiation are kept as low as reasonably achievable.	BP-MSM-1 Policy on Conduct of Plant Operation: “Bruce Power shall operate its nuclear plant facilities, systems, and equipment in a manner that ensures compliance with the operating licences, Operating Policies and Principles and other applicable regulations and standards. Nuclear safety shall be a primary consideration of every operational decision. Bruce Power shall establish operations ownership of all activities that affect station operation and the standards for common nuclear work practices used throughout Bruce Power facilities.” BP-PROG-12.01 Conduct of Plant Operations section 1.0 states the following: “The overall objective of the program is to safely and reliably operate the station systems within the design basis for which the plants are licensed. Operations conducted in accordance with the standards and expectations defined in this program will provide strong support for the four pillars of nuclear safety: 1. Reactor 2. Conventional 3. Radiation protection 4. Environmental”	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-00.06 Health and Safety Management section 1.0 states the following: “The objective of OHS Management is to oversee the planning, implementation, maintenance, and continual improvement of business processes, activities, and human behaviors which contribute to the achievement of worker health and safety and conform to the goals of Bruce Power’s Occupational Health and Safety Policy, as defined in BP-MSM-1, Management System Manual.” BP-PROG-12.05, Radiation Protection Program, Sec 1.0 states: "1.0 Purpose This Program document defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Management Policy as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A). This is achieved by establishing and implementing standards and processes for the conduct of licensed activities (Appendix A) to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Ensure public and occupational exposures to ionizing radiation are controlled such that: a) Individual doses are kept below regulatory dose limits. b) Unplanned exposures are avoided. c) Individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. Control the movement of people and materials in a manner that prevents the uncontrolled release of contamination or radioactive materials from Bruce Power facilities. 2. The achievement of high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 (Rev-1). 4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Canadian Standard Association (CSA) requirements pertaining to contamination control and radiation protection, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.24.	

Article No.	Article Requirement	Assessment	Compliance Category
		Radiation protection (safety) is one of the four pillars of nuclear safety which supports a healthy nuclear safety culture. This Program is designed to embrace and contribute to the principles of nuclear safety as defined in BP-MSM-1, and recognizes that reactor safety, industrial safety, and environmental safety are essential to the long-term success of this Program." BP-RPP-00044, ALARA Program, states the following: 1.0 Purpose This procedure establishes the requirements and responsibilities for the effective implementation of the ALARA Program as per governing document BP-PROG-12.05, Radiation Protection Program. The objective of the ALARA Program is to ensure that occupational radiation exposures, both individually and collectively are maintained As Low As Reasonably Achievable (ALARA)."	
4.25.	All routine and non-routine operational activities shall be assessed for the potential risks associated with harmful effects of ionizing radiation. The level of assessment and control shall depend on the safety significance of the task.	BP-PROC-00771 Work Coordination Plans As part of the preparation plan author shall consider the following with respect to potential risk associated with harmful effects of ionizing radiation (Section 4.3.4): -Radiation Protection Review: Refer to BP-RPP-00011, Requirements for Planning Radiological Work - Interface Document, for ALARA criteria required for review by Radiation Protection. -Radiation Exposure Permits (REPs): Once assessed by Task Planning, the Radiation Protection Department (RPD) staff will receive the requisite information for the preparation of the REPs. When the REPs are ready they are made available to field personnel for inclusion in the Comprehensive Work Package) or the Radiation Hazard Information System (RHIS). -Request for completion of the Pre-ALARA review FORM-11101 will be initiated by RPD staff via e-mail to the WCP Author. -Radiation Exposure Permits and Pre-ALARA review forms will not be included in the WCP. BP-RPP-00011 Requirements for Planning Radiological Work The purpose of this procedure is to effectively plan work so that radiation exposures are kept As Low As Reasonably Achievable (ALARA) thereby implementing the requirements of BP-RPP-00044, ALARA Program.	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.1.1 Radiological Planning Requirements and Approvals provides detailed requirements as related to categorization of radiological work based on hazard type and level.	
4.26.	All activities important to safety shall be carried out in accordance with written procedures to ensure that the plant is operated within the established operational limits and conditions. Acceptable margins shall be ensured between normal operating values and the established safety system settings to avoid undesirably frequent actuation of safety systems.	Introduction to BP-OPP-00002 Operating Policies and Principles states the following: The Operating Policies and Principles are defined to clearly outline operating boundaries within which the station may be operated safely. Within these boundaries, detailed operating procedures are written for clearly defined operating requirements. Procedures are also written for abnormal or emergency conditions which may be accurately defined. BP-PROG-12.01 Conduct of Plant Operations Section 4.1 Operator Documentation states the following: Operations Documentation includes: • Operating procedures (Operating Manuals, Operating Memos, Alarm Response Manuals, Safety System tests, etc.). • Operational flowsheets. Procedures for the safe and reliable operation of plant equipment shall be prepared, approved, controlled and readily available to the operating staff. These procedures shall be prepared for all anticipated normal, abnormal and emergency conditions. All operating procedures shall be created as controlled document, in accordance with the requirements of BP-PROG-03.01, Document Management to ensure document lifecycle management requirements are met. (BP-PROC-00068, Controlled Document Life Cycle Management). Margins between normal operating values and safety system settings are established in the Safety Analysis Report to ensure undesirable frequent actuation of safety systems.	C
4.27.	No experiments shall be conducted without adequate justification. If there is a need to conduct a non-routine operation or test that is not covered by existing operating procedures, a specific safety review shall be	Conducting experiments constitute a change to OPPs and hence the PROL. NK21-CORR-00531-11391, BA-LCH-R8, Sec 5.2 states: "5.2 Changes to Facility, Facility Operation, Equipment or Procedure Licence Condition: The licensee shall not make any change to the design of the facility, facility operation, equipment	C

Article No.	Article Requirement	Assessment	Compliance Category
	performed and a special procedure shall be developed and subject to approval in accordance with national or other relevant regulations.	or procedure that would change the operational limits referred to in condition 3.1, or introduce hazards different in nature or greater in probability than those considered by the Final Safety Analysis Report and Probabilistic Safety Assessment, without the prior written consent of the Commission, or a person authorized by the Commission." BP-OPP-00002 Introduction states the following: Under no circumstances will the Operating Policies and Principles be intentionally violated. If conditions are found to exist which contravene Operating Policies and Principles, the affected system shall be placed in the normal configuration or in another safe configuration, or the unit shall be put in a safe state following procedures and practices approved by the Senior Operations Authority. Section 00.3 Changes to Operating Policies and Principles states the following: 1. Prior to implementation, all changes to the Operating Policies and Principles shall be verified by the Executive Vice President and Chief Nuclear Officer, Bruce A, approved by the President and Chief Executive Officer and submitted to the CNSC for information. 2. Prior to implementation, all changes to the Operating Policies and Principles which revise the operating limits specified in this document or which may adversely impact compliance with the licensing basis shall receive written consent from the CNSC. Section 01.6 Modifications prescribe the conditions under which modifications to station systems and modifications to procedures. In both cases it is stated that: Prior approval of the CNSC shall be required for modifications to station systems/procedures in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence. BP-MSM-1, Management System Manual, Appendix A, Bruce Power Policy Statements states: "Configuration Management Bruce Power shall operate, maintain and modify its plant in a manner that ensures that the physical plant, its design basis, and associated configuration information are consistent with each other at all times. Inconsistencies or deviations are to be identified and corrected through the Configuration Management process.	

Article No.	Article Requirement	Assessment	Compliance Category
		The physical configuration of the plant shall be maintained in accordance with the design and licensing basis, and remain within the bounds of the Safe Operating Envelope. Design and operating margins will be understood and conservatively maintained within the bounds defined by the plant's design basis."	
4.28.	Written communication shall be preferred and spoken communication shall be minimized. If spoken communication is used, attention shall be given to ensuring that spoken instructions are clearly understood.	GRP-OPS-00038 states the following when spoken communication is used: 4.28 Communication Expectation: All communications will be clear, concise and complete to ensure accurate transfer of information so as to minimize the probability of operating and human error. Communications will be performed in a professional manner at all times. Standard expectation with respect to person to person spoken communication is as follows: 1. "3-way communication" will be used for the transfer of operational instructions and the transfer of critical information. Critical information is that information upon which an immediate operational decision will be made. This applies to face-to-face, radio and telephone communications. The standard for operational communication is 3-way as described in BP-PROC-00617, Human Performance Tools For Workers. 3. When communicating with external organizations who may not be familiar with the human performance tool of 3-way communication, Operators must ensure that all relevant information is clearly understood by all involved parties by exercising the elements of 3-way communications. The use of acronyms should be avoided. BP-PROC-00617 Human Performance Tools for Workers 4.4 lists three Verbal Communication Tools including: Effective Verbal Communication, Phonetic Alphabet; and Three-Way Communication.	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.4.1 Effective Verbal Communication The Effective Verbal Communication tool is used to ensure a common understanding between a Sender and Receiver(s). When to Use the "Effective Verbal Communication" Tool Use this tool during the operation or alteration of plant equipment, during performance of important procedural steps, or when the safety of personnel, the environment or the plant may be impacted."	
4.29.	Aspects of the working environment that influence human performance factors (such as work load or fatigue) and the effectiveness and fitness of personnel for duty shall be identified and controlled. Tools for enhancing human performance shall be used as appropriate to support the responses of operating personnel.	Refer to article 3.13 where Fitness for duty aspects of human performance is assessed in detail. BP-PROG-00.07, Human Performance Program, Sec 1.0, 4.7.3 and 4.7.4 state: "Purpose 1.0: Bruce Power's management model for achieving excellence describes our vision, values, key results areas, policies, programs and procedures. It defines how we execute, how we manage performance, and how we assess results. Central to this is fostering a healthy Safety Culture and being recognized for excellence in all aspects of nuclear safety including reactor safety, radiation safety, industrial safety and environmental safety management. The purpose of the Bruce Power Human Performance Program is to achieve excellence in Human Performance. In so-doing, the Human Performance Program meets N286-05 Management System Requirements for Nuclear Power Plants" in particular generic requirements 5.3-5.6. The Human Performance Program also supports INPO 12-012 "Traits of a Healthy Nuclear Safety Culture" (e.g., Individual Commitment to Safety). 4.7.3 Observation and Coaching 4.7.4 states: "Observation and Coaching provides data on behaviours and the work environment, which are leading indicators of Human Performance issues, human errors and significant events. Observation and Coaching of workers provides opportunities to reinforce desired behaviours and correct undesirable work practices and work environment deficiencies. Managers and supervisors will perform regular field observations per BP-PROC-00271, Observation and Coaching. BP-PROG-00.07 is also implemented by:	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00617, Human Performance Tools for Workers BP-PROC-00794, Monitoring Human Performance BP-PROC-00795, Human Performance Tools for Knowledge Workers BP-PROC-00811, Procedure Alterations Bruce Power defines the method to analyze tasks and assess the risks. This is documented in BP-SM-00064, Job Safety Analysis. Two other relevant procedures, GRP-OPS-00041, Infrequently Performed Tests and Evolutions, and BP-PROC-00474, High Risk Evolution Process address the identification and management of risk."	
4.30.	The operating organization shall encourage plant personnel to have a questioning attitude and to make appropriate and conservative decisions, so as to minimize risk and to maintain the plant in a safe condition.	BP-PROG-00.07, HUMAN PERFORMANCE PROGRAM, Sec 4.5 states: "4.5 Traits for a Healthy Nuclear Safety Culture The health of a facility's safety culture depends on the degree to which the employees internalize traits and attributes of a healthy nuclear safety culture. The basic traits and attributes embraced by this Human Performance Program match those listed in INPO 12-012. These traits will be reflected in the values, assumptions, behaviors, beliefs, and norms of the Bruce Power organization and its members. The following traits (refer to INPO 12-012), when embraced, positively influence the organization's shared assumptions, values, beliefs, behaviors and group norms that describe how things are done around here; thus contributing to a more Healthy Nuclear Safety Culture: 1. Personal Accountability. 2. Questioning Attitude. 3. Effective Safety Communication. 4. Leadership Safety Values and Actions.	C

Article No.	Article Requirement	Assessment	Compliance Category
		5. Decision-Making. 6. Respectful Work Environment. 7. Continuous Learning. 8. Problem Identification and Resolution. 9. Environment for Raising Concerns. 10. Work Processes." BP-PROC-00561, Operator Fundamentals, Section 4.2.1 States: "4.1.3 Conservatism - Having a Bias Towards Conservatism is a bias for action in the direction of plant safety and includes maintaining a sufficient safety margin, as indicated by parameters. This behaviour also avoids challenging the plant and shows a clear desire to protect the reactor core. conservatism prompts Operators to reduce reactor power or shut down the reactor whenever the procedures, their training or their judgment indicates the need. It also prompts Operators to stop and question the action they are about to take so that they stop when unsure. In addition, Operators realize that actions allowed during some plant conditions may not be conservative during other plant conditions. Managers strongly support the policy to act conservatively as it applies to reactor safety through frequent communication and reinforcement of this approach to operations. The message must emphasize conservative actions over production goals. When faced with unknown or unexpected conditions, Operators are empowered to take conservative actions. How the crew reacts to unknown or unexpected conditions and the decisions made by the operating crew determine the effectiveness of management's message. The following examples demonstrate a conservative bias for reactor safety: 1. Equipment needed to support effective plant operation is available and is operating properly. This includes backup indications available, controllers in automatic, and redundant equipment operational. All personnel must have a low threshold for equipment deficiencies and must identify and communicate these to their supervisors to ensure equipment health is maintained at a high priority. 2. Operational problems are monitored and re-evaluated as conditions change. The aggregate effects of problems that could affect plant operations are managed such that Operators can monitor plant conditions and respond to transients effectively at all times. 3. Understand plant conditions, effectively control the plant and question conditions and	

Article No.	Article Requirement	Assessment	Compliance Category
		situations that are out of the ordinary or unexpected, particularly if they could erode plant operating margins. Resolve these issues in a timely manner rather than continuing to operate the plant with the condition present. 4. Conduct plant operations with an appropriate questioning attitude and always have well-developed contingency plans should an evolution not proceed as expected. 5. Avoid multiple or concurrent activities with a potential to affect reactor safety. 6. Operators monitor and control operating bands and rates to create and maintain sufficient operating margins. 7. Operators establish contingency plans, commensurate with the associated risk, to mitigate potential adverse consequences during plant evolutions."	
4.31.	The responsibilities and authorities for restarting a reactor after an event leading to an unplanned shutdown, scram or major transient, or to an extended period of maintenance, shall be clearly established in writing. An investigation shall be carried out to determine the cause of the event and corrective actions shall be taken to make its recurrence less likely. Prior to the restart or the resumption of full power of the affected plant, the operating organization shall carry out necessary remedial actions, including inspection, testing and repair of damaged structures, systems and components, and shall revalidate the safety functions that might be challenged by the event. Restart conditions and criteria shall be established and followed after the timely	BP-OPP-00002, Operating Policies And Principles - Bruce A, Sec 63.9 states: "63.9 Resetting of Reactor Trips and Increases in Reactor Power 1. a) Shift Manager authorization is required prior to resetting all reactor trips. Prior to giving this authorization, the Shift Manager shall confirm that: i) The cause of the trip is clearly understood. ii) Unit and station conditions are appropriate to allow resetting of the trip. b) Senior Operations Authority approval is required prior to resetting the following completed reactor trips: Any neutronic trip. A trip preceded by a log rate stepback. A conditioned parameter trip in indicated rising neutron power. 2. Following a reactor stepback or setback caused by a turbine trip or runback, or by a generator rejection, reactor power increases may be authorized by the Control Room Shift Supervisor, in accordance with approved operating procedures. Prior to giving this authorization, the Control Room Shift Supervisor shall confirm that: a) The condition which caused the reactor stepback or setback is clearly understood.	C

Article No.	Article Requirement	Assessment	Compliance Category
	implementation of the necessary corrective actions.	b) Unit and station conditions are appropriate to allow reactor power to be raised up to the level specified in relevant operating procedures. 3. Except as allowed under Clause 2, Shift Manager Authorization is required prior to raising reactor power to attempt a unit recovery following a reactor stepback or setback. Prior to giving this authorization, the Shift Manager shall: a) Confirm that the condition which caused the stepback or setback is clearly understood. b) Confirm that unit and station conditions are appropriate to allow reactor power to be raised. c) Specify the maximum power level to which reactor power may be raised. 4. For reactor power increases other than those mentioned in Clauses 2 and 3, reactor power shall only be raised to a level previously approved by the Shift Manager. Prior to giving this approval, the Shift Manager shall confirm that unit and station conditions are appropriate to allow the reactor power to be raised to the specified level." PROL 15.00/2015, states: "3.4 The licensee shall not restart the reactor after a potential or serious process failure, without the prior written consent of the Commission or a person authorized by the Commission." NK21-CORR-00531-11391, BA-LCH-R8, Bruce Nuclear Generating Station A, Sec 3.4 states: "Preamble: CNSC staff will verify that the licensing envelope was not exceeded. If it was found to be exceeded, an inspection and reconfirmation of the configuration of the reactor would be required as well as review by the Commission. Compliance Verification Criteria: If Bruce Power's systems and processes failed, but they avoided a serious process failure by fortuitous circumstances, CNSC will re-evaluate whether the licensee is qualified to operate. The licensee must demonstrate that they have implemented corrective actions to prevent such an event in the future. A request for restart of the reactor prior to the planned departure from the Guaranteed Shutdown	

Article No.	Article Requirement	Assessment	Compliance Category
		State (GSS) is to be submitted in writing and is to include the following information: Description of the event. Causes of the event. Consequences and safety significance of the event. Recovery plan including corrective actions to be completed prior to reactor restart. A statement regarding plant readiness to resume safe operation. This should include any conditions that the licensee proposes to impose upon reactor restart and/or subsequent reactor operation to ensure safe operation of the nuclear facility. Extent of Conditions has been completed. Event has been properly documented and communicated to staff (including additional training if necessary). Historical Operating Experience (OPEX) review for comparable events."	
4.32.	If a probabilistic assessment of risk is to be used for decision making purposes, the operating organization shall ensure that the risk analysis is of appropriate quality and scope for decision making purposes. The risk analysis shall be performed by appropriately skilled analysts and shall be used in a manner that complements the deterministic approach to decision making, in compliance with applicable regulations and plant licence conditions.	DIV ENG 00010, Probabilistic Risk Assessment Process, Sec 4.0 states: "4.0 Procedure Description 3. PRA shall be used as an aid to judgment in the support of the conduct of engineering, maintenance, and operations at Bruce Power. 10. Staff preparing, applying or otherwise interpreting risk models shall be appropriately qualified and experienced." BP-PROC-00363, Nuclear Safety Assessment, Sec 3.1.11 defines Nuclear Safety assessment as: "3.1.11 Safety Analysis is the application of deterministic analysis and probabilistic analysis techniques to establish and confirm the plant's Design Basis for items important to safety. The results of such analysis shall demonstrate that the plant is capable of meeting prescribed limits for radioactive releases under all operational and design basis accident conditions." The following PRA procedures are used in support of the conduct of engineering, maintenance,	C

Article No.	Article Requirement	Assessment	Compliance Category
		and operations • DPT-RS-00002 R000 - Risk Assessment of Operational Events • DPT-RS-00003 R001 - Evaluation of Risk Outside the Scope of the PRA • DPT-RS-00004 R001 - Risk Assessment of Proposed Changes to Engineering, Operations, Surveillance and Maintenance • DPT-RS-00006 R001 - Outage and Inage Risk Management	
Requirement 9: Monitoring and review of safety performance	The operating organization shall establish a system for continuous monitoring and periodic review of the safety of the plant and of the performance of the operating organization.	Monitoring and review of safety performance is covered under BP-PROG-15.01 Nuclear Oversight Management and its implementing procedures: BP-PROC-00274, External Performance Assessment BP-PROC-00295, Planning & Scheduling Audits BP-PROC-00632, Performance Based Assessments and Reports BP-PROC-00635, Audits BP-PROC-00704, Nuclear Oversight Fundamentals BP-PROC-00706, Nuclear Oversight Issue Elevation and Escalation BP-PROC-00909, Nuclear Oversight Independence BP-PROC-00910, Nuclear Oversight Missed Opportunity Review Process BP-PROC-00137, Focus Area Self Assessment BP-MSM-1, MANAGEMENT SYSTEM MANUAL, Sec 5.0 states the following: Monitoring for Results outlines how we hold ourselves accountable for business plan results, achieving strategic objectives, meeting regulatory requirements and identifying opportunities for improvement. Key features include: • Performance Monitoring. • Management Meetings. • Corrective Actions. • Benchmarking and Operating Experience. • Assessments.	C

Article No.	Article Requirement	Assessment	Compliance Category
		5.1 Performance Monitoring We have an established set of performance indicators that are monitored and reported on a regular basis. 5.2 Management Meetings Regular management meetings are conducted to reinforce accountability and ensure ongoing monitoring and control. Such meetings include: • Operational Performance Reviews. • Business Assessment Reviews. • Business Plan Reviews. 5.3 Corrective Actions Where opportunities for improvement are identified, the Corrective Action process is used. The Corrective Action process provides for identifying, investigating, analyzing and correcting adverse conditions, incidents and acts/practices/behaviours that represent sub-standard or non-conformance situations with regard to established quality requirements. It does so in a manner that ensures a consistent approach to problem solving. The process includes provision of an automated tracking system to assist in the identification and implementation of actionable items arising from corrective actions or improvement opportunities. 5.4 Benchmarking and Operating Experience We seek out leading practice and determine how to apply it at Bruce Power to enable continuous improvement. The "Operating Experience" process provides for evaluating and disseminating in-house and industry operating experience information. This information is sought by and supplied to appropriate personnel for consideration and initiation of actions to prevent adverse conditions or to improve performance with respect to plant safety, reliability, economy and profitability. 5.5 Assessments In addition to Event Review Boards and the Nuclear Safety Review Board which provide oversight, we use a combination of assessments and audits to confirm that work activities meet	

Article No.	Article Requirement	Assessment	Compliance Category
		the stipulations of the Management System, evaluate the Management System and confirm the integrity of plant conditions. Assessments include: • Self Assessments. • Internal and External Audits and Surveillance Activities. • Annual State of the Functional Area Assessment. • Performance Assessments and Accountability Reviews. • Technical Assessments. The Management System is assessed to determine if it is adequately established, implemented, controlled, to confirm its effectiveness in achieving the expected results and that risks are identified and managed and to identify substandard conditions and enhancement opportunities as per the Nuclear Oversight Management program and its implementing procedure. The overall effectiveness of the Bruce Power Management System (BPMS) is evaluated by the Business Assessment Process.	
4.33.	An adequate audit and review system shall be established by the operating organization to ensure that the safety policy of the operating organization is being implemented effectively and that lessons are being learned from its own experience and from the experience of others to improve safety performance.	BP-PROG-15.01, Nuclear Oversight Management, Sec 1.0 states: "1.0 Purpose The purpose of this Program is to describe the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with the Nuclear Oversight Management process. It identifies the processes required to independently oversee the functioning of Bruce Power's Management System. This Program contributes to the development and growth of Nuclear Safety Culture by communicating the Nuclear Safety message, setting the example for nuclear safety and demonstrating this commitment through words and actions. This is accomplished by the Planning, Scheduling, Conducting, Reporting and Overall Evaluation of Audits and Assessments. This includes: Ensuring that oversight activities occur at sufficient frequency to confirm continuing effectiveness and conformance with requirements. [CSA N286-05 Clause 5.14.2]. Ensuring that oversight activities are performed by persons independent of the activities being assessed. [CSA N286-05 Clause 5.14.2].	C

Article No.	Article Requirement	Assessment	Compliance Category
		Ensuring that systematic oversight evaluations occur to determine the establishment, implementation and effectiveness of the Management System in achieving the expected results. This includes compliance against regulatory/statutory requirements and adopted industry standards of excellence. [CSA N286-05 Clause 5.14.2]. Ensuring that assessments performed by external stakeholders are adequately facilitated. Ensuring that oversight results are documented and reported to a level of management having sufficient breadth of responsibility to resolve any identified problems. [CSA N286-05 Clause 5.14.2]. Ensuring the activities and behaviours of Nuclear Oversight staff comply with fundamental expectations to drive performance excellence. Ensuring that a defined process exists to allow Nuclear Oversight staff to highlight significant issues to senior management and to document their response. This procedure implements the process objective stated in BP-MSM-1, Management System Manual, Appendix A, by providing the means to determine the extent to which Bruce Power affairs are being conducted in a manner that promotes reactor, radiological, industrial and environmental safety. This enables the initiation of corrective actions and enhancement opportunities to drive continual improvement."	
4.34.	Self-assessment by the operating organization shall be an integral part of the monitoring and review system. The operating organization shall perform systematic self-assessments to identify achievements and to address any degradation in safety performance. Where practicable, suitable objective performance indicators shall be developed and used to enable senior managers to detect and to react to shortcomings and deterioration in the management of safety.	BP-PROG-01.06, Operating Experience defines: The objective of the Focus Area Self-Assessment (FASA) process is to continually assess and improve the effectiveness with which work activities meet the requirements of the management system. Areas needing improvement are identified and corrective action is initiated. Processes to meet the requirements of the CSA Standard N286.0-05 (e.g., Sections 5.4, 5.11 and 5.14), by making improvements via: Processing Internal and External Operating Experience information; conducting Focus Area Self-Assessments; Benchmarking others; and by attending industry Conferences and Workshops. BP-PROC-00137, Focus Area Self Assessment provides: Support in identifying and documenting lessons learned from internal sources to continuously improve performance by identifying weakness, strengths, threats and opportunities to make improvements to Processes/ Procedures, Training, or System/Equipment Design. It specifies the requirements and describes the process for collecting business intelligence through Comprehensive Focus Area and Quick Hit Focus Area Self- Assessments. The Focus Area Self-Assessment (FASA) process is a tool that focuses on specific areas of a	C

Article No.	Article Requirement	Assessment	Compliance Category
		Functional Area's activities, processes or performance. It is used by Functional Areas to assess the adequacy and effective implementation of their programs. The results of the assessment are then compared with business needs, the management system, industry standards of excellence and regulatory/statutory or other legal requirements. This procedure describes the planning, preparation, execution, and reporting of performance improvement opportunities identified during Self Assessments. The FASA process provides the capability to review the effectiveness of the processes utilized to support the identification of degraded performance and effectively track, trend, prioritize, and correct subtle problems. Separate from Self-Assessment, Performance Based Assessment 0rprivdes independent provides oversight via BP-PROG-15.01, Nuclear Oversight Management and BP-PROC-00632, Performance Based Assessments and Reports. The objective of this process is to evaluate the performance of staff and business processes in key functional area and ensure appropriate information is provided to senior management to aid in the initiation of corrective actions and enhancement opportunities.	
4.35.	Monitoring of safety performance shall include the monitoring of personnel performance, attitudes to safety, response to infringements of safety, and violations of operational limits and conditions, operating procedures, regulations and licence conditions. The monitoring of plant conditions, activities and attitudes of personnel shall be supported by systematic walkdowns of the plant by the plant managers.	See article 4.34 above (BP-PROG-15.01, Nuclear Oversight Management, Sec 4.3). BP-PROC-00271, Observation and Coaching, Sec 1.0 and 4.0 state: "1.0 Purpose This procedure describes the process for conducting Observation and Coaching in Bruce Power facilities. Observation and Coaching drives performance improvement by influencing the behaviours of employees at all levels of the organization. This tool is used to mitigate risks to employees and to the business, primarily through the setting and reinforcing of high standards. Setting and reinforcing high standards contributes to a nuclear safety culture where observed behaviours demonstrate a respect for the reactor core, radiological safety and industrial safety practices and protection of the environment. Effective Observation and Coaching supports performance improvement by assessing the effectiveness of controls used to manage risk, identifying and removing barriers, identifying opportunities for improvement, and by developing capability within our workforce.	C

Article No.	Article Requirement	Assessment	Compliance Category
		4.0 Procedure Description Observation and Coaching is a systematic ongoing process consisting of four steps; Plan, Observe, Providing Feedback and Documenting. Division Managers or Department Mangers will: SET expectations for observations (see Appendix B). CONSIDER the following when choosing tasks, individuals or activities to be observed: Any governing documents that contain specific requirements for Observation and Coaching observations to be performed. Trends in performance data. Station events. Indications of process deficiencies. Input from internal or external oversight groups. New regulatory requirements. Emergent industry issues. New program implementation. Note: This is not an exhaustive list of considerations, rather it is intended to provoke thoughtful reflection of the many drivers for Observation & Coaching activities." Station Human Performance Clock Resets and Human Performance Event Free Days indicators as defined in BP-PROC-00794, Monitoring Human Performance is another measure of monitoring human performance related events. DPT-PE-00009, System and Component Performance Monitoring Walkdowns, Sec 1.0 and 4.1 state: "1.0 Purpose	

Article No.	Article Requirement	Assessment	Compliance Category
		This procedure provides the basis and expectations for the execution of system and component performance monitoring walkdowns. It provides guidance to Plant Engineers for conducting walkdowns on the applicable systems and component types as described in BP-PROC-00382, Performance and Condition Monitoring. Walkdowns are intended to allow Plant Engineers to assess System and Component health and material condition. A strong walkdown program supports high standards for identifying and evaluating degrading material and operating conditions consistent with the INPO Critical Success Factors for Equipment Reliability. Specifically, this procedure defines the scope of performance monitoring walkdowns as follows: It defines various types of walkdowns. It provides guidelines/specific requirements on when to & how to perform walkdowns. It defines the walkdown documentation requirements. The procedure directly supports execution of: BP-PROC-00382 "Performance and Condition Monitoring", BP-PROC-00382 in turn supports the BP-PROG-11.01, "Plant Reliability Integration Program" and implementation of the AP-913 Equipment Reliability Process at Bruce Power. Note superceded by BP-PROC-00781 The procedure is directly supported by DPT-PE-00008 "System and Component Performance Monitoring Plans." This procedure is applicable to the following Systems, Structures & components SSCs and Programs as described in BP-PROC-00382: Tier 1 Systems (Important to Safety) Tier 2 Systems (Important to Generation and Asset Preservation) Sec 4.1 states: Specific concerns should be noted in the report and consideration should be given to performing routine walkdowns jointly with Operations and Maintenance staff." BP-PROC-00781, Performance Monitoring, Sec 1.0 states:	

Article No.	Article Requirement	Assessment	Compliance Category
		"1.0 Purpose This procedure provides the basis and expectations for the Equipment Performance Monitoring Process at Bruce Power. This process supports the Equipment Reliability Program (BP-PROG-11.01). The scope of which Structures, Systems and Components (SSCs) are included in the performance and condition monitoring program is identified by assessing the criticality of the SSC. This is done by applying the appropriate screening criteria to the function of the SSC and assessing the impact of SSC failure on plant safety, reliability or economics via BP-PROC-00778, Scoping & Identification of Critical SSCs." DPT-PE-00008, System and Component Performance Monitoring Plans, Sec 1.0 states: "1.0 Purpose This procedure provides the basis and expectations for the development, generation and implementation of System and Component Performance Monitoring Plans (SPMPs and CPMPs) by which engineering continually monitor risk significant systems & component groups. This procedure directly supports execution of: BP-PROC-00781, Performance Monitoring. DPT-PE-00009, System and Component Performance Monitoring Walkdowns. DPT-PE-00010, System Health Reporting. DPT-PE-00011 Component Health Reporting." Plant walkdowns are formalized by Plant Engineering Department System Walk-down Program. Plant systems engineering section manager are responsible for the conduct of the program as described in MSM - Approved Reference Chart Authorities and Responsibilities - Sheet 0002, BP-MSM-1. These include: -Provide management supervision and technical oversight in support of the Plant Engineering Department System Walk-down Program. This will consist of reviewing and approving System Walk-down plans and final reports developed by assigned system engineers for technical effectiveness, and compliance with ----Department Procedures/Programs. -Conduct field observations; participate in (select) system walk-downs conducted by assigned	

Article No.	Article Requirement	Assessment	Compliance Category
		system engineers. Observe ongoing work and identify practices that are inconsistent with quality work and accepted Bruce Power practices.	
4.36.	The persons and organization performing quality assurance functions shall have sufficient authority and organizational independence to identify problems relating to quality and to initiate, to recommend and to verify the implementation of solutions. These persons and organizations shall report to a high level of management such that the necessary authority and organizational independence are provided, including sufficient independence from costs and schedules when considering safety related matters.	BP-MSM-1 Bruce Power Management System Manual: Identifies numerous quality assurance functions, in particular on page 147, the Nuclear Oversight and Regulatory Affairs organizational unit is to: • Ensures that adverse conditions, incidents, and acts/practices/behaviours that represent sub-standard or non-conformance situations with regard to established quality requirements are identified, investigated, analyzed and corrected. • Ensure compliance to all responsibilities listed in BP-PROG-00.04, Pressure Boundary Quality Assurance Program (PBQA) Section 1.0, Sub-section 3.1. Furthermore on page 154, the Quality Assurance and PMC Quality Assurance Section Managers, • Support the Management Systems Department in researching and reinforcing standards in support of Regulatory and Business requirements, in particular, ensuring that the requirements in support of a healthy Nuclear Safety Culture are understood by leadership and integrated into governance. • Implement and provide oversight of Project Management and Construction (PMC) and the Major Component Replacement (MCR) Quality Management Processes. • Perform Independent Quality Oversight of PMC's and the MCR's activities (including design, supply, installation / construction, commissioning and close-out). • Support all Bruce Power quality assurance activities in collaboration with Operations, PMC, Supply Chain, Engineering, Outage and Maintenance and other NORA Departments. BP-PROG-01.02 Bruce Power Management System (BPMS) Management, Section 4.0: Highlights the BPMS addresses all elements of the business including safety, health, environmental, security, **quality** and economic elements by providing a single framework for the arrangements of processes necessary to address the goals of the organization. This document is structured to align with the principles of N286-12, Management System Requirements for Nuclear Facilities and references the related N286-05 generic requirements and other relevant management system standards, e.g., standards implemented by the IAEA, ISO, and CSA. It satisfies the requirements for the establishment of a management system framework compatible with ISO 14001 Environment Management System requirements and OHSAS 18001:2007	C

Article No.	Article Requirement	Assessment	Compliance Category
		Occupational health and safety management systems - requirements. BP-PROG-15.01 Nuclear Oversight Management specifies the following in section 4.7 Nuclear Oversight Independence: This process defines the common standards and expectations for the activities performed by Nuclear Oversight staff. The organizational independence of Nuclear Oversight staff ensures the freedom to identify quality issues and verify implementation of solutions. This process is a reflection of the industry standard for independence for Nuclear Oversight. The Department Manager, Audit, is the designated business process owner responsible for discharging related duties as they apply to the Level 3 Business Process. The implementing document is BP-PROC-00909, Nuclear Oversight Independence. BP-PROC-00632, Performance Based Assessments and Reports, Sec 1.0 and 4.0 state: "1.0 Purpose The purpose of this procedure is to describe the process for executing Performance Based Assessments and Reports. This is accomplished by evaluating staff and business processes in key functional and cross-functional areas, reporting results, and monitoring the performance of related action plans. This includes: Utilizing qualitative and quantitative information acquired through observation of station field activities, program implementation and leadership effectiveness in implementing station goals and objectives. Providing products, such as PDSs, SDSs, SCRs and reports to line management to track performance and monitor improvement progress such that areas in need of attention are identified prior to outside stakeholder identification. Monitoring corrective action plans to ensure improvements are on schedule. Utilizing Quarterly Reports to accumulate information and providing a reporting mechanism to senior management. This procedure implements the process objective stated in BP-PROG-15.01, Nuclear Oversight Management, Section 4.3, by evaluating the performance of staff and business processes in key	

Article No.	Article Requirement	Assessment	Compliance Category
		functional areas and ensuring appropriate information is provided to senior management to aid in the initiation of corrective actions and enhancement opportunities. 4.0 Procedure Description 4.1 Precautions, Limitations, and Considerations 4.1.1 The Performance Based Assessment Program is independent of all other line management supervisory activities and responsibilities. The Program is also independent of all other station event investigation activities. 4.1.2 Nuclear Safety is the overriding priority of the Assessment Program. While conducting observations, Assessment personnel shall intervene if required to protect people, equipment, and the environment from immediate hazards and/or unsafe conditions. All hazards and unsafe work conditions shall be communicated to the appropriate level of supervision and documented using the Corrective Action Program (CAP). 4.1.3 Observations and facts shall be depersonalized. Any identifying personal information (such as individual names) shall be removed prior to inclusion in Nuclear Oversight Assessment reports. Where required, position titles may be used in order to substantiate facts and insights. 4.1.4 Observation activities will be conducted in a manner that does not impede plant personnel responding to events and transients. 4.1.5 The Nuclear Oversight Specialists and the Nuclear Oversight Inspector shall build an open and supportive relationship with the functional area station FLMs and Managers. This relationship will enable a free flow of performance information to keep the station aware of performance issues and where good performance was observed. The Assessors shall meet frequently with the Functional Area Managers for informal discussions and updates to keep them aware of any issues. 4.1.6 Issues that require senior level management intervention for resolution shall be escalated in accordance with BP-PROC-00706, Nuclear Oversight Issues Elevation and Escalation."	
4.37.	The appropriate corrective actions shall be determined and implemented as a result of the monitoring and review of safety performance. Progress in taking the corrective actions shall be	See article 4.34 above (BP-PROG-15.01, Nuclear Oversight Management BP-PROG-01.07, Corrective Action, Sec 1.0 and 4.0 state: "1.0 Purpose Bruce Power's management model for achieving excellence describes our vision, values, key	C

Article No.	Article Requirement	Assessment	Compliance Category
	monitored to ensure that actions are completed within the appropriate timescales. The completed corrective actions shall be reviewed to assess whether they have adequately addressed the issues identified in audits and reviews.	results areas, policies, programs and procedures. It defines how we execute, how we manage performance, and how we assess results. Central to this is fostering a healthy Nuclear Safety Culture and being recognized for excellence in all aspects of nuclear safety including reactor safety, radiation safety, industrial safety and environmental safety management. This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with the Corrective Action Program in fostering a healthy Nuclear Safety Culture in all aspects of nuclear safety. The objective of the Corrective Action Program is to identify and eliminate or mitigate adverse conditions that have resulted in or could result in loss. 4.0 Program Description All adverse conditions and nonconformances are to be promptly identified, documented and reported. For most events, significant events and significant conditions adverse to quality, the causes will be determined and corrective action will be taken to correct, and where appropriate, prevent their recurrence. Any corrective actions taken to address identified causes are to be tracked to completion. Effectiveness will be verified for actions taken to prevent recurrence. Adverse conditions are trended and periodically analyzed for adverse trends. Where warranted, corrective actions are put in place to address adverse trends. Periodic assessment of the effectiveness of the program will be done based on the results and recommendations obtained from verifications and audits."	
Requirement 10: Control of plant configuration	The operating organization shall establish and implement a system for plant configuration management to ensure consistency between design requirements, physical configuration and plant documentation.	BP-PROG-10.01, Plant Design Basis Management, Sec 4.1 states: "The Design Management Procedure, as documented in BP-PROC-00335 specifies the design activities and outputs that define and manage the Plant Design Basis such that the nuclear operating stations can operate safely and reliably for the duration of their design life. Design Management relies upon the implementing procedures of BP-PROC-00363, Nuclear Safety Assessment to ensure nuclear safety requirements are incorporated into the design. This procedure interfaces with the implementing procedures of BP-PROG-10.02, Engineering Change Control, to ensure the correct tools are used during design changes and modifications. This procedure interfaces with the implementing procedures of BP-PROG-10.03, Configuration Management, to ensure design and operating margins are managed." BP-PROG-10.03, Configuration Management, Sec 1.0 states:	C

Article No.	Article Requirement	Assessment	Compliance Category
		"1.0 Purpose To provide an overview of the Configuration Management (CM) Program at Bruce Power and establish guidance to promote consistent application of the following CM objectives across the site: 1. Clearly define and communicate CM scope, responsibilities, authorities, principles and interfaces. 2. Design basis and licensing basis requirements, which apply to the plant will be accurately identified, documented, maintained and accessible. 3. The plant's physical structures, systems and components, and process computer controls will conform to design basis and license basis requirements. 4. Design basis and license basis requirements will be accurately reflected in plant documentation and in processes and procedures for altering, maintaining, testing and operating the plant. 5. Consistency will be maintained among sources of plant information (documents and electronic data) as well as between plant information and the plant's physical and functional characteristics. 6. Continuous improvement of CM will be achieved by monitoring and assessing CM-related activities and by incorporating feedback of lessons learned from in-house and industry best practices and experience."	
4.38.	Controls on plant configuration shall ensure that changes to the plant and its safety related systems are properly identified, screened, designed, evaluated, implemented and recorded. Proper controls shall be implemented to handle changes in plant configuration that result from maintenance work, testing, repair, operational limits and conditions, and plant refurbishment, and from	BP-PROG-10.02, Engineering Change Control, Sec 1.0 states: "1.0 Purpose This purpose of the Engineering Change Control (ECC) program is to specify the manner in which design changes and modifications are defined, planned, implemented, and controlled. The main objective of the ECC program is to ensure that design changes and modifications are controlled such that structures, systems, components, and significant tools (SSCTs) continue to meet the design basis and operate safely for the full duration of design life." BP-PROG-10.03, Configuration Management, Sec 4.0 states:	C

Article No.	Article Requirement	Assessment	Compliance Category
	modifications due to ageing of components, obsolescence of technology, operating experience, technical developments and results of safety research.	"4.0 Program Description The CM Program objective is to ensure the following: · Modifications to the plant, operation, maintenance and testing of the physical plant configuration is in accordance with the design requirements as expressed in the facility configuration information. · To maintain this consistency throughout the operational life-cycle phase, particularly as changes are being made. · To ensure Safe Operating Envelope (SOE) is maintained for the full duration of the plant design life. This relationship is depicted in Figure 1, Equilibrium Concept. The principles that define the CM Program are found in, Appendix A, Configuration Management Program Principles." There are operational and engineering controls for any change in plant configuration that result from maintenance work, testing, repair, operational limits and conditions, and plant refurbishment, and from modifications due to ageing of components, obsolescence of technology, operating experience, technical developments and results of safety research. BP-PROG-12.05 Conduct of Plant Operations Two of the four operational areas implemented by the Conduct of Plant Operations program are: - Plant Operation. Controls the execution of Operator activities in the plants to start-up, operate and shutdown the reactor units, to refuel the reactors on an on-going basis, to perform routine operations in support of maintenance activities, and to perform routine surveillance of systems and to respond to unanticipated events. - Work Protection. Controls the development and approval of Work Protection related procedures and oversees the execution of Work Protection related activities to ensure an isolated and de-energized condition exists for the execution of work.	
Requirement 11: Management of modifications	The operating organization shall establish and implement a programme to manage modifications.	BP-PROG-10.03, Configuration Management, Sec 4.0 states: "4.0 Program Description The CM Program objective is to ensure the following:	C

Article No.	Article Requirement	Assessment	Compliance Category
		• Modifications to the plant, operation, maintenance and testing of the physical plant configuration is in accordance with the design requirements as expressed in the facility configuration information. • To maintain this consistency throughout the operational life-cycle phase, particularly as changes are being made. • To ensure Safe Operating Envelope (SOE) is maintained for the full duration of the plant design life. This relationship is depicted in Figure 1, Equilibrium Concept. The principles that define the CM Program are found in, Appendix A, Configuration Management Program Principles. The physical plant configuration shall conform to the facility configuration information which is based on the design requirements. The facility configuration information, which includes, as-built drawings and operating procedures (including maintenance procedures) shall accurately reflect both the physical plant configuration and the design requirements. Changes to design requirements shall be reflected in both the physical plant configuration and the facility configuration information. Changes to either the physical plant configuration or facility configuration information shall be supported by, and be consistent with the design requirements. This process ensures the physical configuration of the plant is maintained within the design and licensing basis. … The CM process provides a readily available, accurate source of design basis information through information management processes. Organizational responsibilities and change approval authority are assigned to promote proficiency through standard processes and activities while ensuring commitment to Nuclear Safety (i.e., Reactor, Radiation, Environmental and Industrial Safety), is maintained.”	
4.39.	A modification programme shall be established and implemented to ensure that all modifications are properly identified, specified, screened, designed, evaluated,	BP-PROG-10.02, Engineering Change Control, Sec 1.0 and 4.0 states: "1.0 Purpose This purpose of the Engineering Change Control (ECC) program is to specify the manner in	C

Article No.	Article Requirement	Assessment	Compliance Category
	authorized, implemented and recorded. Modification programmes shall cover structures, systems and components, operational limits and conditions, procedures, documents and the structure of the operating organization. Modifications shall be characterized on the basis of their safety significance. Modifications shall be subject to the approval of the regulatory body, in accordance with their safety significance, and in line with national arrangements.	which design changes and modifications are defined, planned, implemented, and controlled. The main objective of the ECC program is to ensure that design changes and modifications are controlled such that structures, systems, components, and significant tools (SSCTs) continue to meet the design basis and operate safely for the full duration of design life. 4.0 Program Description The program objective is to ensure that design changes and modifications are sufficiently controlled such that requirements are met. Requirements for design changes and modifications come from Bruce Power's Power Reactor Operating Licences (PROLs) and the documents referenced there-in, the CMLF facility licence, and numerous laws, regulations, codes, and standards. A matrix of these requirements can be found in Appendix A, Requirements. This program applies a graded approach based on risk. The assessment of risk includes elements of safety (industrial safety, reactor safety, environmental safety, radiation safety) and business needs. It is expected that each person will take responsibility for nuclear safety by: Following all applicable procedures as written or ensuring that required procedure changes or alterations occur, and Accepting and performing only those tasks for which he or she is qualified in accordance with BP-PROG-02.02 or - in the case of vendors - an appropriate, accepted vendor Quality Assurance (QA) program. To ensure rigorous decision-making, it is expected that each person will: Obtain input from stakeholders when specified in an implementing procedure, Challenge underlying assumptions, and Encourage candid dialogue between the design team, the project controls team, and their stakeholders while carrying out implementing processes. This program is implemented by seven procedures:	

Article No.	Article Requirement	Assessment	Compliance Category
		1. BP-PROC-00743, Site Services Engineering Change Control. 2. BP-PROC-00542, Configuration Information Change. 3. BP-PROC-00539, Design Change Package. 4. BP-PROC-00877, Modification Installation Quality Assurance. 5. BP-PROC-00615, Commissioning Modifications and Projects. BP-PROG-10.03, Configuration Management, Sec 4.0 states: "4.0 Program Description The CM Program objective is to ensure the following: · Modifications to the plant, operation, maintenance and testing of the physical plant configuration is in accordance with the design requirements as expressed in the facility configuration information. · To maintain this consistency throughout the operational life-cycle phase, particularly as changes are being made. · To ensure Safe Operating Envelope (SOE) is maintained for the full duration of the plant design life. This relationship is depicted in Figure 1, Equilibrium Concept. The principles that define the CM Program are found in, Appendix A, Configuration Management Program Principles." BP-PROG-10.02, Engineering Change Control, Sec 1.0 and Appendix A states: "Appendix A: Requirements Bruce A PROL 15.00/2014 & Bruce B PROL 16.00/2014 Clause 5.2 The licensee shall not make any change to the design of the facility, facility operation, equipment or procedure that would change the operational limits referred to in condition 3.1, or introduce hazards different in nature or greater in probability than those considered by the Final Safety Analysis Report and Probabilistic Safety Assessment, without the prior written consent of the Commission, or a person authorized by the Commission."	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-MSM-1, Management System Manual, Sec 4.1.5 states: "4.1.5 Organization Authorities and Responsibilities An Approved Reference Chart of the organization structure is maintained. It is derived from information contained in the SAP database (the official system of record) and defines the organizational names, positional/role titles, reporting structure, key responsibilities and associated information. This chart is found on the Human Resources Intranet page. For each organization unit defined in the Approved Reference Chart, there are related roles, authorities and responsibilities defined in BP-MSM-1 Sheet 0002, Management System Manual Approved Reference Chart Authorities and Responsibilities Sheet 0002 or in Organization Manuals. BP-MSM-1, Management System Manual, Page 1 indicates that the MSM requires CNSC Acceptance/Notification." Also as described in article 4.27: BP-OPP-00002, Section 01.6 Modifications prescribe the conditions under which modifications to station systems and modifications to procedures. In both cases it is stated that: Prior approval of the CNSC shall be required for modifications to station systems/procedures in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence.	
4.40.	Modification control, in compliance with the requirements set out in Ref. [4], shall ensure the proper design, safety assessment and review, control, implementation and testing of all permanent and temporary modifications. Consequences of the modification for human tasks and performance shall be systematically analysed. For all plant modifications, human and organizational factors shall be	BP-PROG-10.01, PLANT DESIGN BASIS MANAGEMENT, Sec 4.1 states: "4.1 Design Management The Design Management Procedure, as documented in BP-PROC-00335 specifies the design activities and outputs that define and manage the Plant Design Basis such that the nuclear operating stations can operate safely and reliably for the duration of their design life. Design Management relies upon the implementing procedures of BP-PROC-00363, Nuclear Safety Assessment to ensure nuclear safety requirements are incorporated into the design. This procedure interfaces with the implementing procedures of BP-PROG-10.02, Engineering Change Control, to ensure the correct tools are used during design changes and modifications. This procedure interfaces with the implementing procedures of BP-PROG-10.03, Configuration Management, to ensure design and operating margins are managed."	C

Article No.	Article Requirement	Assessment	Compliance Category
	adequately considered. Ref. [4]: INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Design, IAEA Safety Standards Series No. NS-R-1, IAEA, Vienna (2000	DPT-PDE-00013, Human Factors Engineering Program Plan, Sec 1.0 states: "1.0 Purpose This procedure provides direction in implementing Human Factor processes into changes performed under the Design Change Package procedures (BP-PROC-00539 [R-22]. This procedure may also be applied to projects outside of the modifications procedures where it is deemed that a Human Factors (HF) review will provide added benefit. Examples would include changes to equipment outside of BP-PROC-00539. For changes outside of BP-PROC-00539 the determination as to whether HF review is required will be made by the department manager or above of the line requesting the work in conjunction with the Manager, Plant Design Engineering. The Section Manager responsible for Human Factors, will provide input to the decision as required. This procedure is based upon NUREG-0711, Human Factors Engineering Program Review Model [R-1], and conforms to Canadian Nuclear Safety Commission (CNSC) documents G-276, Regulatory Guide for Human Factors Engineering Program Plans [R-2] and G-278, Regulatory Guide for Verification and Validation Plans [R-3]. Appendix B outlines the key elements of the NUREG-0711 model. This procedure defines the qualification level necessary to perform various HF duties within Bruce Power's engineering change process." BP-PROC-00615, Commissioning Modifications and Projects, Sec 1.0 states: "1.0 Purpose This process specifies how commissioning is to be performed for Bruce Power Structures, Systems, Components and significant Tools (SSCT). It includes requirements for commissioning planning, commissioning specification, execution and reporting. The expectation is that commissioning will demonstrate that: Installed systems, equipment and components will perform in accordance with specifications and design intent before they are placed into service. Systems, equipment and components, which were altered to facilitate a change, are returned to	

Article No.	Article Requirement	Assessment	Compliance Category
		their original configuration. Commissioning results are properly documented. Systems, equipment and components are ready for turnover. Work performed during the execution of this procedure falls within the practice of professional engineering (also known as engineering work). At Bruce Power, effective 01JUN2014, an individual shall be a Professional Engineer licensed in the province of Ontario in order to perform engineering work or their work shall be supervised by a Professional Engineer licensed in the province of Ontario."	
4.41.	Temporary modifications shall be limited in time and number to minimize the cumulative safety significance. Temporary modifications shall be clearly identified at their location and at any relevant control position. The operating organization shall establish a formal system for informing relevant personnel in good time of temporary modifications and of their consequences for the operation and safety of the plant.	BP-PROC-00638, Temporary Configuration Change Management, Sec 1.0, 4.0 and 4.5 state: "1.0 Purpose This process satisfies, in part, the regulatory requirement to control changes. The purpose of this process is to prescribe a method to control Temporary Configuration Changes (TCCs) made to facilities licensed by the Canadian Nuclear Safety Commission (CNSC) at Bruce Power. Objectives of this procedure include: Ensure that temporary changes do not adversely impact safe reliable plant operation or design basis. Ensure that temporary changes are adequately controlled. Provide for management oversight of the quantity of installed TCCs and their duration. Demonstrate compliance with regulatory requirements. BP-PROC-00638, Temporary Configuration Change Management, Sec 4.0 states: 4.0 Procedure Description The following principles apply to the use of TCCs: 1. TCCs are expected to be in place for a period not exceeding six months or where removal is not possible during the plant operation, for a period not exceeding one outage cycle. 2. When installed, TCCs shall have removal plans. If the TCC is a modification of a registered	C

Article No.	Article Requirement	Assessment	Compliance Category
		pressure boundary system the installation shall not exceed one year or one outage cycle where removal is not possible during plant operation. 3. TCCs are not applicable to inoperable/out of service SSCTs unless the SSCT needs to become operable (in service, standby) with a temporary change installed, or the controlling procedure is being closed with a temporary change installed. 4. The total number of installed TCCs shall be minimized. 5. When TCCs are necessary, they shall be prepared and installed such that: a) The desired results will be achieved. b) Personnel and equipment are not placed at risk (no unsafe conditions). c) Appropriate codes and standards, applicable to the type of temporary change, are met. d) The materials used are appropriate for the application. e) The Operating Policies and Principles are adhered to. f) Existing Work Protection is not violated. g) The TCC Removal Work Order (WO) or a Plant Health Committee (PHC) Endorsed Project Number must be specified when the TCC is prepared. h) The work order can be replaced by the approved operational procedure if no field work is required. 6. A TCC record shall be created for each temporary configuration change. 7. IF a TCC is not controlled by a Continuous Use Procedure and will be applied and removed within a single shift, THEN RECORD the installation and removal in the Unit Chrono Log. Expectations and Standards in GRP-OPS-00038, Section 4.33, Item 6 apply. 8. For all TCC installations, the necessary reviews, approvals and Shift Manager (SM) authorization must be obtained before the change is installed. Any temporary change which impacts on the pressure boundary must be performed via an approved Engineering Change using BP-PROC-00539, Design Change Package. Refer to BP-PROG-00.04, Section A - Program Scope, Section 1.1, Nuclear Pressure Boundary Activities, and Section 1.2, Conventional Pressure Boundary Activities, for a description of Pressure	

Article No.	Article Requirement	Assessment	Compliance Category
		Boundary activities, or consult with a Pressure Boundary Specialist, if unsure. 10. The electronic TCC Record is the official record. Paper copies used in the installation process are filed in the Work Control Area (WCA) for back up. 11. Once a TCC is installed it is still possible to correct obvious errors in the details of the TCC Record, but changes to the intent of a TCC are not permitted. If a physical change of a TCC is required a new TCC Record, which describes the new configuration, must be prepared and installed and the original TCC removed. 12. TCCs will be monitored by the TCC Coordinator to ensure compliance with the requirements of this procedure." BP-PROC-00638, Temporary Configuration Change Management, Sec 4.5 states: "4.5 Installation/Testing 1. The Installer ensures WO Assessment is complete and includes items in BP-PROC-00543, Task Planning, Section 4.7.24 prior to the start of installation. 2. The installer prepares any required TCC Tags (FORM-12523, Temporary Configuration Change Tag [Electronic], or FORM-12113, Temporary Configuration Change [TCC] Backup Tag [Paper Backup]). TCC Tags may be added, deleted or changed at any time before the TCC Status has been changed to “Installed”. If a TCC Tag is required on a device on the Main Control Room (MCR) Unit panels, a TCC Tag should still be prepared in the TCC Program as described above, so that the tag is recorded. It is not necessary to print these tags, since printed tags are not applied to the MCR panels. Request the ANO/CRO prepare a label on a magnetic backing to be applied to the panel in accordance with GRP-OPS-00022, Operator Aids, similar to that used for Caution Tags (BP-WPP-00007, Caution Tag Procedure). 3. The installer performs the TCC installation per the instructions following approved procedures. 4. Hang the tags at the locations identified on the tags, print name and initial each tag as they do so. If not already populated, the installer shall print their name on each tag. The installer shall initial each tag before hanging. 5. The TCC Installation shall be verified and documented on the TCC record by a second competent person in the same trade (For example, Mechanical Maintainer, Control Maintainer, etc.) as the installer. Verification may be concurrent or independent as directed by the work group Supervisor or the SM/CRSS. Verification includes checking that the installation was	

Article No.	Article Requirement	Assessment	Compliance Category
		performed correctly in accordance with the instructions and confirming that the TCC Tags were hung correctly."	
4.42.	The plant management shall establish a system for modification control to ensure that plans, documents and computer programs are revised in accordance with modifications.	BP-PROG-10.03, Configuration Management, Sec 1.0 states: "1.0 Purpose To provide an overview of the Configuration Management (CM) Program at Bruce Power and establish guidance to promote consistent application of the following CM objectives across the site: 1. Clearly define and communicate CM scope, responsibilities, authorities, principles and interfaces. 2. Design basis and licensing basis requirements, which apply to the plant will be accurately identified, documented, maintained and accessible. 3. The plant's physical structures, systems and components, and process computer controls will conform to design basis and license basis requirements. 4. Design basis and license basis requirements will be accurately reflected in plant documentation and in processes and procedures for altering, maintaining, testing and operating the plant. 5. Consistency will be maintained among sources of plant information (documents and electronic data) as well as between plant information and the plant's physical and functional characteristics. 6. Continuous improvement of CM will be achieved by monitoring and assessing CM-related activities and by incorporating feedback of lessons learned from in-house and industry best practices and experience." BP-PROG-10.01, Plant Design Basis Management, Sec 4.0 states: "4.0 Program Description This program ensures that the plant design meets safety, reliability, and regulatory requirements including pressure boundary quality assurance requirements described in BP-PROG-00.04, Pressure Boundary Quality Assurance Program. Additionally, this program sets out	C

Article No.	Article Requirement	Assessment	Compliance Category
		requirements for engineering analysis and documentation such that the adequacy of the design can be demonstrated and the Safe Operating Envelope is maintained for the full duration of the plant design life. This program is implemented by the following procedures as indicated in Appendix B, Document Hierarchy. BP-PROC-00335, Design Management BP-PROC-00363, Nuclear Safety Assessment BP-PROC-00502, Resolution of Differing Professional Opinions BP-PROC-00582, Engineering Fundamentals DIV-ENG-00008, Engineering Work Management DIV-ENG-00009, Design Authority DIV-ENG-00021, Professional Engineering Accountabilities”	
4.43.	Before commissioning a modified plant or putting the plant back into operation after modifications, personnel shall be trained, as appropriate, and all relevant documents necessary for plant operation shall be updated.	Refer to BP-PROG-10.03, Configuration Management, Sec 1.0 in article 4.42 above. BP-PROC-00615, Commissioning Modifications and Projects, Sec 4.5 and 4.0 state: "4.5 Training The purpose of the Commissioning Training sub-process is to ensure any training required for staff to support commissioning activities and operations, or maintenance activities following AFS is provided. Note: Training, planning and delivery are governed by BP-PROG-02.02, Worker Learning and Qualification. 4.5.1 Operations Training: Training of operations staff needs to be provided where required to support operation of the modification both during commissioning and following AFS. This need is identified early in the modification process." 4.0 Procedure Description Commissioning of Modifications, Projects, and Construction activities are performed following the completion of the installation process and update of Milestone 392, INSTAL COMP, as per interfacing document BP-PROC-00539, Design Change Package. Commissioning is considered	C

Article No.	Article Requirement	Assessment	Compliance Category
		complete when Milestone 510 COMM COMP has been updated. The basic principles of commissioning are as follows: 1. Changes to SSCTs will be commissioned to demonstrate the following: a) The modification will perform in accordance with specifications and design requirements before being placed put in service. b) System, equipment and components, which were altered to facilitate a change, are returned to their original configuration. c) The commissioning results are properly documented. 2. Commissioning documentation will be prepared dependent on the impact of the modification on the following six risk classifications and Modification Outline found in FORM-10700, Design Scoping Checklist (Reference: BP-PROC-00539, Appendix B, Risk Classification and Controls): Employee Safety Environmental Equipment Nuclear Safety Production Safeguards and Security 3. Commissioned modifications will be declared as Available for Service (AFS) and accepted by Operations when: a) The commissioning results are interpreted and demonstrated to be satisfactory. b) Appropriate training of operations and maintenance staff has been completed. c) Operating documentation has been revised and issued. d) Status of regulatory commitments checked and fulfilled."	
Requirement 12: Periodic Safety	Systematic safety assessments of the plant, in accordance with the	NK21-CORR-00531-11005, Submission of Safety Basis Report, Submission of Safety Basis Report states:	C

Article No.	Article Requirement	Assessment	Compliance Category
Review	regulatory requirements, shall be performed by the operating organization throughout the plant's operating lifetime, with due account taken of operating experience and significant new safety related information from all relevant sources.	"1.0 Purpose The purpose of this letter is to submit the Bruce Power Safety Basis Report (Enclosure 1) as information useful to the regulatory review of the Bruce A and Bruce B Power Reactor Operating Licence (PROL) renewals. As previously indicated in Reference 1, Bruce Power is committed to the implementation of a Periodic Safety Review (also referred to as Periodic Application of Integrated Safety Review (PAISR)) process in support of the continued safe operation of Units 1 through 8, with the first full submission planned for no later than 2019. Bruce Power has used the IAEA Safety Guide SSG-25, "Periodic Safety Review of Nuclear Power Plants" as a basis to develop this process. The 2014 Periodic Safety Review process was developed to support Bruce Power's internal planning process, and is submitted for the purpose of providing additional information. It contains information useful to the regulatory review of the nuclear power reactor operating licences PROL 15.00/2014 and PROL 16.00/2014, which are expected to cover the period from November 2014 until October 2019 inclusive. The Safety Basis Report, which includes the current analysis bases and safety significant elements of an IAEA SSG-25 based Periodic Safety Review, has been compiled for the five year licence period 2014 to 20.19. The PROL renewal applications were provided under References 2 and 3. A comprehensive PAISR is being developed and the full set of safety factor assessments will be completed to support the licence period beyond 2019. The Safety Basis Report (Enclosure 1) includes the following: Objective and Scope Review of Current Analysis Bases, Review and Assessment Processes for Safe Operation Interim Periodic Safely Review Assessments - Safely Factor on Plant Design - Safely Factor on Condition of SSC - Safely Factor on Aging	

Article No.	Article Requirement	Assessment	Compliance Category
		- Safely Factor on Deterministic Analysis - Safely Factor on Probabilistic Safely Assessment - Safety Factor on Hazard Analysis Improvement plan and initiatives Summary and Conclusions" BP-PROC-00363, Nuclear Safety Assessment, Sec 4.0 and 4.1, state: "4.0 Procedure Description NSA is the systematic process carried out, throughout the design modification process or in addressing emergent issues (e.g., plant aging) that may affect the Design Basis or the Safety Report Basis, to ensure that all necessary nuclear safety requirements are defined for the actual or proposed design of the plant. The NSA also considers very unlikely severe accidents that may result in major radioactive releases to ensure that their likelihood of occurrence remains extremely low. NSA integrates safety analysis, PRA and CSE." BP-PROG-01.06, Operating Experience Program, Sec 1.0 states: "1.0 Purpose The objective of the Bruce Power Operating Experience Program is to define the processes used to identify and capture lessons learned from sources within Bruce Power, and external to Bruce Power, in order to continuously improve performance by making improvements to Processes/Procedures, Training, or System/Equipment Design." NK21-CORR-00531-11617, Integrated Safety Review for Bruce A states: "The purpose of this letter is to submit the Bruce A Integrated Safety Review (ISR) Basis Document to the CNSC for acceptance, in support of conducting an ISR pertaining to the continued operation of Bruce A. This request is in anticipation of RD-360 Rev 1 being included as a licence requirement in the next Bruce A PROL and Licence Conditions Handbook.	

Article No.	Article Requirement	Assessment	Compliance Category
		RD-360 requires acceptance of the ISR Basis Document in section 6.2.1. The scope of the ISR will be based on IAEA Specific Safety Guide SSG-25, "Periodic Safety Review for Nuclear Power Plants" (Reference 2), taking the ISR process as described in CNSC Regulatory Document RD-360 "Life Extension of Nuclear Power Plants" (Reference 3), the draft CNSC REGDOC-2.3.3 "Integrated Safety Reviews" (Reference 4) and guidance from Reference 5 into consideration. As part of an Asset Management Initiative underway since 2009, Bruce Power has been completing the plant condition assessments necessary to support this work. The enclosed ISR Basis document is the first step in conducting the ISR. It sets out the scope and methodology for the ISR as called for in SSG-25, Section 4.5, and establishes the required depth and rigour of the associated safety reviews and assessments."	
4.44.	Safety reviews shall be carried out at regular intervals. Safety reviews shall address, in an appropriate manner, the consequences of the cumulative effects of plant ageing and plant modification, equipment requalification, operating experience, current standards, technical developments, and organizational and management issues, as well as siting aspects. Safety reviews shall be aimed at ensuring a high level of safety throughout the operating lifetime of the plant.	Siting aspects are no longer applicable except for new facilities within the framework of the BNPD site. Also note that IAEA document SSG-25, issued in 2013, does not require sitting to be assessed as part of a PSR nor does CNSC RD-360. See assessment of Requirement 12 above: NK21-CORR-00531-11005, Submission of Safety Basis Report BP-PROC-00363, Nuclear Safety Assessment, Sec 4.0 and 4.1, state: "4.0 Procedure Description NSA is the systematic process carried out, throughout the design modification process or in addressing emergent issues (e.g., plant aging) that may affect the Design Basis or the Safety Report Basis, to ensure that all necessary nuclear safety requirements are defined for the actual or proposed design of the plant. The NSA also considers very unlikely severe accidents that may result in major radioactive releases to ensure that their likelihood of occurrence remains extremely low. NSA integrates safety analysis, PRA and CSE. BP-PROC-00335, Design Management (interfacing document) and BP-PROC-00363, Nuclear Safety Assessment (this procedure) are fundamentally iterative processes that provide assurance that the plant Design Basis as described in design documentation and the safety analysis as described in the SR agree and provide a consistent basis for safe operation. This iterative process continues until a design solution has been reached that meets all safety requirements including those that may evolve during the course of design.	C

Article No.	Article Requirement	Assessment	Compliance Category
		NSA is undertaken to address: - Proposed or planned changes, i.e., design changes, changes to operating procedures, changes to maintenance requirements, changes to surveillance requirements, or plant status changes. - Emergent issues concerning plant design or operation, or the adequacy of applicable NSAs. 4.1 NSA Initiation and Review 4.1.2 Operational Support Operational issues may be identified in Station Condition Records (SCRs), Technical Operability Evaluations (TOEs) or OPEX findings, including S 99 reporting. The identification and evaluation of adverse conditions via the SCR and TOE processes are defined in BP-PROC-00060 and BP-PROC-00014, Technical Operability Evaluation, respectively. The process to identify, evaluate and apply lessons learned from operational issues, both from within Bruce Power and from the industry, is defined in BP-PROC-00062, Processing External and Internal Operating Experience. Evaluation and application of lessons learned from operational issues may require NSA. NSA may be required to address inspections performed as part of plant performance monitoring. The requirements for plant performance monitoring are defined by BP-PROC-00781, Performance Monitoring. Operational support (nuclear safety review, risk profiling, heat sinks analysis) may also be identified via GRP OPS 00001, Operating Memos: Bruce A and Bruce B, or via outage or inage work planning, per BP-PROC-00342, Planned Outage Management and BP-PROC-00329, On Line Work Management Process."	
4.45.	The operating organization shall report to the regulatory body as required, in a timely manner, the confirmed findings of the safety review that have implications for safety.	Assessed in detail in article 3.7 NK21-CORR-00531-11391, Bruce Nuclear Generating Station A Nuclear Power Reactor Operating Licence Conditions Handbook (LCH-BNGSA-R8), Section 1.7 S-99 states: "Reporting Requirements for Operating Nuclear Power Plants Licence Condition: The licensee shall notify and report in accordance with CNSC regulatory document S-99 entitled: REPORTING REQUIREMENTS FOR OPERATING NUCLEAR POWER PLANTS." BP-PROC-00363, Nuclear Safety Assessment, 4.1.3, states:	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.1.3 Interaction with Regulatory Agencies - Requirements for communication with regulatory agencies are defined in BP-PROC-00058, CNSC Commitment Management. Regulatory agencies may identify issues in their correspondence. For example, the CNSC may raise an Action Item or a Generic Action Item (the former is specific to Bruce Power, while the latter is a generic industry issue). Bruce Power may identify issues requiring follow up in their formal or informal communications with the regulatory agencies such as the CNSC, for example by raising a Regulatory Commitment, Regulatory Management Action or Management Action. Follow up actions from these issues may include the requirement for NSA."	
4.46.	The scope of the safety review shall include all safety related aspects of an operating plant. To complement deterministic safety assessment, probabilistic safety assessment (PSA) can be used for input to the safety review to provide insight into the contributions to safety of different safety related aspects of the plant.	See assessment of Requirement 12 above: NK21-CORR-00531-11005, Submission of Safety Basis Report Application Requirements for Renewal of Power Reactor Operating Licences for Bruce Nuclear Generating Stations A and B. NK21-CORR-00531-11005, Submission of Safety Basis Report "As previously indicated in Reference 1, Bruce Power is committed to the implementation of a Periodic Safety Review (also referred to as Periodic Application of Integrated Safety Review (PAISR)) process in support of the continued safe operation of Units 1 through 8, with the first full submission planned for no later than 2019. Bruce Power has used the IAEA Safety Guide SSG-25, "Periodic Safety Review of Nuclear Power Plants" as a basis to develop this process." DIV-ENG-00010, Probabilistic Risk Assessment Process Sec 4.0 states: "4.0 Procedure Description 1. PRA shall be used to assess the magnitude of risks to the public from nuclear safety related accidents due to the operations of Bruce Power nuclear power plants. 2. Performance standards, in the form of risk-based public safety goals (Table 1), shall be used as guidance in assessing the acceptability of public risk and, where appropriate, to derive suitable targets for system reliability, except where specific regulatory requirements for system unavailability exist. Risk shall be monitored and reviewed on an annual basis. There is no absolute limit for instantaneous risk. Instantaneous risks that exceed the threshold value shall comply with Section 4.0 (6). 3. PRA shall be used as an aid to judgment in the support of the conduct of engineering,	C

Article No.	Article Requirement	Assessment	Compliance Category
		maintenance, and operations at Bruce Power. 4. Proposed changes to plant operation, configuration, or procedures that may significantly affect risks identified in Section 4.0 (1) above shall be reviewed to quantify their impact on risk and to assess their acceptability. For cases where such changes would result in a reduction in risk, the costs and benefits shall be considered as part of the decision making process that looks at the impact of the risk. 5. A review shall be conducted for all cases that exceed the Review Threshold Value for Instantaneous Risk given in Table 1. The review shall take the form outlined in Appendix D."	
4.47.	On the basis of the results of the systematic safety assessment, the operating organization shall implement any necessary corrective actions and reasonably practicable modifications for compliance with applicable standards aiming at enhancing the safety of the plant.	See assessment in article 4.46 above: NK21-CORR-00531-11005, Submission of Safety Basis Report, states: "As previously indicated in Reference 1, Bruce Power is committed to the implementation of a Periodic Safety Review (also referred to as Periodic Application of Integrated Safety Review (PAISR)) process in support of the continued safe operation of Units 1 through 8, with the first full submission planned for no later than 2019. Bruce Power has used the IAEA Safety Guide SSG-25, "Periodic Safety Review of Nuclear Power Plants" as a basis to develop this process." DIV-ENG-00010, Probabilistic Risk Assessment Process Sec 4.0 states: "item 4. Proposed changes to plant operation, configuration, or procedures that may significantly affect risks identified in Section 4.0 (1) above shall be reviewed to quantify their impact on risk and to assess their acceptability. For cases where such changes would result in a reduction in risk, the costs and benefits shall be considered as part of the decision making process that looks at the impact of the risk."	C
Requirement 13: Equipment qualification	The operating organization shall ensure that a systematic assessment is carried out to provide reliable confirmation that safety related items are capable of the required performance for all operational states and for accident conditions.	BP-PROG-10.01, Plant Design Basis Management Sec 1.0 states: "The objective of the Plant Design Basis Management program is to maintain the Design Basis and to ensure the plant can operate safely for the full duration of its design life. The processes contained under the elements of this program provide consistent methods for performance of the Engineering work and other activities required to meet the program objectives." BP-PROC-00335 Design Management states the following: 4.10.2 Environmental Qualification The implementing procedures necessary to sustain the plants Environmental Qualification status	C

Article No.	Article Requirement	Assessment	Compliance Category
		will be governed within the Design Management program. This will establish proof of performance under design basis accident\ conditions, and maintain that proof current with the plant licensing basis, design basis, service conditions and operating configuration. In addition, it will provide assurance that applicable items are purchased, stored, installed, configured, maintained and replaced in a manner that preserves their qualified status. Primary implementing procedure is BP-PROC-00261, Environmental Qualification	
4.48.	Appropriate concepts and the scope and process of equipment qualification shall be established, and effective and practicable methods shall be used to upgrade and preserve equipment qualification. A programme to establish, to confirm and to maintain required equipment qualification shall be launched from the initial phases of design, supply and installation of the equipment. The effectiveness of equipment qualification programmes shall be periodically reviewed.	BP-PROC-00261, Environmental Qualification, Sec 1.0 states: "1.0 Purpose This EQ Procedure Document establishes the authority for the Environmental Qualification (EQ) Process at Bruce Power site. The EQ philosophy as identified in this Procedure Document will remain in effect for the life of both Bruce A and B plants. This process supports the Plant Design Basis Management program BP-PROG-10.01. The EQ Process establishes an integrated and comprehensive set of requirements that provide assurance that credited essential equipment and components can perform their safety-related functions if exposed to harsh environmental conditions resulting from Design Basis Accidents, in accordance with the plant design and licensing basis and that this capability is preserved over the life of the plant." SEC-EQD-00022, Development Of Environmental Qualification Lists (EQL), Sec 1.0 states: "1.0 Purpose This procedure defines the process for developing and maintaining the Environmental Qualification List (EQL) - a list of plant components required to be environmentally qualified to provide assurance they will perform as intended when exposed to the harsh environmental conditions of a design basis accident. (The requirement to develop and maintain an EQL is defined in BP-PROC-00261, Environmental Qualification). Incorporation of Bruce A into EQIS is currently being phased in. For EQ-related systems in Units 0A, 3 and 4, EQIS currently includes the SRM EQ-12s along with HECL, EQL, room, manufacturer, model, and EQ Dossier number for all SRCL components."	C

Article No.	Article Requirement	Assessment	Compliance Category
		NK29-DG-03650-002, Seismic Qualification of Safety Related Systems, Sec 1.0 states: "1.0 Purpose The purpose of this design guide is to establish the design requirements for designated safety related systems to meet the seismic aspects of Canadian nuclear safety principles. This design guide is referenced by the following Bruce Power document: DPT-PDE-00017, Bruce Power Seismic Qualification Standard" DPT-PDE-00017, Bruce Power Seismic Qualification Standard, Sec 1.0 and 4.0 state: "1.0 Purpose This standard sets out the administrative (design, procurement, operations and maintenance) controls for ongoing preservation and maintenance of seismic qualification of safety related structures, systems and components at Bruce Power Nuclear Generating Station. 4.0 Procedure Description This standard is applicable to all elements of the seismic qualification process in accordance with: BP-PROC-00433, Design Change Package (U1/U2 Restart and Security) BP-PROC-00500, Control of Unsecured Equipment in Seismically Qualified Areas BP-PROC-00539, Design Change Package B-SPEC-01370-00001, Seismic Qualification of Mechanical Equipment B-SPEC-01370-00002, Seismic Qualification of Instrumentation and Control Equipment NK21-DG-20091-001, Seismic Structural Design Guide NK21-DG-20091-002, Bruce A Seismic Design Guide NK21-OM-09034-04.11.01 & 04.11.02, Post-Seismic Response, Units 1234 & Unit 0 NK29-AIM-03600.1-25, Post-Seismic Response, Units 05678 NK29-DG-03650-002, Seismic Qualification of Safety Related Systems	

Article No.	Article Requirement	Assessment	Compliance Category
		SEC-PE-00010, Procurement Engineering Process The standard describes the engineering and administrative processes for preserving seismic qualification of safety related systems, structures and components. These processes ensure that seismic qualification of Bruce NGS is preserved for the life of the facility. This standard applies to both Bruce A and Bruce B." BP-PROC-00261 Section 4.4.16 states the following with respect to Program Effectiveness and Review – The EQ Section shall prepare a Semi-Annual EQ Program Health Report to document and communicate the health of the EQ Program. See SEC-EQD-00049, Environmental Qualification (EQ) Health Reporting, for further details. Furthermore, the effectiveness of the EQ Process activities and interfaces shall be periodically assessed by audit or self-assessment, independent review and/or management oversight, to verify Process effectiveness and that EQ documentation is being maintained current with the design and licensing basis of the station. A typical scope of these activities may include one or more of the following: Performing a review for compliance with the governing framework documents, programmatic or technical adequacy of EQ documentation, effectiveness of programmatic interfaces, effectiveness of training related to EQ and corrective action effectiveness reviews.	
4.49.	The scope and details of the equipment qualification process, in terms of the required inspection area(s), method(s) of non-destructive testing, possible defects inspected for and required effectiveness of inspection, shall be documented and submitted to the regulatory body for review and approval. Relevant national and international experience shall be taken into account in accordance with national regulations.	See assessment of article 4.48 above: BP-PROC-00261 Section 4.4 addresses EQ process sustainability requirements and states the following: Preservation of EQ is an ongoing process that continues beyond the initial development and implementation phase of EQ. Now that EQ has been established, it is important to preserve the qualified status of the installed equipment. The Engineering Change Control (ECC) process controls changes to the design and Maintenance and Procurement activities must be performed correctly. Impacts to the Process may result from changes in regulatory commitments, accident analysis, design basis, service conditions, operating experience, plant modifications and procurement activities. Programmatic interfaces and procedural control of prescribed activities provide assurance that activities essential to preserving the qualified status of the equipment are	C

Article No.	Article Requirement	Assessment	Compliance Category
		correctly performed and properly integrated into station processes and work practices. Operating Experience feedback from internal and external industry sources (see BP-PROC-00062) is critical for identifying unanticipated aging mechanisms, changes in service conditions or equipment performance. Section 4.4.10 states the following: Condition Monitoring Process - Periodic maintenance, surveillance, testing, corrective action, failure trending and operating experience reviews are acceptable methods to detect unanticipated age-related degradation that may not have been accounted for in establishing the qualified life of equipment or components. Results of such processes that identify age-related failures or significant material degradation of EQ equipment and components, shall be used to assess the need to revise the EQ maintenance, surveillance and replacement requirements in the applicable EQA/EQD. EQ-related condition monitoring requirements are a sub-set of the Plant Engineering condition monitoring process established in BP-PROC 00781, Performance Monitoring and included in System and Component Monitoring Plans, Walkdowns and System, Component and Program Health Reports (DPT-PE-00008 through -00011). The interface between EQ Engineering and Station Engineering is described in SEC-QD-00030, EQ Equipment Condition Monitoring Procedure.	
Requirement 14: Ageing management	The operating organization shall ensure that an effective ageing management programme is implemented to ensure that required safety functions of systems, structures and components are fulfilled over the entire operating lifetime of the plant.	BP-PROC-00400, Life Cycle Management for Critical SSCs, Sec 1.0 states: "1.0 PURPOSE This process enables the development of Life Cycle Management Plans (LCMPs) for Systems, Structures, or Components (SSCs). This process is consistent with Canadian Nuclear Safety Commission (CNSC) direction RD-334, Ageing Management for Nuclear Power Plants, and the recommendations from the Institute of Nuclear Power Operators (INPO) AP-913, Equipment Reliability. The LCMP shall pull relevant technical information (e.g., age-related degradation mechanisms, replacement and major overhaul tasks/frequencies, current condition, etc.) from the Technical Basis Assessment(s) (TBA), Performance Monitoring Plan(s) (PMP), Health Report(s), and other data sources and use this information to document the recommended long-term mitigation options for the subject SSC. These recommended options will then be included in the Asset Life Projections & Options document (ALP&O). The ALP&O process adds to the recommended long-term options key information needed in	C

Article No.	Article Requirement	Assessment	Compliance Category
		business strategy decisions. Once the business strategy decisions are made the approved mitigation options (long-term plan) shall be documented in the LCMP, and the LCMP shall be issued. 3.1 Definitions 3.1.7 Life Cycle Management (LCM) - Is the integration of aging management and economic planning to optimize the operation, maintenance, and service life of SSCs, maintain an acceptable level of performance and safety, and maximize return of investment over the service life of the plant. [INPO AP-913]" DPT-NSAS-00016, Integrated Aging Management For Safety Assessment Sec 1.0 states: "1.0 Purpose This procedure describes how fitness for service inspection/monitoring and safety analysis activities are coordinated to ensure that safety margins are adequate and aging management issues are addressed. This procedure is aligned with the requirement that data and information be collected to confirm safety analysis assumptions and derived acceptance criteria continue to be met, as outlined in Canadian Nuclear Safety Commission (CNSC) Regulatory Document RD-334, Aging Management for Nuclear Power Plants." BP-PROC-00400 is also supported by the implementing procedures of BP-PROG-11.01 Equipment Reliability and BP-PROG-11.04 Plant Maintenance. It is noted that BP-PROC-00533 Obsolescence Management is covered under BP-PROG-11.01	
4.50.	The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programme for periodic safety	Section 1.0 Purpose of BP-PROC-004000 states the following: "This process enables the development of Life Cycle Management Plans (LCMPs) for Systems, Structures, or Components (SSCs). This process is consistent with Canadian Nuclear Safety Commission (CNSC) direction RD-334, Ageing Management for Nuclear Power Plants, and the recommendations from the Institute of Nuclear Power Operators (INPO) AP-913, Equipment Reliability. The LCMP shall pull relevant technical information (e.g., age-related degradation mechanisms, replacement and major overhaul tasks/frequencies, current condition, etc.) from the Technical Basis Assessment(s) (TBA), Performance Monitoring Plan(s) (PMP), Health Report(s), and other data sources and use this information to document the recommended long-term mitigation options for the subject SSC. These recommended options will then be included in the Asset Life Projections & Options document (ALP&O). The ALP&O process adds to the recommended long-term options key information needed in	C

Article No.	Article Requirement	Assessment	Compliance Category
	review. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes.	business strategy decisions. Once the business strategy decisions are made the approved mitigation options (long-term plan) shall be documented in the LCMP, and the LCMP shall be issued." Aging Management is integrated within the Equipment Reliability Program and driven by BP-PROC-00783 Long Term Planning and Life Cycle Management. It is coordinated with BP-PROC-00899 Asset Life Projections and Options and BP-PROC-00936 Asset Life Management Options Selection Committee as well as BP-PROC-00533 Obsolescence Management. Equipment Reliability (ER) program is based on the INPO Equipment Reliability Process Description (AP-913) following an integrated and coordinated approach. As illustrated in Appendix A- Process Map of BP-PROG-11.01, main elements of the program are linked to each other so that relevant outputs of each element can be fed back to relevant elements to ensure continuous improvement of each element and ageing management program as a whole. In addition all relevant programs and their supporting procedures are controlled documents and as such they are reviewed and updated periodically in accordance with BP-PROG-03.01 Document Management. NK21-CORR-00531-11005, Submission of Safety Basis Report, states: "As previously indicated in Reference 1, Bruce Power is committed to the implementation of a Periodic Safety Review (also referred to as Periodic Application of Integrated Safety Review (PAISR)) process in support of the continued safe operation of Units 1 through 8, with the first full submission planned for no later than 2019. Bruce Power has used the IAEA Safety Guide SSG-25, "Periodic Safety Review of Nuclear Power Plants" as a basis to develop this process." It should be noted that Ageing is one of the safety factors reviewed in accordance with the SSG-25 guidance.	
4.51.	Long term effects arising from operational and environmental conditions (i.e. temperature conditions, radiation conditions, corrosion effects or other degradations in the plant that may affect the long term reliability of plant equipment or structures) shall be evaluated and assessed	See discussion for Article 4.50 above. Safety relevance of SSCs is one of the three criteria in defining the scope of ageing management program. Section 4.1 of BP-PROC-00400 states the following: "LCMPs shall be developed for SSCs that meet all of the following three criteria: -Components of Critical Categorization (Critical-Category) 1 or 2 as identified through BP-PROC-00666, Component Categorization.	C

Article No.	Article Requirement	Assessment	Compliance Category
	as part of the ageing management programme. Account shall be taken in the programme of the safety relevance of structures, systems and components.	-The total value of the SSC type is equal or greater than $10M. The $10M threshold cost includes installation costs. -The SSC is susceptible to life-limiting failure mechanisms, which can act over the life of the SSC in the form of aggressive and long-term mechanisms (e.g., components subject to corrosion, thermal stressors, poor chemistry control, etc.). In addition to the three requirements above, LCMPs may be developed at the discretion of the Bruce Power Chief Engineer/Senior VP of Engineering." It should be noted that component categorization in BP-PROC-004000 for critical category 1 and 2 are those components that significantly contribute to Reactor Safety, Radiological Safety Environmental Safety, or Employee Safety based on a set of criteria. Currently Appendix B of BP-PROC-00400 contains forty existing and projected LCMPs. BP-PROC-00400 section 4.3 provides detailed requirements on the data gathering and review. These include • Regulatory Requirements • Design, Operation and Performance Requirements, • Environmentally Qualified Component • Internal/External OPEX • Current Condition Summary • Remaining Service Life Analysis & Assumptions • Recommended Mitigation Options	
Requirement 15: Records and reports	The operating organization shall establish and maintain a system for the control of records and reports.	See details in assessment of article 4.52. next.	C
4.52.	The operating organization shall identify the types of records and reports, as specified by the regulatory body that are relevant for the safe operation of the plant. Records of operation, including maintenance and surveillance,	BP-PROG-03.01, Document Management Section 1.0, 4.0, 4.1, 4.2, and 4.3.2 state: "Section 1.0 This program document defines the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with the management of controlled documents and records.	C

Article No.	Article Requirement	Assessment	Compliance Category
	shall be kept available from initial testing during the startup of each plant system important to safety, including relevant off-site tests. The records of operation shall be retained in proper archives for periods as required by the regulatory body. All records shall be kept readable, complete, identifiable and easily retrievable [2]. Retention times for records and reports shall be commensurate with their level of importance for the purposes of operation and plant licensing and for future decommissioning. [2] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-R-3, IAEA, Vienna (2006).	Document Management shall maintain and manage documents during their life cycles in a manner that ensures integrity, security, accessibility, disclosure and preservation, while satisfying applicable legal and regulatory requirements. Vital records essential to the continued operations of Bruce Power shall be managed in support of business continuity to ensure recovery from possible disaster. 4.0 Program Description The following sub-sections identify the key elements of this process, the associated requirements and the approaches used to satisfy these requirements. This program must ensure that the preparation, distribution and maintenance of documents, is controlled. This includes ensuring that: Controlled documents are identified. The Document Owner for each Controlled Document shall be identified. The preparation, distribution and maintenance of documents is controlled according to the following requirements: [CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 5.9] Changes are controlled: [CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 5.12] Normal operating procedures are prepared on how to operate the plant. Abnormal operating procedures are prepared for non-routine and emergency conditions where immediate action is required. The maintenance of records shall be undertaken as follows: [CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 5.13] a) Records that are to be produced and retained are identified. b) Records are stored and routinely inspected to ensure their preservation and protection from loss, deterioration, or destruction. c) Records are complete, valid, legible, retrievable and traceable to the parts and activities to which they refer. d) Records are designated permanent or non-permanent. Records that meet one or more of the	

Article No.	Article Requirement	Assessment	Compliance Category
		following criteria shall be designated as permanent. i) Records of value in demonstrating capability for safe operation; ii) Records required to maintain, rework, repair, replace, or modify a structure, system, or component; iii) Records of value in determining the cause of an accident, malfunction, or unscheduled occurrence; iv) Records required to provide baseline data for periodic inspection; and v) Records that would be of value in decommissioning a system, component, or structure. e) Permanent records are maintained for the life of the plant, or at least for the life of the particular item concerned. f) Minimum retention periods for non-permanent records are defined. Classification of information and any access restrictions imposed on a record shall be identified. Refer to BP-PROC-00110, Information Classification, Access and Handling Requirements. Document Custodians are trained in the appropriate Document Management Functions. Refer to TQD-00027, Clerical Training and Qualification Description. 4.1 Controlled Document Life Cycle Management The Department Manager, Business Services, is the designated process owner for BP-PROC-00068, Controlled Document Life Cycle Management. Responsibilities include process definition, administration and ongoing oversight/monitoring in regard to effectiveness, efficiency and compliance. Activities associated with implementing the requirements can be found in BP-PROC-00068, Controlled Document Life Cycle Management. Content, format, signing authority requirements and other standards for writing Controlled Documents for specific Document Types and Sub Types are defined in their governing Controlled Documents (i.e., Operations documents special requirements outlined in BP-PROG-12.01 suite of documents and General Procedures and Program special requirements outlined in BP-PROG-01.02 suite of documents). 4.2 Records Management	

Article No.	Article Requirement	Assessment	Compliance Category
		The Department Manager, Business Services, is the designated process owner for BP-PROC-00098, Records Management and is the appointed Responsible Officer. Responsibilities include process definition, administration and ongoing oversight/monitoring in regard to effectiveness, efficiency and compliance. Activities associated with implementing the requirements can be found in BP-PROC-00098, Records Management. 4.3.2 Secure Storage 1. Records stored in the permanent Records storage facilities shall be protected according to written procedures from damage, loss or destruction, and shall be firmly attached in binders or placed in folders or envelopes for storage in steel cabinets or on shelving in containers. Electronic records are stored in the Content Server according to written procedures to prevent loss or destruction. 2. In the event of a disaster, immediate action is required to preserve the integrity of the records. Refer to BP-BCP-00030, Business Services - Document Management - Business Continuity Procedure. 3. Provisions shall be made for special processed records (such as radiographs, photographs, negatives, microform, and magnetic media) to prevent damage from excessive light, stacking, electromagnetic fields, temperature, and humidity. 4. The Document Management Section shall perform quality checks on Records as per approved criteria. 5. The Document Management Section shall maintain Masters of Controlled Documents. 6. The Document Owner shall identify any special record requirements specified in the relevant contract to the Document Custodian responsible for maintaining consultants' and contractors' records. 7. Records are retained on a medium suitable to meet the approved retention period and stored in the appropriate environment to ensure the life expectancy of the medium." BP-PROC-00068, Controlled Document Life Cycle Management Section 4.0 states: " 4.0 Procedure Description	

Article No.	Article Requirement	Assessment	Compliance Category
		The Department Manager, Business Services is the designated Process owner for BP-PROC-00068, Controlled Document Life Cycle Management, and authorizes the Section Manager, Document Management to administer this process. The Flow Process for Controlled Documents consists of initiation, Create/Revise, Review, Approval, Issue, Implementation, Active Document Use, and Change Control. Refer to Appendix A, Process Map. The preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Changes to controlled documents, other than those defined as minor changes, are considered major or intent changes and shall be reviewed for adequacy, approved for release by authorized personnel and distributed to and used at the location(s) where the prescribed activity is performed. Station System Procedures are principally technical in nature and provide operating, maintenance or engineering information/instructions associated with systems, structures, equipment or components. These include Maintenance Procedures, Operating Procedures and System-based technical procedures. Other procedures with various names or types, such as welding Procedure Specification, and Calibration Procedure are also used. For instructions on the preparation, review and approval of specific Controlled Documents, refer to the governing documents they take authority from. Instructions, Procedures and Drawings that prescribe activities affecting quality shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished. Monitoring helps to ensure continual legal accountability of the documentation system. The monitoring processes are documented to provide evidence of compliance with procedures and standards that the organization has adopted. Quality checks will be performed for the purpose of self-assessment of the Document Management processes. Refer to Section 4.11." BP-PROC-00098, Records Management, Sec 4.1 states: "4.1 Record Identification 1. Document Owner or Document Author shall: a) Identify records and other documents to be generated, supplied or maintained according to	

Article No.	Article Requirement	Assessment	Compliance Category
		General Procedures, design documents, Codes, Standards, procurement documents, test procedures, or other documents. The most stringent requirements of codes and standards shall be used in determining the final disposition. b) Ensure compliance to the requirements of regulatory agencies, codes and standards that specify Quality Assurance (QA) Records to be generated, maintained, legible, identifiable and traceable to the item or activity to which they apply. Identify any distribution, access restrictions or handling requirements. c) Classify records as QA, non-QA, and/or Vital and identify the retention period as lifetime or non-permanent, in accordance with the appropriate code or standard. BP-PROC-00238, Retention Process for Bruce Power Records, identifies the process for creating Records Retention Authorizations (RRAs). d) Identify any special record requirements specified in the relevant contract to the Document Custodian responsible for maintaining consultants' and contractors' records. e) Individual records in a system history docket need not be stored together provided they are individually indexed. The records comprising the system history docket shall be indexed as a minimum, by SCI/USI, Unit, Equipment Number (when applicable) and the Work Order number (when applicable). Additional indexing requirements shall be identified by the Document Owner or the Records Officer. f) Clearly identify facility or property number, followed by System/Subject Classification Index (SCI) number or defined numbering configuration for that record series. Refer to BP-PROC-00320, Management of Nuclear Subject Classification Indexes. Records stored in a file requiring a unique identifying number shall be identified in an indexing guideline in accordance with BP-PROC-00454, Document Type and Subtype Maintenance. g) Identify all external contract records to be produced and turned over to Bruce Power under "deliverables". h) Follow BP-PROC-00068, Controlled Document Life Cycle Management for documents subject to document control process."	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00238, Retention Process for Bruce Power Records, Sec 4.0 and 4.1 state: "4.0 Procedure Description Retention must be established to: Ensure the protection of all records. Retain records of value or historical interest. Satisfy Federal or Provincial statutes; Regulatory agencies; and Bruce Power retention requirements. Transfer inactive records. Destroy records that have served their usefulness. Maintain the audit trail of a record. The most stringent requirements of codes and standards shall be used in determining the final disposition. Records are evaluated through the retention process, resulting in the establishment of the Records Management (RM) Classifications. This database lists those records/record series that have been approved on retention. Bruce Power approved Records Retention Authorizations (RRAs) are available electronically in Content Server. It is imperative that the Records Management Classifications reflects the current status of all Bruce Power records. Send requests for Records Retention Authorizations to the generic mailbox "BNPD Records Retention Authorization (RRA)". Verification and oversight activities for this procedure are defined in SEC-DOCM-00005. 4.1 Record Retention Authorizations 4.1.1 Retention Periods A retention period is established based on legal, regulatory or codes and standards requirements.	

Article No.	Article Requirement	Assessment	Compliance Category
		Controlled Documents shall remain active until superseded, obsoleted or revised. Retention will be applied to the inactive document. The retention period of Life of Facility will only be used when justified and is also known as permanent or lifetime. Retention periods are expressed in terms of a defined period of time to eliminate any possible misunderstanding as to when the destruction action is to take place. The period of time is based on the date the record was approved/completed unless otherwise specified. Defined time periods are usually in years or months. The current year/month is not included in the time period, e.g., 6 years = 6 years + current year. Destruction for documents with a yearly retention shall be destroyed during the first quarter of the destruction year."	
Requirement 16: Programme for long term operationt	Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations.	Although relevant, this article has not been assessed because the Integrated Safety Review process, is the vehicle by which Bruce Power is establishing a program for long-term operation of Bruce A as described in the Bruce Power letter F. Saunders to K. Lafreniere, “Integrated Safety Review for Bruce A”, dated October 27, 2014, CNSC NK21-CORR-00531-11617. In response, CNSC has found Bruce A Integrated Safety Review Basis Document to be acceptable and stated the subsequent steps of ISR to be addressed (CNSC letter, K. Lafreniere to F. Saunders “Acceptance of Bruce A Integrated Safety Review (ISR) Basis Document”, dated January 23, 2015, NK21-CORR-00531-11878).	RNA
4.53.	The justification for long term operation shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant		RNA

Article No.	Article Requirement	Assessment	Compliance Category
	throughout its extended operating lifetime.		
4.54.	The comprehensive programme for long term operation shall address: (a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes); (b) Setting the scope for all structures, systems and components important to safety; (c) Categorization of structures, systems and components with regard to degradation and ageing processes; (d) Revalidation of safety analyses made on the basis of time limited assumptions; (e) Review of ageing management programmes in accordance with national regulations; (f) The implementation programme for long term operation.		RNA
5.		Operational Safety Programmes	NA

Article No.	Article Requirement	Assessment	Compliance Category
Requirement 17: Consideration of objectives of nuclear security in safety programmes	The operating organization shall ensure that the implementation of safety requirements and security requirements satisfies both safety objectives and security objectives.	Assessed in detail under Article 5.1. The overarching Bruce Power Programs that address this requirement are: BP-PROG-00.06 "Health and Safety Management" BP-PROG-08.02 "Nuclear Security".	C
5.1.	The operating organization shall be responsible for managing the implementation of safety requirements and security requirements by ensuring close cooperation between safety managers and security managers, with the objective of minimizing risks.^1 Security and safety shall be viewed as complementary, as many of the measures designed to ensure one will also serve to ensure the other. Safety and security measures shall be designed and implemented in such a manner that they do not compromise each other. The operating organization shall establish mechanisms to resolve potential conflicts and to manage safety–security interfaces. 1 Guidance on nuclear security measures is provided in the IAEA Nuclear Security Series.	To address "Security and safety shall be viewed as complementary, as many of the measures designed to ensure one will also serve to ensure the other." BP-PROG-00.06 "Health and Safety Management" states "4.4.7 Emergency Preparedness and Response Fire, Security, Radiation and Medical emergencies have been identified as areas of concentration for emergency situations at Bruce Power. Procedures and training for responding to, preventing, and mitigating the likely illness and injury associated with these risks are documented in the BP-PROG-08.01, Emergency Measures Program, BP-PROG-08.02, Nuclear Security, BP-PLAN-00001, Bruce Power Nuclear Emergency Plan, and BP-PLAN-00006, Conventional Emergency Plan." BP-PROG-08.02 "Nuclear Security", states under "1.0 Purpose": "The Nuclear Security Program supports Bruce Power's fundamental nuclear safety objective to protect the public, site personnel and the environment from harm, by establishing and maintaining effective security defenses against radiological hazards caused by malicious and malevolent acts." To address: "The operating organization shall establish mechanisms to resolve potential conflicts and to manage safety–security interfaces." BP-PROG-08.02 "Nuclear Security", states under "4.1 General Requirements", "The CNSC regulatory framework consists of a mix of requirements and guidance. Requirements are set out in legislation, regulations, licences and CNSC regulatory documents. Guidance on how applicants and licensees can meet regulatory requirements is provided in	C

Article No.	Article Requirement	Assessment	Compliance Category
		CNSC guidance documents. 1. This revision of BP-PROG-08.02 has been structured to comply with the Governance Oversight Support Perform model in accordance with B-HBK-08130-00001, GOSP Implementation Handbook. Lower tier procedures issued prior to issuance of this version of the program document may not fully conform to requirements set out below. Non-conformance issues will be addressed through the established document review cycle in accordance with BP-PROC-00068, Controlled Document Life Cycle Management. 2. Where appropriate, security processes shall be structured to facilitate compliance with CNSC requirements and to conform with CNSC guidance or expectations to the extent practical. 3. Where appropriate, security processes shall be structured to facilitate compliance with provincial and federal legislative requirements and conform to guidance or expectations to the extent practical. BP-PROG-00.06 "Health and Safety Management" states: "4.6 Management Review OHSMS will be reviewed to ensure continuing suitability, adequacy and effectiveness. Management review addresses the possible need for changes to policy, objectives and other elements of the OHSMS. OHS management review is described in BP-PROC-00619, Occupational Health and Safety Management Review."	
Requirement 18: Emergency preparedness	The operating organization shall prepare an emergency plan for preparedness for, and response to, a nuclear or radiological emergency.	Assessed in detail under Articles 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7. The overarching Bruce Power Programs that address this requirement are BP-PROG-00.06 "Health and Safety Management" and BP-PROG-08.01 "Emergency Measures Program". BP-PROG-00.06, "Health Safety Management", states: "4.4.7 Emergency Preparedness and Response Fire, Security, Radiation and Medical emergencies have been identified as areas of	C

Article No.	Article Requirement	Assessment	Compliance Category
		concentration for emergency situations at Bruce Power. Procedures and training for responding to, preventing, and mitigating the likely illness and injury associated with these risks are documented in the BP-PROG-08.01, "Emergency Measures Program", BP-PROG-08.02, Nuclear Security, BP-PLAN-00001, Bruce Power Nuclear Emergency Plan."	
5.2.	Emergency preparedness arrangements shall cover the capability of maintaining protection and safety in the event of accident conditions; mitigating the consequences of accidents if they do occur; protection of site personnel and the public, and protection of the environment; coordinating response organizations, as appropriate; and communicating with the public in a timely manner [1, 5]. Emergency preparedness arrangements shall include arrangements for the prompt declaration of an emergency, timely notification and alerting of response personnel, assessment of the progress of the emergency, its consequences and any measures that need to be taken on the site, and the necessary provision of information to the authorities. Appropriate arrangements shall be established from the time that nuclear fuel is first brought to the site, and the emergency plan and all emergency preparedness arrangements shall be completed before the commencement of fuel loading.	BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states "1.2 Objective The strategic objective of this plan is to ensure that Public Safety is first and foremost the driving focus of emergency response efforts. To ensure this is adequately prioritized within the response framework, priority of response is such that protection of the reactor core through Control, Cool and Contain efforts is priority thus ensuring the protection of the Public against radiological and conventional hazards. The priority of response objectives are as follows: 1. To protect the reactor core through Control, Cool and Contain. 2. To protect public safety. 3. To protect employee and responder safety. 4. To protect property and the environment. 5. To protect and management corporate reputation. 2.0 Exceptions Security (hostile action) Response as well as Emergency Fire and First Aid Response is dealt with through separate provisions, but provisions of the NERP still apply to deal with the associated potential threat of release of radioactive material, i.e., the need for off-site notifications, situation updates, confirmation of any radioactive releases. For those events where accident consequences indicate that the design basis response has not been effective, the Emergency Response Organization (ERO) will activate BP-PROC-00659, Severe Accident Management Procedure (SAMG). This procedure interfaces with BP-PLAN-00001 in order to utilize the structures and processes contained therein to assist the incident Facility with its response. The response to address accidents involving the transportation of radioactive material and radioactive liquid emissions is dealt with separately." BP-PROG-08.01 "Emergency Measures Program" states:	C

Article No.	Article Requirement	Assessment	Compliance Category
	[1] EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006). [5] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE CO-ORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA	"1.0 Purpose The purpose of the program is to describe how Bruce Power manages risks that have the potential to impact reactor safety, public safety, employee and responder safety, environmental safety and corporate reputation through a risk-based program of prevention, mitigation, preparedness, response, and recovery." and "5.3 Implementing Documents This program is implemented by the following document(s): BP-PLAN-00001, Bruce Power Nuclear Emergency Plan BP-PLAN-00002, Winter Storm Transportation Plan BP-PLAN-00003, Bruce Power Electricity Emergency Plan BP-PLAN-00004, Business Continuity Management BP-PLAN-00005, Radioactive Materials Transportation Emergency Response Plan BP-PLAN-00006, Conventional Emergency Management Plan BP-PLAN-00008, Fire Safety Management BP-PROC-00127, Radioactive Liquid Emissions Response Procedure BP-PROC-00317, Crisis Management BP-PROC-00659, Severe Accident Management Procedure BP-PROC-00722, Staff Shortage - Illness Related BP-PROC-00772, Limited Site Access Contingency Procedure SEC-EPP-00007, Emergency Management Program Assessment" BP-PROG-09.02, "Stakeholder Interaction" states "Communications during a nuclear emergency is also addressed by this program."	

Article No.	Article Requirement	Assessment	Compliance Category
	Safety Standards Series No. GS-R-2, IAEA, Vienna (2002).	BP-PROC-00919, Stakeholder Information Disclosure states "4.1 Stakeholder Information Program Requirements and Reporting Bruce Power commits to: Maintaining comprehensive crisis communication procedures to effectively manage events of significance to ensure timely and effective communications and dissemination of information."	
5.3.	The operating organization shall develop an emergency plan and shall establish the necessary organizational structure, with assigned responsibilities for managing an emergency, and shall contribute to the development of off-site emergency procedures.	BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "7.0 RESPONSIBILITIES 7.1 Emergency Preparedness Organization Overall authority for Emergency Management resides with the Chief Executive Officer. Strategic and programmatic direction for Emergency Management rests with the Division Manager, Emergency, and Protective Services Division, developed in consultation with the managers who have line responsibility for emergency response. The Emergency and Protective Services Division staff coordinate the implementation and maintenance of the emergency response capability described in the NERP, to produce and revise the appropriate emergency response implementing procedures, to procure and maintain the equipment necessary to support the procedures, to arrange appropriate training, and to schedule and conduct drills to measure the effectiveness of emergency response. They also interface with local external organizations and with local, Provincial and federal government to assist in the off-site planning, preparation and training for emergencies, and exercise support. There are emergency preparedness activities that are sub-contracted or delegated to subject matter experts or other qualified service providers. This can involve such matters as accident analyses, meteorology, health physics, dosimetry, telecommunications, information systems and technology, training, public affairs, nuclear systems, etc. The Emergency and Protective Services Division arranges for appropriate support in such areas and coordinates and monitors such work to ensure that the agreed deliverables are achieved." "4.1.2.1 Emergency Response Procedures	C

Article No.	Article Requirement	Assessment	Compliance Category
		Preparation and issuance of Emergency Response Procedures (ERPs) will be in accordance with Bruce Power standards. All procedures, which implement this Plan, will be validated prior to issuance."	
5.4.	The emergency plan shall cover all activities under the responsibility of the operating organization and it shall be adhered to in the event of an emergency. The emergency plan shall include arrangements for an emergency involving a combination of non-nuclear hazards and nuclear hazards, such as a fire in conjunction with significant levels of radiation or contamination, or toxic or asphyxiating gases in conjunction with radiation or contamination. Account shall be taken in the emergency plan of the specific site conditions. Preparation of the emergency plan shall be coordinated with those bodies having responsibilities in an emergency, including public authorities and private enterprises, as relevant, and the plan shall be submitted to the regulatory body as required. The plan shall be subject to review and updating in the light of experience gained.	BP-PROG-08.01 Emergency Management Program describes how Bruce Power manages risks that have the potential to impact reactor safety, public safety, employee and responder safety, environmental safety and corporate reputation through a risk-based program of prevention, mitigation, preparedness, response, and recovery. Following an Incident Management System (IMS) approach, BP-PROG-08.01 outlines the functional requirements, implementing approaches and key responsibilities for applying an all hazards emergency management process to identified threats to ensure rapid, effective response to events that reduces time at risk ensuring the continuity of Bruce Power's business operations. BP-PROG-08.01 is supported by the following plans and procedures which are reviewed and updated at regular intervals per BP-PROC-00068 Controlled Document Life Cycle Management: BP-PLAN-00001, Bruce Power Nuclear Emergency Plan BP-PLAN-00002, Winter Storm Transportation Plan BP-PLAN-00003, Bruce Power Electricity Emergency Plan BP-PLAN-00004, Business Continuity Management BP-PLAN-00005, Radioactive Materials Transportation Emergency Response Plan BP-PLAN-00006, Conventional Emergency Management Plan BP-PLAN-00008, Fire Safety Management BP-PROC-00127, Radioactive Liquid Emissions Response Procedure BP-PROC-00317, Crisis Management BP-PROC-00659, Severe Accident Management Procedure BP-PROC-00722, Staff Shortage - Illness Related BP-PROC-00772, Limited Site Access Contingency Procedure SEC-EPP-00007, Emergency Management Program Assessment	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "1.0 Scope This Nuclear Emergency Response Plan (NERP) applies to all facilities within the Bruce Power Site... However, the infrastructures that are defined within this plan can be used to support the planning and response to all emergencies at the Bruce Power site." Section 4.0 Plan Description states the following: The NERP takes into account response means and methods to support an all hazards response approach to emergencies, including a nuclear emergency. While operations and maintenance programs and procedures address Prevention and aspects of Mitigation, the focus of the Nuclear Emergency Response Plan addresses Preparedness, Response and Mitigation requirements. "4.1.2 Implementation Implementation of the NERP is conducted through a set of approved Emergency Response Procedures (ERPs) which detail response actions, facilities and equipment to support the response, staff trained and qualified to execute the emergency response procedures, education of Public and arrangements with external agencies to provide support as required." "4.1.3.5 Emergency Management Administrative Requirements Emergency Management Department requires controls of any change to the program. This provides process to manage and control changes to the NERP and its implementing documents, facilities, and equipment. The impact of the proposed change on facilities, equipment, plans, procedures, staffing, other disciplines or departments, etc., is identified. Proposed changes are subjected to a decrease in effectiveness review prior to making a change. Need for modifying the proposed change, management approval, involvement of Regulatory Affairs, and Canadian Nuclear Safety Commission (CNSC) review is identified prior to making the proposed change. Changes to the NERP and its implementing procedures are coordinated and controlled by Emergency Management Department. Department Manager, Emergency Management is the contact point for all changes to the NERP and impacted implementing procedures. For the details, see SEC-EPP-00006, Emergency Management Requirements Management."	

Article No.	Article Requirement	Assessment	Compliance Category
		"4.1.3.6 Plan Assessment SEC-EPP-00007, Emergency Management Program Assessment is the procedure, which lists and describes the processes, which are used to assess this Plan and the other Plans, which implement BP-PROG-08.01, Emergency Management Program. The following describes the processes, which are used to assess this Plan, and the processes, which manage it and implement it. 1. Quality Assurance Assessments Bruce Power's NERP is audited by Bruce Power's internal audit organization over a period of three (3) years. The audit program will address the plan, preparedness, and response implementing procedures, equipment, facilities, training, personnel selection, and qualification. Reports of the ongoing audit program and special audits are directed to the owners of the Policy and Program responsible for the implementation of the NERP. Audit findings will be subject to root cause evaluations as appropriate, corrective actions will be identified, and, a schedule for corrective action will be developed. Important corrective actions will be tracked in the Corrective Action system. 2. Self-Assessment The Drill and Exercise program will provide an overall integrated assessment. A comprehensive list of drill and exercise objectives is defined and a schedule for conducting drills and exercises is established so that all of the objectives are tested within a set period of time. Drill and exercise reports will provide a list of findings. The Emergency Management Department will initiate a causal factor evaluation as appropriate and identify the corrective actions. Completion of corrective actions will be tracked using the management Action Tracking System."	
5.5.	A training programme for emergencies shall be established and implemented to ensure that plant staff and, as required, staff from other participating organizations possess the essential knowledge, skills and attitudes required for the accomplishment of non-routine tasks under stressful emergency conditions.	BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "4.1.2.3 Training TQD-00005, ERO Training and Qualification describe the program that is used to qualify and train personnel appointed to the ERO. This program was developed using the Systematic Approach to Training (SAT) per the requirement identified in BP-PROG-02.02, Worker Learning and Qualification Program. A General Employee Training (GET) program is provided and includes emergency response training. GET training is delivered to all employees requiring unescorted access to the nuclear facility so they are knowledgeable in the emergency response actions required of them. Various drills and exercises that require general staff involvement occur during the year to fortify and verify the correct response from staff at the site. Other	C

Article No.	Article Requirement	Assessment	Compliance Category
		venues that reinforce the required emergency action from general employees at site include safety awareness meetings and line supervision briefings. Emergency tones are broadcast and tested routinely at all locations." "4.1.2.5 Agreements with External Agencies Agreements exist with local fire departments for on-site fire-fighting support. Arrangements and procedures also exist for local ambulance service and hospital support for casualties. The Toronto Hospital Corporation, Western Division has been provincially designated and funded as the radiation trauma centre for Ontario. This includes the capability to deal with contaminated casualties, trauma, and acute radiation syndrome. Agreements are in place to obtain support from local and provincial police forces in the event of an on-site security intrusion." TQD-00005, Emergency Response Organization Training and Qualifications Description states: "1.0 Scope and Applicability The purpose of the Emergency Response Organization Training and Qualification Description (TQD) is to establish the requirements for the Training and Qualification of individuals assigned to specific emergency response positions as defined in BP-PLAN-00001, entitled Bruce Power Nuclear Emergency Plan. The major groups identified in the Nuclear Emergency Plan that comprise the Emergency Response Organization are listed below. Another key group required in responding to an emergency is Emergency Protective Services (EPS) - Fire. The Training and Qualification requirements for EPS - Fire can be found in TQD-00090. - The Shift Emergency Response Organization Staff - The Emergency Operations Centre Staff (EOC) - The Site Management Centre Staff (SMC) - The Corporate Emergency Support Centre Staff (CESC) - Other Emergency Response Organization Personnel - Transportation Emergency Response Plan Members (TERP)" BP-PROC-00378 - Bruce Power Health Surveillance states:	

Article No.	Article Requirement	Assessment	Compliance Category
		"1.0 Purpose The purpose of employee health screening is to help workers to work safely by ensuring that their health is compatible with the demands of the work they do. Employee health screening will be done in certain cases as mandated by legislation, such as respiratory protection. This document describes the procedure and responsibilities related to Bruce Power's employee health screening. It was developed to be consistent with Bruce Power's corporate policies on Health and Safety. Employee Health Screening is a component of Bruce Power Employee Wellness Department, whose programs are described in BP-PROC-00379."	
5.6.	The emergency plan shall be tested in exercises before the commencement of fuel loading. Emergency preparedness exercises shall be planned and conducted at suitable intervals, to evaluate the preparedness of plant staff and staff from external response organizations to perform their tasks, and to evaluate their cooperation in coping with an emergency and in improving the efficiency of the response.	This plan must be in place at all times given the Bruce Power multi-unit design which addresses, "The emergency plan shall be tested in exercises before the commencement of fuel loading." BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "4.1.3.3 Drills and Exercises Drills and exercises are part of the overall process for assessing the integrated performance of the organization and the capability of people, facilities, and equipment. BP-PROC-00010, Emergency Preparedness Drills and Exercises provides the drill and exercise objectives along with the planned frequency to test each of these objectives over a 5-year period. In addition, it describes the process used to plan, develop a scenario and supporting data, conduct, evaluate, and critique an exercise or a drill. The method used to train evaluators and controllers is provided." BP-PROC-00010, "Emergency Preparedness Drills and Exercises" states: "1.0 Purpose This procedure outlines the Bruce Power, Nuclear Emergency Preparedness Exercise and Drill Program, developed to meet the requirements of BP-PLAN-00001, Bruce Power Nuclear Emergency Plan. The procedure includes a description of the process used to plan an exercise or a drill, develop a scenario and supporting data, conduct, evaluate, and critique an exercise or	C

Article No.	Article Requirement	Assessment	Compliance Category
		a drill. It includes a comprehensive list of drill and exercise objectives and the planned frequency to test each of these objectives, and the process for evaluating, rating and reporting the performance during a drill or an exercise." "4.1 Integrated Drill and Exercise Schedule 4.1.1 Section Manager, Emergency Plan Programs shall perform the following: 1. Ensure that an integrated, annual schedule and 3-year plan is developed and approved which identifies evaluated drills and exercises and that the schedule satisfies the following requirements. a) Meets drill and exercise frequency requirements of BP-PLAN-00001, Bruce Power Nuclear Emergency Plan, as a minimum. b) Supports needs of external organizations, primarily Province of Ontario and municipalities with responsibilities under the PNERP, for conduct of drills and exercises. 2. Negotiate schedule for joint drills and exercises with external groups to meet Bruce Power needs to practice external interfaces, and ensure, to the extent feasible, that integrated drill and exercise schedule shows in advance the participation of external groups. 3. Ensure integrated drill and exercise schedule is updated whenever new drill dates are identified, and schedule is reviewed and updated at least quarterly. 4. Ensure integrated drill and exercise schedule is issued to internal stakeholders for planning and execution to all groups with responsibilities under this procedure, e.g., Line Management, Work Control Managers, and Emergency Plan Programs Section. 5. Communicate integrated drill and exercise schedule to external stakeholders, as necessary such as to Emergency Management Ontario (EMO) and Canadian Nuclear Safety commission (CNSC)."	
5.7.	Facilities, instruments, tools, equipment, documentation and communication systems to be used in an emergency shall be kept available and shall be maintained in good operational condition in such a manner that they are unlikely to be affected by,	BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "4.1.3.2 Maintenance and Testing of Facilities and Equipment A process is used to monitor, periodically test, and maintain the emergency response facilities and equipment so that both the facilities and equipment are operable 24 hours a day, 7 days a week. Different types of equipment, e.g., radiation instruments, communication equipment, meteorological, data transmitting equipment faxes, computers, etc., and their operability testing	C

Article No.	Article Requirement	Assessment	Compliance Category
	or made unavailable by, accident conditions.	frequency is provided. A routine walk through of facilities to monitor for operability is specified. For the details, see BP-PROC-00844, Maintenance and Testing of Emergency Management Facilities and Equipment." BP-PROC-00844, "Maintenance and Testing of Emergency Management Facilities and Equipment" states: "1.0 Purpose This procedure defines the process and frequencies, by which emergency facilities and equipment are periodically inspected, inventoried, operationally checked, and are tested. The testing and maintenance program described herein is mandated under BP-PLAN-00001, Bruce Power Nuclear Emergency Response Plan (to be referred to hereafter as the Emergency Plan) to ensure the required facilities and equipment are available and ready operationally to support an adequate emergency response capability. This procedure applies only to equipment and facilities used in a radiological emergency that is consistent with the scope and applicability of Emergency Plan. Beyond Design Basis Event Analysis specifications for Emergency Mitigation Equipment (EME) has been completed and the Engineering changes for the plant modifications are found in the Engineering Change Control module of PASSPORT	
Requirement 19: Accident management programme	The operating organization shall establish an accident management programme for the management of beyond design basis accidents.	Assessed in detail under Articles 5.8 and 5.9. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-08.01 "Emergency Measures Program" which states: "4.8.8 BP-PROC-00659, Severe Accident Management The purpose of this procedure is to develop actions for use by the Shift Organization to respond to accident conditions, which are outside of the established accident design basis response. This procedure uses the structures, roles, and processes established in BP-PLAN-00001, Bruce Power Nuclear Emergency Plan to activate the technical support group responsible for developing those actions and to communicate those actions to the Shift Response Organization. This procedure interacts with conduct of plant operations identified in BP-PROG-12.01, Conduct	C

Article No.	Article Requirement	Assessment	Compliance Category
		of Plant Operations. The plan owner is the Department Manager, Emergency Management Department."	
5.8.	An accident management programme shall be established that covers the preparatory measures and guidelines that are necessary for dealing with beyond design basis accidents. The accident management programme shall be documented and periodically reviewed and revised as necessary. It shall include instructions for utilization of the available equipment — safety related equipment as far as possible, but also conventional equipment — and the technical and administrative measures to mitigate the consequences of an accident. The accident management programme shall also include organizational arrangements for accident management, communication networks and training necessary for the implementation of the programme.	BP-PLAN-00001, Bruce Power Nuclear Emergency Plan states: "2.0 Exceptions Security (hostile action) Response as well as Emergency Fire and First Aid Response is dealt with through separate provisions, but provisions of the NERP still apply to deal with the associated potential threat of release of radioactive material, i.e., the need for off-site notifications, situation updates, confirmation of any radioactive releases. For those events where accident consequences indicate that the design basis response has not been effective, the Emergency Response Organization (ERO) will activate BP-PROC-00659, Severe Accident Management (SAMG). This procedure interfaces with BP-PLAN-00001 in order to utilize the structures and processes contained therein to assist the incident Facility with its response. The response to address accidents involving the transportation of radioactive material and radioactive liquid emissions is dealt with separately." BP-PROC-00659, Severe Accident Management states: "1.0 Purpose This procedure defines the requirements of Bruce Power's Severe Accident Management (SAM) program by establishing: 1. The actions to be taken to: Terminate core damage progression. Maintain the capability of containment. Minimize on site and off site releases. Achieve a safe, stable state of the reactor and plant over the long term. 2. The preparatory measures necessary for implementation of such actions. As described in Regulatory Guide G-306, Severe Accident Management Programs for Nuclear Reactors, the Nuclear Safety and Control Act (NSCA) and its Regulations contain provisions	C

Article No.	Article Requirement	Assessment	Compliance Category
		which are relevant to establishing the need for a SAM program for a person who holds a licence to operate a nuclear reactor. The intent of these provisions can be met by incorporating this procedure and its associated implementing documents into the framework established by the Bruce Power Management System and with due consideration to the intent of OP&P principles, licence conditions and external industry best practices. (Reference Section 5.5.) This procedure does not apply to design basis accidents which are addressed through the existing operational and procedural framework. SAMG has been developed specifically to deal with the possibility of a severe accident occurring on a single reactor unit operating initially at high power. Although SAMG has not been developed to address events on a shutdown unit or events on multiple units it is believed that strategies developed for one unit would be applicable to a shutdown unit or to multiple units. "7.0 Responsibilities" identifies the positions within the organization to manage the program. "5.3 Implementing Documents This procedure is implemented by the following documents: BP-SAM-00001 Technical Support Group User’s Guide" and a host of BP SAM documents. "5.6 External Industry Standards or Internal/External Lessons Learned/OPEX This procedure is prepared in consideration of the following external industry standards and internal/external lessons learned or operating experience: COG Joint Project Report - COG JP 4056-001 R4, Technical Basis for Severe Accident Management Guidance Volume 1 COG Joint Project Report - COG JP 4056-002 R3, Technical Basis for Severe Accident Management Guidance Volume 2 COG Joint Project Report - COG JP 4056-023/ 019 R1, Severe Accident Management Guidance: Bruce A / B Documentation Package CNSC Regulatory Guide G-306, Severe Accident Management Programs for Nuclear Reactors,	

Article No.	Article Requirement	Assessment	Compliance Category
		May 2006 With reference to G-306, the COG Industry Joint Project Team provided a set of consolidated comments to the CNSC during G-306 preparation. Bruce Power's comments are contained in NK21-CORR-00531-03183 / NK29-CORR-00531-04946 - Bruce Power Comments on CNSC Draft Regulatory Guide G-306, "Severe Accident Management (SAM) Programs for Fission Reactors", January 4, 2005" BP-SAM-00001, "Technical Support Group User's Guide" states "6.2 SAG/SCG Structure Each of the SAGs employs a common high level structured approach. The Guideline Evaluators are instructed to follow a twelve step process with the following high level objectives. The detailed instructions for achieving each high level objective are unique to, and provided in, each SAG: 1. Identify Available Strategies to Restore Acceptable DFC Parameter Value 2. Determine Capability of Available Equipment 3. Identify and Evaluate Negative Impacts 4. Determine if Strategy Should be Implemented 5. Identify Preferred Equipment Line up 6. Identify Any Constraints on Implementation 7. Direct Control Room Staff to Implement Strategy 8. Verify Strategy Implementation 9. Determine if Additional Mitigating Actions are Necessary to Mitigate Actual Negative Impacts 10. Determine if Another Strategy is Required 11. Identify Long Term Concerns 12. Return to Diagnostic Flow Chart (DFC)	

Article No.	Article Requirement	Assessment	Compliance Category
		Each of the SCGs also employs a common high level structured approach. The Guideline Evaluators are instructed to follow an eight step process with the following high level objectives. The detailed instructions for achieving each high level objective are unique to, and provided in, each SCG: 1. Identify Available Strategies to Restore Acceptable SCST Parameter Value 2. Identify Preferred Equipment Line up 3. Identify Any Constraints on Implementation 4. Direct Control Room Staff to Implement Strategy 5. Verify Strategy Implementation 6. Determine if Another Strategy is Required 7. Identify Long Term Concerns 8. Return to the Severe Challenge Status Tree (SCST))"	
5.9.	Arrangements for accident management shall provide the operating staff with appropriate systems and technical support in relation to beyond design basis accidents. These arrangements and guidance shall be available before the commencement of fuel loading and they shall address the actions necessary following beyond design basis accidents, including severe accidents. In addition, arrangements shall be made, as part of the emergency plan, to expand the emergency response arrangements, where necessary, to include the responsibility for long term	BP-SAM-00001, "Technical Support Group User's Guide" is a document that identifies the assembly of a Technical Support Group which is to support the operations staff. BP-SAM-00001, "Technical Support Group User's Guide" states: "5.4 Long Term Concerns and Tracking Active Strategies Severe Accident Exit Guide (SAEG) 1 is entered on each pass through the DFC, and at the end of each Severe Accident Guide (SAG)/ Severe Challenge Guide (SCG) Guide in which a strategy has been implemented. Its purpose is to track ongoing strategies after the guide that implemented them has been exited. Upon exit from any SAG or SCG, the Worksheet #1, Long Term Concerns, should be completed and attached to SAEG 1. These worksheets provide checklists of plant parameters to be periodically monitored to ensure that the implemented strategy can continue in the long term. In cases where an alternate strategy is currently keeping a SAM parameter within limits, as time permits, TSG staff should continue to examine "better" strategies (e.g. recirculation) to minimize long term concerns and to place the reactor into a sustainable state."	C

Article No.	Article Requirement	Assessment	Compliance Category
	actions.		
Requirement 20: Radiation protection	The operating organization shall establish and implement a radiation protection programme.	Assessed in detail under Articles 5.10, 5.11, 5.12, 513, 5.14, 5.15 and 5.16. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-12.05 "Radiation Protection Program".	C
5.10.	The operating organization shall ensure that the radiation protection programme is in compliance with the requirements of the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources [6]. The operating organization shall verify, by means of surveillance, inspections and audits, that the radiation protection programme is being correctly implemented and that its objectives are being met. The radiation protection programme shall be reviewed on a regular basis and updated if necessary. [6] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION,	BP-PROG-12.05 "Radiation Protection Program" states: "1.0 Purpose This Program document defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Management Policy as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A). This is achieved by establishing and implementing standards and processes for the conduct of licensed activities (Appendix A) to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Ensure public and occupational exposures to ionizing radiation are controlled such that: a) Individual doses are kept below regulatory dose limits. b) Unplanned exposures are avoided. c) Individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. 2. Control the movement of people and materials in a manner that prevents the uncontrolled release of contamination or radioactive materials from Bruce Power facilities. 3. The achievement of high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 (Rev-1). 4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Canadian Standard Association (CSA) requirements pertaining to contamination control and radiation protection, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.24.	C

Article No.	Article Requirement	Assessment	Compliance Category
	International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).	This Program also defines the requirements for compliance with Ontario Occupational Health and Safety Act (OHSA), X-Ray Safety and Radiation Emitting Devices (RED) Act requirements. These regulations pertain to x-ray generating equipment not licensed by the CNSC. The Program Document Hierarchy (Appendix B) illustrates the minimum suite of procedures available through this Program that define processes and standards to ensure these objectives are met. Radiation protection (safety) is one of the four pillars of nuclear safety which supports a healthy nuclear safety culture. This Program is designed to embrace and contribute to the principles of nuclear safety as defined in BP-MSM-1, and recognizes that reactor safety, industrial safety, and environmental safety are essential to the long-term success of this Program. This Radiation Protection Program (the Program) is applicable to all Bruce Power facilities and all workers performing radiological work at Bruce Power, whether they are full-time or part time-staff, or contractors." "4.1.4 Performance Metrics The DM, RP Programs identifies performance metrics and standards to be achieved. SFAMs measure and report performance against the metrics, and identify lower level trends in radiation protection performance in accordance with SEC-RPR-00012, Radiation Protection Performance Indicators. ALARA Committees review performance against dose targets and goals in accordance with BP-RPP-00044. Their objective is to drive performance to be better than target." "4.6 Verification of Radiological Work Verification is a process of confirming by measurement or observation that planned results have been achieved. Verification processes are integrated at all levels of radiation protection activities to ensure that the processes and systems established in this Program meet the objectives outlined in Section 1.0. The results of these items are used to assess the performance of this Program and identify where improvements are required. Line Management are responsible for ensuring that information required to conduct the audits is available upon request and that there is full participation in the audit.	

Article No.	Article Requirement	Assessment	Compliance Category
		Through these processes, areas for improvement are identified to enhance training material, supporting systems and equipment, or the way work is planned or is executed in order to achieve the desired results. Any non-compliances or areas for improvement identified as a result of verification processes are documented, investigated, and improvements implemented according to BP-PROG-01.07, Corrective Action. A summary of the verification processes is described below, and in more detail in the referenced implementing procedures."	
5.11.	The radiation protection programme shall ensure that for all operational states, doses due to exposure to ionizing radiation in the plant or doses due to any planned releases of radioactive material from the plant are kept below authorized limits and are as low as reasonably achievable.	BP-PROG-12.05 "Radiation Protection Program" states: "1.0 PURPOSE This Program document defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Management Policy as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A). This is achieved by establishing and implementing standards and processes for the conduct of licensed activities (Appendix A) to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Ensure public and occupational exposures to ionizing radiation are controlled such that: a) Individual doses are kept below regulatory dose limits. b) Unplanned exposures are avoided. c) Individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account."	C
5.12.	The radiation protection programme in the operating organization shall have sufficient independence and resources to be able to enforce and to advise on radiation protection regulations, standards and procedures, and on safe working	BP-PROG-12.05 "Radiation Protection Program" states: "4.1.1 Radiation Protection Organization ... The following groups also have responsibility for defining, carrying out, and overseeing aspects of this Program: - Oversight of ALARA is provided by Site and Station ALARA Committees and ALARA Sub-Committees as defined in BP-RPP-00044, ALARA Program.	C

Article No.	Article Requirement	Assessment	Compliance Category
	practices.	- Independent audits of this Program are conducted in accordance with BP-PROG-15.01, Nuclear Oversight Management. -The Joint Committee on Radiation Protection (JCRP) provides a forum for communications between management and worker representatives of the Society of Energy Professionals Union and the Power Worker's Union (PWU) on radiation protection topics, and develops recommendations to senior management for improvements in this Program in accordance with its Terms of Reference. Any worker can provide feedback on this Program through this committee. Expectations of these committees and individuals are further defined in this document and identified implementing procedures. Specific individual responsibilities that apply to this Program are summarized in Section 7.0. All workers performing radiological work are responsible for the safe conduct of radiological work in accordance with the instructions they have been provided, and have the authority to stop work or prevent the initiation of work that could result in a violation of this Program, radiation protection standards or procedures, unplanned radiation dose, or that which could otherwise endanger personnel. This is further described in BP-RPP-00041, Executing Radiological Work."	
5.13.	All plant personnel shall understand and acknowledge their individual responsibility for putting into practice the measures for controlling exposures that are specified in the radiation protection programme. Consequently, particular emphasis shall be given to the training of all site personnel so that they are aware of radiological hazards and of the necessary protective measures.	BP-PROG-12.05 "Radiation Protection Program" states: "4.1.1 Radiation Protection Organization ... The following groups also have responsibility for defining, carrying out, and overseeing aspects of this Program: All workers performing radiological work are responsible for the safe conduct of radiological work in accordance with the instructions they have been provided, and have the authority to stop work or prevent the initiation of work that could result in a violation of this Program, radiation protection standards or procedures, unplanned radiation dose, or that which could otherwise endanger personnel. This is further described in BP-RPP-00041, Executing Radiological Work." "4.2.1 Training Requirements The Department Manager (DM), Radiation Protection (RP) Programs ensures that a training program is in place for radiation protection. Employees, temporary and contract workers are selected, trained and qualified in accordance	C

Article No.	Article Requirement	Assessment	Compliance Category
		with BP-PROG-02.02. The training requirements for achieving and maintaining qualifications in radiation protection are defined and approved by the DM, RP Programs. The training and qualification structure for radiation protection is described in BP-RPP-00006, TQD-00042, Radiation Protection Training and Qualification Description, TQD-00046, Radiation Protection Technician Training and Qualification Description, and TQD-00075, Health Physicist, Authorized Health Physicist Training and Qualifications Description. Line Managers identify the qualifications required for their workers in accordance with this document and based on the knowledge of the work they will be performing. When planning work to ensure doses are ALARA, the need for and provision of additional training to support the performance of high-risk work or any other work activities is determined by SFAMs. This is further described in BP-RPP-00011, Requirements for Planning Radiological Work, and implementing procedure of BP-RPP-00044."	
5.14.	All site personnel, including contractors, who are working in a controlled area or who are regularly present in a supervised area shall have their occupational exposures assessed in accordance with the requirements of Ref. [6]. Dose records shall be kept and shall be made available to personnel on demand and to the regulatory body. [6] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD	BP-PROG-12.05 "Radiation Protection Program" states: "6.0 Records Records required by this Program are defined in implementing procedures." "4.1.2 Radiation Protection Document and Records Management Radiation protection procedures are created and managed in accordance with BP-PROG-01.02, and BP-PROG-03.01, Document Management, respectively. Specific procedural expectations for authors of documents that support this Program are described in SEC-RPR-00013, Radiation Protection Process Quality Management. Records made under this Program are retained in accordance to regulatory requirements and BP-PROG-03.01. The types of records that are retained are documented in the lower level implementing procedures of this document and specific guidelines for the maintenance of radiation protection records are described in SEC-RPR-00045, Radiation Protection Records Retention (an implementing document of SEC-RPR-00013), and SEC-DOS-00001, Dosimetry Quality Assurance, an implementing document of BP-PROC-00913." "The types of records that are retained are documented in the lower level implementing procedures of this document and specific guidelines for the maintenance of radiation protection records are described in SEC-RPR-00045, Radiation Protection Records Retention (an implementing document of SEC-RPR-00013), and SEC-DOS-00001, Dosimetry Quality	C

Article No.	Article Requirement	Assessment	Compliance Category
	HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).	Assurance, an implementing document of BP-PROC-00913. Radiation hazard information and dose information is recorded and maintained in the Radiation Hazard Information System (RHIS) and the Dose Management System (DMS), respectively. The DM, RP Programs, through the Site Functional Area Managers (SFAMs), ensures that individual dose information is available to workers in support of controlling dose. The DM, RP Programs, through the Section Manager (SM) Dosimetry, provides workers with their dose information in writing. The DM, RP Programs, through the SM, Dosimetry, maintains a record of the Nuclear Energy Worker (NEW) status for all designated NEWs in accordance with BP-RPP-00026, Designation of the Nuclear Energy Worker, an implementing procedure of BP-RPP-00006, Radiation Protection Qualification. Dose information for each Nuclear Energy Worker (NEW) that is monitored for radiation exposure is maintained as described in BP-PROC-00280, Dosimetry Requirements, and its implementing procedures. The SM, Dosimetry ensures that when required, changes to dose records are conducted in accordance with CNSC Standard S-260, Making Changes to Dose Related Information Filed with the National Dose Registry. Where dosimetry results are unavailable, steps are taken to estimate the exposure of the individual. In these instances, an AHP/RSO (as applicable) or delegate approves the assigned dose in accordance with BP-PROC-00280 and its implementing procedures."	
5.15.	The radiation protection programme shall include the health surveillance of site personnel who may be occupationally exposed to radiation for ascertaining their physical fitness and for giving advice in cases of accidental overexposure. This health surveillance shall consist of a preliminary medical examination followed by periodic checkups.	BP-PROG-12.05 "Radiation Protection Program" states: 4.4.1 Action Levels, Administrative Dose Limits and Exposure Control Levels As required by the CNSC Radiation Protection Regulations and Bruce Power CNSC Licences, Action Levels for individual exposure events are identified for each licence issued by the CNSC to Bruce Power. These levels are set such that triggering an Action Level indicates a possible loss of control of this Program. Bruce Power's Action Levels are defined in: SEC-RPR-00022, Action Levels. Annual and five-year individual Administrative Dose Limits (ADLs), set below regulatory limits and Action Levels, are used to control exposure to all NEWs, including contractors and visitors. Exposure Control Levels (ECLs) are then set below ADLs. The DM, RP Programs defines the	C

Article No.	Article Requirement	Assessment	Compliance Category
		ADLs and ECLs, and is responsible for establishing a process for managing individual dose to ensure dose is ALARA. Line Managers, in conjunction with SFAMs, ensure individual doses are maintained below the ECLs and are ALARA. This process is described in BP-RPP-00009. Doses to pregnant workers are maintained lower than the effective dose limits prescribed by the CNSC regulations for the remainder of the pregnancy through lowering Exposure Control Levels (ECLs), changing work assignments, and enhanced monitoring of exposures. These processes are further described in BP-RPP-00018 and BP-RPP-00009." BP-PROC-00379 "Employee Wellness" states: "1.0 Purpose This document describes policies and principles underlying Bruce Power's Employee Wellness programs. Bruce Power's Employee Wellness Department provides a comprehensive and integrated approach to health and wellness. It addresses a broad range of health and wellness issues including physical and psychosocial, environment, health practices, and personal resources, through its programs, policies and practices. 2.0 Exceptions Under the Ontario Occupational Health and Safety Act, Section 28(3), a worker is not required to participate in a prescribed medical surveillance program unless the worker consents to do so. 4.2.3 Health Surveillance is more completely described in BP-PROC-00378, Health Surveillance. Employee health screening helps workers to work safely by ensuring their health is compatible with the demands of the work they do." 4.2.4 Health Promotion programs encourage health and wellness. Environmental issues such as medical effects of spills and radiation issues are investigated by company medical personnel in conjunction with other safety personnel (e.g., industrial hygiene and health physics).	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00378 - Bruce Power Health Surveillance states: "4.0 Procedure Description 1. Employee health screening will be completed at the following times for all Bruce Power employees, including temporary workers: - Pre-Hire i.e., whenever an employee joins the company or rejoins the company following a break in continuity of employment. - Whenever there has been a significant change in the employee¡¦s health status, such as following an illness or accident. - Whenever there is a question regarding the compatibility of an employee¡¦s health and their work. - At regular intervals, as demanded by the nature of the work. For high risk groups, such as Nuclear Response Team (NTR), screening will be done yearly. - Upon exit of employment, as required, e.g., audiometric examination. Health screening for all other employees, contractors and those using Bruce Power facilities and/or training services will be done by request and based on resourcing. 2. To initiate an employee health screening, the employee and their supervisor will complete FORM-11767, Employee Health Screening Request. This will describe the nature of the work done, such as vault work, as well as identify the hazards and working conditions the worker encounters. This request includes the signed consent of the employee for the health screening. 3. The worker or their supervisor will schedule an employee health screening appointment with Health Services. 4. The Occupational Health Nurse will review the employee's health, consider the hazards and working conditions identified, and assess the worker's fitness to work in these conditions. The assessment will be completed using the guidelines from Bruce Power Employee Wellness Medical Directives. 5. Based on the health assessment, employees will be assessed as "fit", "unfit", or "fit with restrictions" for working under each of the conditions identified. These are the results of the employee health screening. 6. Employee Wellness will release the results of the health screening to their supervisor, and	

Article No.	Article Requirement	Assessment	Compliance Category
		Bruce Power Training Department, with the consent of the employee as well as the Manager, HR, Employee Wellness as it pertains to eligibility to meet the minimum mandatory requirements of a position. All medical documentation and health information collected during the health assessment will be kept secure and confidential within Bruce Power Employee Wellness. If the Occupational Health Nurse is unable to make an assessment of the employee's fitness for doing the work, he or she may request further information from the Bruce Power Physician, or from external health care providers, as appropriate. Bruce Power Employee Wellness will serve as the point of collection and coordination of all such health information, and will keep this information confidential. 7. Once the assessment of the employee's fitness for their work has been made by Bruce Power Health Services, the results (fit, unfit or fit with restrictions) will be released to their supervision, with the employee's consent, as described in step 6. 8. With respect to pre-employment health screening, if the results of the assessment for a candidate for placement are determined to be "unfit" or "fit with restrictions" and as a result cannot meet minimum position requirements, the Department Manager, HR, Wellness, must review the restriction and discuss hiring suitability with hiring manager and the Legal Department as appropriate."	
5.16.	The radiation protection programme shall ensure control over radiation dose rates for exposures due to activities in areas where there is radiation arising from or passing through structures, systems and components, such as in inspection, maintenance and fuel handling. It also addresses plant chemistry activities as well as exposures due to radioactivity of substances in the fuel coolant (liquid or gas) and associated fluids. The programme shall make arrangements to maintain these doses as low as reasonably	CNSC NSRD licences (Appendix A of BP-PROG.12.05 Radiation Protection Program) issued to Bruce Power allow for: The acquisition, use, transfer, and disposal of nuclear substances and radiation devices Subsection 1). The operation of a Class II Nuclear Facility (Subsection 2). The performance of industrial radiography (Subsection 3). The Corporate and Class II Facilities Radiation Safety Officers (RSO)s are responsible for the administration of these licences and for the provision of oversight of the implementation of programs and procedures required to comply with the conditions of the licences for which they are responsible, as outlined in BP-RPP-00043 Management of Nuclear Substances and Radiation Generating Equipment and BP-PROC-00817 Management of Class II Nuclear Facilities. Relevant applications of BP-RPP-00043 are as follows: Nuclear Substances and Radioactive Devices- The SVPs of Bruce A and Bruce B and VP of Site Services are responsible for the safe use, movement, and storage of nuclear substances (sealed and unsealed) and radiation devices in their facility/project, and are supported by the Corporate RSO and SFAMs in accordance with BP-RPP-00043.	C

Article No.	Article Requirement	Assessment	Compliance Category
	achievable.	Industrial Radiography-The SVP, Outages and Maintenance Services, is responsible for the safe conduct of industrial radiography activities. Because of the significant radiological consequences that may result from potential errors or equipment failure while performing industrial radiography, the Corporate RSO provides radiological oversight and support for industrial radiography as it is performed by site personnel or contractors. Oversight instructions provided by the Corporate RSO are implemented and supported by the SFAMs. The conduct of radiography is further described in BP-PROC 00036, Conduct of Radiography, and implementing procedure of BP-RPP-00043. X-Ray Generating Equipment Management- BP-PP-00043 outlines the requirements for the management of x-ray generating equipment, authorized for use at Bruce Power by the Ontario Ministry of Labour, in accordance with BP-PROC-00929 Management of X-Ray Generating Equipment. As described in BP-PROC-00306 Chemical Risk Management Procedure, radioactive materials including fuel bundles, radioactive sources, tritium, heavy water, etc. are governed by Radiation Protection Procedures. The Bruce Power ALARA Program, BP-RPP- 0044, identifies planning strategies to control dose and minimize exposure As Low As Reasonably Achievable at Bruce Power to meet the requirements outlined in CNSC Regulatory Guide G-129, Keeping Radiation Exposures and Doses “As Low as Reasonably Achievable (ALARA)”. Input from the following programs assist in effective ALARA planning and radiological work execution, and dose reduction initiatives: BP-PROG-11.01, Equipment Reliability, BP-PROG-11.02, Online Work Management Program, BP-PROG-11.03, Outage Management, BP-PROG-11.04, Plant Maintenance, and BP-PROG-12.02, Chemistry Management. BP-PROG-12.05, "Radiation Protection Program" states: "4.6 Verification of Radiological Work 2. Routine Radiological Surveys BP-RPP-00005, Routine Radiological Surveys, outlines the requirements for routine radiological surveys performed to verify: the implementation of this Program, the integrity of operating systems, to support the early discovery of unexpected hazards; and to identify longer term trends in hazard conditions. The location, type and frequency of routine surveys are scaled to the probability and the consequences of exposures.	

Article No.	Article Requirement	Assessment	Compliance Category
		SFAMs develop and maintain their respective facility's survey program in accordance with BP-RPP-00005. The results of surveys are communicated through posting and labelling. These activities are conducted in accordance with the CNSC Radiation Protection Regulations as described in BP-RPP-00023. Survey results are retained and accessible to workers in the RHIS for identification of trends and for work planning. In order to verify the technical basis of this Program, routine and periodic source term characterization data is undertaken in accordance with SEC-RPR-00073, Source Term Characterization of Radioactive Systems and Areas, an implementing document of BP-RPP-00049, Source Term Management (an implementing document of BP-RPP-00044)." BP-RPP-00005 Revision 7, "Routine Radiological Survey" states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines Routine Radiological Survey Program requirements. The purpose of routine radiological surveys is to: Determine radiation field levels and contamination levels from particular operations so that appropriate control measures for restricting exposure can be implemented. Detect a breakdown in controls or systems. Identify longer term trends in hazard conditions." BP-RPP-00044, "ALARA Program" states: "1.0 Purpose This procedure establishes the requirements and responsibilities for the effective implementation of the ALARA Program as per governing document BP-PROG-12.05, Radiation Protection Program. The objective of the ALARA Program is to ensure that occupational radiation exposures, both individually and collectively are maintained As Low As Reasonably Achievable (ALARA)."	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-RPP-00023, "Hazards Surveys, Posting, Response and Recording" states: "1.0 Purpose This procedure is an implementing document of BP RPP 00041, Executing Radiological Work, and details the requirements for surveying for radiation hazards, recording hazard details and the methods of communicating the results of these surveys to workers and management. Survey requirements are defined by the Radiation Exposure Permit (REP) in accordance with BP RPP 00041 as required by BP RPP 00011, Requirements for Planning Radiological Work. Guidance is also provided for responding to unexpected hazards." BP-RPP-00049, "Source Term Management" states: "1.0 Purpose This procedure establishes the requirements and responsibilities for the effective implementation of the Source Term Management Program. The objective of the Source Term Management Program is to ensure that materials selection, plant operation, maintenance activities, and chemistry strategies during normal operations, shutdowns, and start-ups are managed to the extent practical to reduce the radiation source term. The Source Term Management Program shall be implemented through a Source Term Management Team. The commitment to reduce source term must be supported by all departments within the company. The benefits of such efforts could be significant, serving to reduce overall occupational radiation dose incurred by the plant staff and thereby increasing flexibility in the use of personnel as well as public benefit through reduced emissions."	
Requirement 21: Management of radioactive waste	The operating organization shall establish and implement a programme for the management of radioactive waste.	Assessed in detail under Articles 5.17, 5.18, 5.19, and 5.20. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-12.05 "Radiation Protection Program" which states: "4.5.2 Radioactive Waste Management The DM, RP Programs is responsible for defining the governance and oversight requirements for Bruce Power's Radioactive Waste Program as defined in BP-PROC-00878, Radioactive Waste Management."	C

Article No.	Article Requirement	Assessment	Compliance Category
5.17.	Adequate operating practices shall be implemented to ensure that the generation of radioactive waste is kept to the minimum practicable in terms of both activity and volume.	BP-PROC-00878 - "Radioactive Waste Management" states: "1.0 Purpose This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. 3. Ensure decisions on management of radioactive waste are based on minimizing risk to the environment, public and staff and minimizing total life cycle costs for radioactive waste storage and disposal. 4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Standards and Canadian Standard Association (CSA) requirements pertaining to radioactive waste management, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.28. 5. The achievement of high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 (Rev-1). At all times, nuclear safety shall be a primary consideration of every radioactive waste management activity and operational decision with respect to these activities."	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.1 Radioactive Waste Minimization At all times, workers shall strive to minimize the production of solid radioactive waste. BP-PROC-00714, Low Level Radioactive Waste Minimization, defines the requirement for minimization of low level radioactive waste and defines the expectations for all workers. To raise awareness about waste minimization, BP-PROC-00181, Waste Minimization Plan, has been developed and defines how work groups can work to reduce waste when completing work/tasks and introduces waste accountability, improves monitoring and tracking of waste, and assists in planning appropriate waste targets and costs. Work groups are expected to complete and include in work plans, FORM-11803, Waste Minimization Plan. Bruce Power staff and contractors shall adhere to BP-PROC-00158, Removal of Packaging Material Prior to Entering Zone 2, Zone 3 and the Unzoned Areas, to eliminate unnecessary packaging and material from entering the site for the purpose of reducing the fireload and the potential for contaminated material. This procedure also defines the process for the elimination of unnecessary packaging material entering the protected area at Bruce Power Facilities."	
5.18.	The operating organization shall establish and implement a programme for the management of radioactive waste. The programme for the management of radioactive waste shall include the pretreatment, characterization, classification, treatment, conditioning, transport, storage and disposal of radioactive waste, as well as regular updating of the inventory of radioactive waste. Treatment and storage of radioactive waste shall be strictly controlled in a manner consistent with the requirements for the predisposal management of radioactive waste [7]. Records shall be maintained for waste generation and waste	BP-PROC-00878 - "Radioactive Waste Management" states: "4.1 Radioactive Waste Minimization At all times, workers shall strive to minimize the production of solid radioactive waste. BP-PROC-00714, Low Level Radioactive Waste Minimization, defines the requirement for minimization of low level radioactive waste and defines the expectations for all workers. To raise awareness about waste minimization, BP-PROC-00181, Waste Minimization Plan, has been developed and defines how work groups can work to reduce waste when completing work/tasks and introduces waste accountability, improves monitoring and tracking of waste, and assists in planning appropriate waste targets and costs. Work groups are expected to complete and include in work plans, FORM-11803, Waste Minimization Plan. Bruce Power staff and contractors shall adhere to BP-PROC-00158, Removal of Packaging Material Prior to Entering Zone 2, Zone 3 and the Unzoned Areas, to eliminate unnecessary packaging and material from entering the site for the purpose of reducing the fireload and the potential for contaminated material. This procedure also defines the process for the elimination of unnecessary packaging material entering the protected area at Bruce Power Facilities.	C

Article No.	Article Requirement	Assessment	Compliance Category
	classification, as well as for the storage, treatment and disposal of waste. [7] INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of Radioactive Waste, IAEA Safety Standards Series No. GSR Part 5, IAEA, Vienna (2009).	4.2 Radioactive Waste Handling and Segregation The handling and segregation of radioactive waste at source is performed by qualified personnel of the work group generating the waste in accordance with BP-RPP-00010, Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials. Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the work group generating the waste. Through the segregation process, radioactive waste is clearly identified by waste type, radiological properties, and point of origin to ensure proper segregation into designated waste receptacles and assists in radioactive waste minimization. 4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the correct disposal stream: B-SMP-79100-00002, Operation of the Trakker/Scanner B-SMP-79100-00003, Operation of the Waste Bag Monitor" B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E B-SMP-79100-00011, Waste Shielding Flask Use B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable 2. Compactable	

Article No.	Article Requirement	Assessment	Compliance Category
		3. Non-processable 4. Metal melt 4.4 Radioactive Waste Packaging, Transport and Storage Following segregation, radioactive wastes are processed and packaged by CvM staff in preparation for: 1. Shipment to Ontario Power Generation (OPG) for disposal at their on-site landfill located on the Bruce Power Site in accordance with BP-PROC-00196, Landfill Waste Acceptance Criteria; or 2. Shipment to OPG for disposal at their Western Waste Management Facility (WWMF) as Low or Intermediate Level Waste in accordance with BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste; or 3. Shipment to Energy Solutions Bear Creek Facility in Tennessee for processing in accordance with BP-PROC-00711, Waste Acceptance Guidelines for Energy Solutions. Radioactive waste is prepared for shipment in accordance with BP-PROC-00188, Radioactive Material Transportation, specifically: BP-RPP-00013, Radioactive Shipments, for off-site shipments. BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material, for transfer of radioactive waste to on-site licensed facilities, including OPG. Note: Waste that has been determined to be free releasable for disposal to a facility outside Bruce Power (e.g., a recycling or compost facility) is transported to the central waste staging yard at Bruce Power by Bruce Power staff in accordance with BP-PROC-00196 and BP-PROC-00888." BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste "4.1.6 Waste Tracking Tracking of L&ILW is an important element of OPG's L&ILW management lifecycle program and Bruce Power should have the capability to track L&ILW from its point of origin (e.g., station pick-up point) to placement in packages for transfer.	

Article No.	Article Requirement	Assessment	Compliance Category
		Copies of Bruce Power's radioactive waste tracking database and logs shall be made available to OPG NWMD Staff upon request. 4.1.8 Documentation Requirements All L&ILW proposed to be received at OPG's WWMF shall be accompanied by the following documents below, as applicable. Note: All documents shall be completed by Bruce Power staff and verified by OPG NWMD Staff prior to transfer of waste to OPG's WWMF as required by the respective document. 1. For each transfer of LLW: a) W-FORM-10124, Low Level Radioactive Waste Load Statement and 2. For each transfer of ILW: a) W-FORM-10125, Intermediate Level Waste Load Statement. 3. Additional forms as required by the type of radioactive waste being transferred and defined by the criteria in this procedure: a) W-FORM-10114, Radioactive Waste Notification b) W-FORM-10115, Inspection/Test c) W-FORM-10116, Solidified Liquid Waste Record 4. Bruce Power shall also supply any supplementary information such as loading checklists and logs, radiological surveys, chemical analyses as appropriate. This information shall be attached to the documentation listed above. 5.7 Associated Forms W-FORM-10114, Radioactive Waste Notification (Interface) W-FORM-10115, Inspection/Test Report (Interface) W-FORM-10116, Solidified Liquid Waste Report (Interface) W-FORM-10124, Low Level Radioactive Waste Load Statement (Interface) W-FORM-10125, Intermediate Level Waste Load Statement (Interface)	

Article No.	Article Requirement	Assessment	Compliance Category
		W-FORM-10578, Load Statement - Steam Generators (Bruce Power) W-FORM-10591, Load Statement - End Fitting Refurbishment Waste Container (Bruce Power) W-FORM-10594, Standing Conditional Radioactive Waste Acceptance Permit (SCRWAP) (Interface) W-FORM-10617, Load Statement - Pressure Tube and Calandria Tube Refurbishment Waste Container (Bruce Power)" Additional documentation and records keeping activities are identified in BP-PROC-00133 - Hazardous Waste Management Requirements for off-site shipments etc.	
5.19.	The operating organization shall establish and implement procedures consistent with international standards, national regulations and licence conditions for the monitoring and control of discharges of radioactive effluents. These procedures shall be made available to the regulatory body if required. The volume and activity of radioactive discharges to the environment shall be reported periodically to the regulatory body.	BP-PROC-00878 - "Radioactive Waste Management" states: "4.5.2 Active Liquid Waste BP-PROC-00029, Bruce Power Waste Acceptance Criteria – Active Liquid Effluent, defines the criteria for the acceptance of Active Liquid Effluent received at Bruce A Active Liquid Waste Treatment System. These criteria define the maximum allowable content of the Active Liquid Effluent that can be accepted at Bruce A Active Liquid Waste Treatment System, such that the Active Liquid Effluent can be processed by the Bruce A Active Liquid Waste Treatment System. These Waste Acceptance Criteria apply to all Active Liquid Effluent generated on the Bruce Site that is received at the Bruce A Active Liquid Waste Treatment System for processing. 5.1 Relevant Statutory, Regulatory and Licensing Requirements This procedure is intended to satisfy relevant statutory, regulatory and licensing requirements as specified in the following documents: CNSC P-290, Managing Radioactive Waste CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.28 General Nuclear Safety and Control Regulations, SOR/2000-202, Section 3(1)(j) (current version in force since 17APR2008)" Bruce Power is to have a transition plan from S99 to meet the newly issued CNSC REGDOC 3.1.1.	C

Article No.	Article Requirement	Assessment	Compliance Category
		The following detailed reporting requirements are identified in CNSC REGDOC 3.1.1, "Reporting Requirements for Nuclear Power Plants": "Waterborne tritium release is the monthly tritium liquid effluent released to the environment via monitored pathways from each station. Waterborne gross beta/gamma release is the monthly beta/gamma liquid effluent released to the environment via monitored pathways from each station. Waterborne carbon-14 release is the monthly carbon-14 liquid effluent released to the environment via monitored pathways from each station."	
5.20.	The operating organization shall ensure that a programme is established and implemented for monitoring the environment in the vicinity of the plant site, to assess radiological consequences of any radioactive releases to the environment. Results from this monitoring shall be made available to the public, and in particular to the public living in the vicinity of the plant site.	BP-PROG-00.02 R009, "Environmental Safety Management" states: "BP-PROC-00793, Environmental Performance Index Indicators and Reporting Procedure, provides rational[e] and calculations for assessing environmental performance." "4.5.1 Monitoring and Measurements Bruce Power identifies the requirement for and subsequently develops the procedures to monitor and measure the key characteristics of operations and activities with significant environmental impacts. This is a systematic approach for collecting information and measurements under safe and controlled conditions with qualified personnel and appropriate quality control measures. Monitoring and measurement procedures and activities associated with potential discharges or releases of contaminants to the environment specify that the appropriate monitoring and measurement requirements are managed by operations, maintenance and environment departments. Calibration of environmental monitoring and measuring equipment is conducted on a regular basis as part of a preventive maintenance program. Records of these calibrations are maintained by the Maintenance Department. To facilitate the monitoring of equipment with environmental issues, PASSPORT allows users to flag work orders, work requests and equipment with an Environmental Issue tag known as EI. Enhancing the EMS and SEAs integration into applicable Bruce Power policies and procedures and improving environmental performance are integral part of discussions of Management Leadership Meetings (MLM), Environmental Oversight Committee (EOC) and Peer Group meetings. Other new approaches are being developed and implemented to facilitate operational activities associated with SEAs and to improve environmental performance."	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.4.3 Communication Communication with employees on environmental issues is achieved by bulletin board postings, Management Leadership Meeting (MLM), e-mails, regular staff meetings, The Point articles, safety videos, manuals, and the intranet. Communication with external interested parties on environmental issues is coordinated through Corporate Affairs and the Environment Departments. Response to concerns of external parties shall be reviewed in annual Management Review Meetings. Senior management has considered processes for external communication on its significant environmental aspects and reached the decision that these would not be communicated to the public on a regular basis. Request for information concerning any Bruce Power Environmental Aspects is to be processed as per BP-PROC-00052, Public Inquiry and Response. Stakeholder interactions are governed by BP-PROG-09.02, Stakeholder Interaction. The following documents provide guidelines for Bruce Power communication (internal and external) strategy. 1. BP-PROC-00059, Event Response & Reporting, details the processes to comply with the Bruce Power requirements for: The immediate care of injured people. Immediate response to events. Reporting, recording, and rating events 2. BP-PROC-00535, Written Communications with Environmental Regulators, describes the steps necessary to prepare, review, approve, and issue formal written communication to environmental regulators. 3. DPT-ENV-00010, Environment Department Routine Rotating Duties, describes the duty of the weekly Single Point of Contact (SPOC), which includes verbal and/or written communication on certain regulatory issues."	
Requirement 22: Fire safety	The operating organization shall make arrangements for ensuring fire safety.	Assessed in detail under Articles 5.21, 5.22, 5.23, 5.24 and 5.25. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-08.01, Emergency Measures Program which states: "4.8.7 BP-PLAN-00008, Fire Safety Management	C

Article No.	Article Requirement	Assessment	Compliance Category
		The primary purpose of this plan is to oversee the planning, implementation, and control of activities related to fire safety, which are conducted by various contributing organizations" 4.8.7 BP-PLAN-"5.3 Implementing Documents This procedure is implemented by the following documents: BP-PROC-00150, Notifications prior to Maintenance of Fire Systems BP-PROC-00159, Control of Ignition Sources BP-PROC-00186, Fire Extinguishers BP-PROC-00187, Fire Protection Impairment Control BP-PROC-00189, Control of Transient Material BP-PROC-00259, Fire Protection for Relocatable Structures BP-PROC-00289, Fire Hose and Couplings BP-PROC-00842, Compressed Gas Storage BP-PROC-00857, Fire Barriers"	
5.21.	The arrangements for ensuring fire safety made by the operating organization shall cover the following: adequate management for fire safety; preventing fires from starting; detecting and extinguishing quickly any fires that do start; preventing the spread of those fires that have not been extinguished; and providing protection from fire for structures, systems and components that are necessary to shut down the plant safely. Such arrangements shall include, but are not limited to: (a) Application of the	BP-PLAN-00008, Fire Safety Management has sections on: "4.2.1 Fire Safety Management Plan Elements ... 2. Fire Prevention (Section 4.4) a) Control of Transient Combustibles. b) Control of Ignition Sources (including hot work fire watches). c) Periodic Inspections (including housekeeping). d) Fire Barriers." BP-PLAN-00008, Fire Safety Management states: "4.7 System Status and Impairment	C

Article No.	Article Requirement	Assessment	Compliance Category
	principle of defence in depth; (b) Control of combustible materials and ignition sources, in particular during outages; (c) Inspection, maintenance and testing of fire protection measures; (d) Establishment of a manual firefighting capability; (e) Assignment of responsibilities, and training and exercising of plant personnel; (f) Assessment of the impact of plant modifications on fire safety measures.	4.7.1 System Status Plant Fire Protection Features shall remain fully operational to support the protection of the specific SSCs important to safety for which they were provided. Measures shall be established to provide for the identification of impairment and system status of all fire protection features. These measures shall include a requirement to determine the need for compensatory measures (i.e., fire watches, etc.), and to notify the appropriate plant fire protection personnel of action being taken. Notification of the CNSC of significant impairments shall be coordinated as necessary. 4.7.2 Impairment Procedures shall be established to identify methods required to maintain the level of fire protection provided when a particular fire protection feature is impaired or during periods of maintenance. These methods may vary depending upon the categorization (i.e., required for safe shutdown or important to loss prevention, etc.) of the equipment that the fire protection feature is protecting and on the function that the fire protection feature provides. Compensatory measures (i.e., fire watches, backup water supply, etc.) shall be established such that the defence-in-depth objectives, given the impaired feature, are maintained. BP-PLAN-00008, Fire Safety Management states: "4.8 Training The requirements associated with training are governed by the processes and activities associated with BP-PROG-02.02, Worker Training and Qualification." and has 4.8.1 General Employee General employee training shall be conducted for all staff. This training shall provide employees with general fire protection/prevention and the appropriate actions to be taken by an employee discovering a fire. This training shall be consistent with the requirements of CSA N293, Fire Protection for CANDU Nuclear Power Plants. Supervisory staff shall be trained in the fire emergency procedures described in the fire safety plan before they are given any responsibility for fire safety. Contractors and other non-Bruce Power personnel shall be sponsored by qualified personnel, until the contractors or other non-Bruce Power personnel have received training.	

Article No.	Article Requirement	Assessment	Compliance Category
		4.8.2 Emergency and Protective Services (EPS) Fire EPS Fire shall be trained to fight potential fires in all areas on site. Training shall include initial classroom instruction followed by periodic classroom instruction, fire-fighting practice and site fire drills. 4.8.3 Offsite Fire Department Training shall be available to the local fire department staff to delineate responsibilities and duties and operational precautions when fighting fires on site. Where practical, the training of the local fire department should be coordinated with EPS Fire. Bruce Power has entered into a Mutual Aid agreement with the Offsite Fire Department. 4.8.4 Fire Watch All individuals assigned fire watch duties, regardless of whether they are station staff, visitors or contractors, shall be trained in the duties and responsibilities of the fire watch. Specific guidance is given by BP-PROC-00159, Control of Ignition Sources. 4.8.5 Maintenance Personnel Personnel responsible for the maintenance and testing of the fire protection features shall be qualified by training and experience for such work. For example, personnel performing work on a detection system shall understand the system and its function and have a basic understanding of code requirements, such that changes to systems (replacement part, component orientation, etc.) does not affect the system's performance. 4.8.6 QA/QC Personnel performing inspections shall be knowledgeable and competent in the design and installation requirements for the specific fire protection feature. Specific guidance is given by BP-PROG-02.02, Worker Training and Qualification. 4.8.7 Operations Personnel Operator training shall include training on procedures to shut down the unit(s) in the event of a fire. Training is conducted in accordance with the specific Units Operator Training Program.	

Article No.	Article Requirement	Assessment	Compliance Category
		4.8.8 Engineering Personnel Engineering personnel shall receive training to remain current with developments in the field. 4.8.9 Fire Protection Program Personnel Fire Protection Program personnel shall receive training to remain current with developments in the field. 4.9 Configuration Management Station modifications shall be reviewed for their impact on the Bruce Fire Safety Management Plan. As a minimum, the configuration management process shall: Provide instructions for evaluation of modifications that have the potential to affect fire protection, including the continued ability to achieve the nuclear safety performance goals during and after a fire. Ensure that: a) Adequate fire protection is maintained during and after the modification. b) Combustible fuel package and ignition sources are considered. c) Fire protection regulatory requirements are reviewed for compliance. d) The defence-in-depth is maintained for the overall fire protection program. Ensure that prior to implementation, any proposed modification with the potential to impact protection from fire be submitted for a third-party review. This review shall be carried out by one or more independent external agencies having specific expertise with such reviews. These reviews shall be submitted to the CNSC or a person authorized by the CNSC. Specific guidance for the configuration management is provided in BP-PROG-10.01, Plant Design Basis Management and BP-PROG-10.02, Engineering Change Control Management.	
5.22.	A comprehensive fire hazard analysis shall be developed for the plant and shall be periodically reviewed and, if necessary, updated.	BP-PLAN-00008, Fire Safety Management states: "4.3.1 Fire Hazard Assessment The Fire Hazard Assessment (FHA) is a detailed report on station fire hazards and fire protection features. The FHA shall be maintained. FHA will include the assessments of the effects of fire or fire suppression activities on radioactive material outside the reactor and also	C

Article No.	Article Requirement	Assessment	Compliance Category
		assessment of the effectiveness of fire protection measures in all fire zones. 4.3.2 Fire Safe Shutdown Analysis A Fire Safe Shutdown Analysis (FSSA) shall be performed for each fire area containing structures, systems and components important to safety or representing a potential hazard to those areas. The FSSA will continue to be the analysis of the ability of a specific set of systems, equipment and cables (FSSA credited) to meet the reactor shutdown, cooling, containment and monitoring goals of CSA N293. The FSSA shall: Consider potential in situ fire hazards. Specify measures for fire prevention, fire detection, fire suppression and fire containment. Determine the consequences of a fire in any location in the plant on the ability to safely shutdown any and/or all units (input from the Fire Hazard Assessment). Determine the consequences of a fire in any location in the plant on the ability to minimize the release of radioactivity such that the facility can be operated without undue risk to the health and safety of station personnel and the public. Determine the effects of inadvertent operation of fire suppression systems and manual fire-fighting activities on the ability of structures, systems or components to perform their safety function. The FSSA shall be maintained.	
5.23.	In the arrangements for firefighting, special attention shall be paid to cases for which there is a risk of release of radioactive material in a fire. Appropriate measures shall be established for the radiation protection of firefighting personnel and the management of releases to the environment.	BP-PLAN-00006- Conventional Emergency Plan Conventional Emergency Events for the purpose of this procedure include fire, rescue, first aid, chemical or biological spills. The basis for response planning is to estimate the situations or events that may occur based on Operating Experience (OPEX) both internal and external. The Bruce A and Bruce B's Fire Hazard Analysis also provides guidance for planning purposes as well industry experts have evaluated the CANDU stations to postulate the worst case scenarios. These events are used as a measure to develop and evaluate the procedures. DPT-ERO-00005, Pre-Fire Plans - Preparation and Use, describes the documentation and control of the pre-fire plans. 4.2.2 Emergency Response; Flexibility is achieved through the use and the format of the Standard Operating Guidelines	C

Article No.	Article Requirement	Assessment	Compliance Category
		which provide guidance as opposed to specific direction. This best industry practice is supported by fire service industry experts. The above response protocol is based on Alan V. Brunacini's Fire Command text which is endorsed by the National Fire Protection Association (NFPA). Emergency Response by Emergency and Protective Services (EPS) Fire is directed by DPT-ERO-00001, Emergency Services Operational Procedure. This procedure describes the minimum complement number of personnel and their required function. This procedure also gives an overview of the response protocol for the various EPS Fire members. BP-PLAN-00008, Fire Safety Management states: 4.3.1 Fire Hazard Assessment The Fire Hazard Assessment (FHA) is a detailed report on station fire hazards and fire protection features. The FHA shall be maintained. FHA will include the assessments of the effects of fire or fire suppression activities on radioactive material outside the reactor and also assessment of the effectiveness of fire protection measures in all fire zones. As described in section 4.5.1, one of the actions to be taken to coordinate fire-fighting activities with off-site fire departments is provisions for training off-site fire department personnel in basic radiation principles, typical radiation hazards and precautions to be taken for a fire involving radioactive materials in the plant. BP-PLAN-00001. Bruce Power Nuclear Emergency Response Plan: On-site firefighting is the responsibility of Emergency and Protective Services – Fire. Section 4.2.3.6 of the BP-PLAN-00001, Bruce Power Nuclear Emergency Response Plan identifies the radiation protection measures for emergency responders. Section 4.2.3.6 states the following: As appropriate, Station emergency responders are provided with personal dosimeters and radiation monitoring equipment. All emergency teams, mobilized by the EOC, are briefed prior to deployment on radiation levels, self-reading or electronic personal dosimeters are issued and	

Article No.	Article Requirement	Assessment	Compliance Category
		dose and dose rate limits are assigned, protective clothing and airborne hazard breathing protection is specified. Potassium Iodide (KI) tablets are available for issue if necessary. Radiation protection requirements are prepared for each team. Teams are also provided with the necessary communication equipment prior to deployment. Section 4.2.3.7 states the following: In the event of an identified fire or a medical emergency, the immediate response is the responsibility of the EPS - Fire under the command of the Emergency Response Coordinator (ERC). The Station treatment area is equipped to provide first aid and decontamination services. In addition, agreements are in place for support for local fire and ambulance services. Procedures are in place to allow for the access and the radiation protection requirements of off-site support staff responding to the site…” Section 7.2.1.4 describes the responsibilities of the Safety Section Chief which includes: The Safety Section Chief is responsible to ensure that source term survey data and off-site survey results are collected and communicated to the Province, redeployment of off-site survey teams at Provincial request, on-site exposure control and management, recommending on-site protective actions, guidance on any radiological casualties, radiological or hospital support, on-site dose consequence assessment, radiation protection services, contamination control strategies, approval of exposure permits as needed and radiological habitability of EMC. BP-PLAN-00001 Section 4.2.6 identifies of the BPNERP the establishment of the Emergency Worker Centre to monitor and control the exposure of external emergency workers who may be required to enter areas affected by radiation. This is supported by various emergency response procedures, e.g., BP-ERP-00039, Off-site Exposure Control Desk, BP-ERP-00034, Off-Site Centre Monitoring And Decontamination Unit (MDU) Supervisor, and BP-ERP-00060, Emergency Worker Centre Personal Monitoring and Decontamination.	
5.24.	The operating organization shall be responsible for ensuring that appropriate procedures are in place for effectively coordinating and cooperating with all firefighting services involved. Periodic joint fire drills and	BP-PLAN-00006- Conventional Emergency Plan 4.1 Conventional Emergency Response Procedures Preparation and Maintenance Controlled documentation is an essential part of the Conventional Emergency Management plan. These various procedures shall describe the processes, actions and interactions of the persons involved. The procedures shall be used during training and as part of the evaluation of the planned emergency response drills and exercises. Actual emergency response de-briefings	C

Article No.	Article Requirement	Assessment	Compliance Category
	exercises shall be conducted to assess the effectiveness of the fire response capability.	shall also be used as part of the evaluation process. The procedures can also be used for audit purposes and shall provide a basis for controlling changes and modifications to the emergency response capability. All of the various debriefings, evaluations and audits will provide input to procedure changes or revisions. DPT-ERO-00008, Drill Program describes the evaluation process that is internal to the Emergency Services department which provides input to the improvement process. BP-PLAN-00008, Fire Safety Management states: 4.8.2 Emergency and Protective Services (EPS) Fire EPS Fire shall be trained to fight potential fires in all areas on site. Training shall include initial classroom instruction followed by periodic classroom instruction, fire-fighting practice and site fire drills. 4.8.3 Offsite Fire Department Training shall be available to the local fire department staff to delineate responsibilities and duties and operational precautions when fighting fires on site. Where practical, the training of the local fire department should be coordinated with EPS Fire. 4.5.1 Notification and Response Documentation shall address: 1. Actions to be taken by an individual discovering a fire, such as, notification of the Control Room and/or attempting to extinguish a fire. 2. Actions to be taken by the Control Room Operator upon report of a fire or receipt of an alarm on a Control Room annunciator panel, such as announcing the location of fire over the Public Address (PA) system, sounding the Emergency Response Team Tone and notifying Emergency and Protective Services (EPS) Fire of the type, size and location of the fire. 3. Actions to be taken by EPS Fire after notification by the Control Room operator of a fire Include the location for EPS Fire to assemble to determine the fire-fighting strategy and type of fire-fighting equipment to be used for the hazard involved. 4. Actions to be taken to coordinate fire-fighting activities with off-site fire departments, including: Identification of an individual who assesses the situation and calls in outside fire department	

Article No.	Article Requirement	Assessment	Compliance Category
		assistance when needed. Identification of an individual who will coordinate the fire-fighting activities when aided by off-site fire fighting organizations. Provisions for training off-site fire department personnel in basic radiation principles, typical radiation hazards and precautions to be taken for a fire involving radioactive materials in the plant. 5. Actions to be taken by the Operations Staff to make off-site notification as required by the Emergency Plan. 6. Specific guidance is given in BP-PROC-00059, Event Response and Reporting.	
5.25.	Fire protection systems and firefighting systems shall be designed to ensure that damage to, or inadvertent operation of, these systems does not significantly impair the capabilities of the structures, systems and components necessary for safe shutdown.	Design requirements for fire protection systems and firefighting systems is governed by CSA N293-07 which provides the minimum fire protection requirements for the design, construction, commissioning, operation, and decommissioning of CANDU NPPs. A recent review of the Bruce Power Fire Protection Program against CSA N293-07 has been performed) to satisfy a commitment to the CNSC to provide an assessment of the Fire Protection Program at Bruce A/B including the alignment with Fire Protection Codes and Standards. The review concluded that CSA N293-07 is being complied with, and that Bruce Power regularly submits progress reports regarding the transition to N293-07.	C
Requirement 23: Non-radiation-related safety	The operating organization shall establish and implement a programme to ensure that safety related risks associated with non-radiation-related hazards to personnel involved in activities at the plant are kept as low as reasonably achievable.	Assessed in detail under Article 5.26. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-00.06, Health and Safety Management which states: "1.0 Purpose This program document defines the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with Occupational Health and Safety (OHS) Management. The objective of OHS Management is to oversee the planning, implementation, maintenance, and continual improvement of business processes, activities, and human behaviors which contribute to the achievement of worker health and safety and conform to the goals of Bruce Power's Occupational Health and Safety Policy, as defined in BP-MSM-1, Management System	C

Article No.	Article Requirement	Assessment	Compliance Category
		Manual. Bruce Power has adopted the Occupational Health and Safety Assessment Series (OHSAS) 18001:2007 standard as the framework for managing its Occupational Health and Safety Management System (OHSMS). The overall Bruce Power Occupational Health and Safety Management System conforms to the Canadian Nuclear Safety Commission (CNSC) regulatory standards CSA N286-05 clause 6.27 Workplace Safety." "4.4.6 Operational Control Bruce Power governs all activities by 5 corporate values. The first value is “Safety First”. We embrace and practice strong nuclear safety principals, recognizing that reactor safety, conventional safety, radiation safety, and environmental safety are essential to the successful achievement of our goals. Therefore, when hazards are associated with operations or other activities, actions will be taken at all business levels to ensure appropriate controls are in place and maintain employee safety and well being as stated in the OHS Policy. Documented procedures and inputs have been established and maintained to cover situations where their absence could lead to deviations from the OHS Policy and established OHS objectives." Within the Program is Procedure BP-PROC-00389 Conventional Safety Programs which states: "1.0 Purpose The objective of this procedure is to provide overview information on the key responsibilities, functions and process map for the Conventional Safety Programs Section. This section operates under the Plan, Do, Check, and Review, Occupational Health and Safety Management Model."	
5.26.	The non-radiation-related safety programme^2 shall include arrangements for the planning, implementation, monitoring and review of the relevant preventive and protective measures, and it shall be integrated with the nuclear and radiation safety programme. All personnel, suppliers, contractors and visitors (where appropriate) shall be trained and shall possess the	BP-PROG-00.06, Health and Safety Management states: "1.0 Purpose This program document defines the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with Occupational Health and Safety (OHS) Management. The objective of OHS Management is to oversee the planning, implementation, maintenance, and continual improvement of business processes, activities, and human behaviors which contribute to the achievement of worker health and safety and conform to the goals of Bruce Power’s Occupational Health and Safety Policy, as defined in BP-MSM-1, Management	C

Article No.	Article Requirement	Assessment	Compliance Category
	necessary knowledge of the non-radiation-related safety programme and its interface with the nuclear and radiation safety programme, and shall comply with its safety rules and practices. The operating organization shall provide support, guidance and assistance for plant personnel in the area of non-radiation-related hazards. 2 Non-radiation-related safety concerns hazards other than radiation related hazards; this is sometimes referred to as industrial safety or conventional safety.	System Manual. Bruce Power has adopted the Occupational Health and Safety Assessment Series (OHSAS) 18001:2007 standard as the framework for managing its Occupational Health and Safety Management System (OHSMS). The overall Bruce Power Occupational Health and Safety Management System conforms to the Canadian Nuclear Safety Commission (CNSC) regulatory standards CSA N286-05 clause 6.27 Workplace Safety." "4.4.6 Operational Control Bruce Power governs all activities by 5 corporate values. The first value is “Safety First”. We embrace and practice strong nuclear safety principals, recognizing that reactor safety, conventional safety, radiation safety, and environmental safety are essential to the successful achievement of our goals. Therefore, when hazards are associated with operations or other activities, actions will be taken at all business levels to ensure appropriate controls are in place and maintain employee safety and well being as stated in the OHS Policy. Documented procedures and inputs have been established and maintained to cover situations where their absence could lead to deviations from the OHS Policy and established OHS objectives." All aspects of health and safety management are implemented via two sets of programs/procedures: 1. General programs/procedures covering both nuclear and conventional safety such as: BP-PROC-00596 Occupational Health and Safety Hazards and Risk Assessment Registry and Applicable Legal Requirements Identification BP-PROC-00617 Human Performance Tools for Workers BP-PROG-00.07 Human Performance Program BP-PROG-14.02 Contractor Management BP-SM-00064 Job Safety Analysis BP-SM-00070 Bruce Power Safety Rules BP-WPP series Work Protection Procedure 2. Hazard specific procedures:	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00306 Chemical Risk Management Procedure BP-PROC-00379 Employee Wellness BP-PROC-00389 Safety Manuals BP-PROG-08.01 Emergency Measures Program BP-PROG-08.02 Nuclear Security BP-PROG-12.05 Radiation Protection Programs BP-SM-00070 Bruce Power Safety Rules CTP series- Common Technical Procedures NK document series- Operating Manuals "4.4.3 Competence, Training and Awareness Human Resources Division ensures qualified and/or appropriate applicants are recommended for hire for positions at Bruce Power as per BP-PROG-02.01, Worker Staffing. Training Division has overall accountability for coordinating all training activities. Personnel assigned to perform specific tasks are qualified and competent on the basis of appropriate knowledge, training, and experience. The systematic approach to training is the core process used for the development of training. This process is defined in BP-PROG-02.02, Worker Training and Qualification. Contract staff are; competent, trained and aware as per the responsibility of the contract manager as documented in BP-PROG-14.02, Contractor Management, and Visitors are sponsored while on site by a competent employee." "7.4 OHSMS Representative 7.4.1 Ensure an OHSAS 18001 compliant OHSMS is implemented and maintained as part of the BP-MSM-1, Bruce Power Management System. 7.4.2 Ensures adequate resources to achieve safety objectives, and measures established for Bruce Power.	

Article No.	Article Requirement	Assessment	Compliance Category
		7.4.3 Responsible for the management review process. 7.4.4 Recommend objectives and targets and associated OHSMS programs, and ensure appropriate Senior Management approves annual objectives. 7.5 Conventional Safety Programs Department Manager 7.5.1 Act as the CFAM for Conventional Safety Programs. 7.5.2 Ensure OHSMS is properly implemented, maintained, and performing to requirements. 7.5.3 Report on safety performance as part of the OHS Management Review. 7.5.4 Provide guidance on OHS requirements. 7.5.5 Ensure OHS standards and requirements, meet or exceed regulatory requirements. 7.5.6 Ensure system is in place to identify, interpret, and communicate OHS regulatory requirements (Federal, Provincial and Municipal) and other commitments. 7.5.7 Ensure audits and assessment of Bruce Power activities are conducted to ensure they are performed consistent with applicable laws, regulations, regulatory commitments, license and other requirements. 7.5.8 Ensure audits and assessments of the OHS are carried out on a routine basis to ensure the OHS meets the requirements of OHSAS 18001. 7.5.9 Recommend objectives and targets and associated OHSMS programs. 7.6 Safety Support Department 7.6.1 Act as the Conventional Safety SFAM for area of support. 7.6.2 Provide line management support for safety rules, safety procedures, safety legislation or other safety related interpretations/evaluations/deviations." BP-PROG-14.02 Contractor Management provides guidance to Bruce Power employees managing contractors who are performing work for Bruce Power. It is to ensure work is executed per contractual documents and in accordance with applicable procedures, planned budgets and schedules and in conformance with Bruce Power's requirements for worker health and safety according to BP-PROG-00.06, Health and Safety Management and within expectations for nuclear safety (radiological safety, industrial safety, reactor safety, environmental safety).	

Article No.	Article Requirement	Assessment	Compliance Category
		Contract Manager/Officer ensures the contractor's personnel are qualified and trained to perform the work assigned including any additional risk based training that may be required for specific tasks.	
Requirement 24: Feedback of operating experience	The operating organization shall establish an operating experience programme to learn from events at the plant and events in the nuclear industry and other industries worldwide.	Assessed in detail under Articles 5.27 through 5.33. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-01.06, Operating Experience Program which states: "1.0 Purpose Bruce Power's management model for achieving excellence describes our vision, values, key results areas, policies, programs and procedures. It defines how we execute, how we manage performance, and how we assess results. Central to this is fostering a healthy safety culture and being recognized for excellence in all aspects of nuclear safety including reactor safety, radiation safety, industrial safety and environmental safety management. The objective of the Bruce Power Operating Experience Program is to define the processes used to identify and capture lessons learned from sources within Bruce Power, and external to Bruce Power, in order to continuously improve performance by making improvements to Processes/Procedures, Training, or System/Equipment Design. This fosters a healthy nuclear safety culture in all aspects including reactor safety, radiation safety, industrial safety and environmental safety management."	C
5.27.	The operating organization shall establish and implement a programme to report, collect, screen, analyse, trend, document and communicate operating experience at the plant in a systematic way. It shall obtain and evaluate information on relevant operating experience at other nuclear installations to draw lessons for its own operations. It shall also encourage the exchange of experience within	BP-PROG-01.06, Operating Experience Program states: "4.0 Program Description Bruce Power operating licenses contain requirements to comply with CSA Standard "N286-05: Management System Requirements for Nuclear Power Plants". The sections of the Standard which apply to the Operating Experience Program are: Section 5.6 - Experience is sought, shared, and used. Experience gained from the nuclear industry shall be shared and used to make improvements. Section 5.11 - Problems are identified and resolved. Section 5.14.1 - Self-assessment.	C

Article No.	Article Requirement	Assessment	Compliance Category
	national and international systems for the feedback of operating experience. Relevant lessons from other industries shall also be taken into consideration, as necessary.	The goal of this program is to implement processes at Bruce Power to meet the requirements of the CSA Standard by making improvements via; Processing Internal and External Operating Experience information, conducting Focus Area Self Assessments, Benchmarking others, and by attending industry Conferences and Workshops. 4.1 Processing External and Internal Operating Experience (BP-PROC-00062) The objectives of processing External and Internal OPEX are: 1. To use external operating experience information to identify, evaluate and apply lessons learned to improve plant safety, reliability and commercial performance through improvements to processes, procedures, training, and system/equipment design. 2. Communicate internal experience from the Bruce Site to others in the industry in order to improve nuclear plant safety, reliability, and commercial performance around the world. 4.1.1 Internal Operating Experience Special attention must be given to identifying useful internal OPEX and sharing the lessons learned across the Bruce Site and with the nuclear industry. Bruce Power is obligated to submit internal event information to the industry. This is usually accomplished with a WANO WER Report and a COG OE database posting, which are prepared and posted to WANO and to COG. Reports are prepared for event information that is identified as potentially useful to others in the nuclear industry. The process for screening, preparing, and issuing OPEX reports to the industry is described in BP-PROC-00062. Once posted to the industry, these reports then re-enter Bruce Power for screening along with other external OPEX, via processes also described in BP-PROC-00062. In this way Bruce Power events which get shared externally, also get screened along with external OPEX, by any potentially applicable work groups at Bruce Power regardless of the specific source of the OPEX on site. In addition, procedure BP-PROC-00518, Root Cause Investigation, requires as part of the resulting corrective action plans, assignment actions to produce a one or two page Lessons Learned briefing to; a) be published in all site Management Leadership Meeting agendas, and b) be archived on the OPEX web pages under Internal OPEX. 4.1.2 External Operating Experience	

Article No.	Article Requirement	Assessment	Compliance Category
		4.1.2.1 WANO Significant Operating Experience Reports (SOERs). WANO produces SOERs which are of much importance to the industry. There are also non-SOER industry analysis recommendations which WANO treats as equivalent to SOER recommendations. These are titled with other terms since they were issued prior to the existence of WANO SOERs (prior to ~1999). WANO Atlanta Centre (WANO-AC) monitors all SOER-level recommendations and maintains a list of those which are of ongoing concern to the industry. This list is called the WANO-AC SOER and Selected Recommendations list. The process for managing WANO SOER and Select List items is described in BP-PROC-00062. 4.1.2.2 Other External OPEX Screening and evaluations are carried out on types of external operating experience other than WANO SOERs. COG OE records, INPO Experience Reports (IERs), WANO Event Reports (WERs), United States Department of Energy reports, EPRI reports, and others, may require evaluation depending on applicability to Bruce Power processes, training, or equipment/system design. External OPEX identified as applicable to Bruce Power can lead to the initiation of documented actions. The actions may be to; a) initiate a Station Condition Record as per BP-PROG-01.07, Corrective Action, (specifically BP-PROC-00060, Station Condition Record Process), b) initiate action tracking assignments using BP-PROC-00019, Action Tracking or, c) creating Training Change Requests as per procedures associated with BP-PROG-02.02, Worker Training and Qualification. The process for screening and evaluating external OPEX and for creating documented actions when applicable is described in BP-PROC-00062.	
5.28.	Events with safety implications shall be investigated in accordance with their actual or potential significance. Events with significant implications for safety shall be investigated to identify their direct and root causes, including causes relating to equipment design, operation and	Investigation of events with safety implications are covered under BP-PROG-01.07 Corrective Action. The objective of the Corrective Action Program is to identify and eliminate or mitigate adverse conditions that have resulted in or could result in loss. BP-PROC-00060 Station Condition Record Process provides the direction for the level of investigations that need to be conducted commensurate with their safety significance of any adverse condition recorded. A number of evaluation methods are employed including root cause investigation, equipment root cause investigation, Apparent Cause Evaluation, Equipment Apparent Cause Evaluation, Common Cause Analysis, A3 Problem Solving Evaluations, Fix	C

Article No.	Article Requirement	Assessment	Compliance Category
	maintenance, or to human and organizational factors. The results of such analyses shall be included, as appropriate, in relevant training programmes and shall be used in reviewing procedures and instructions. Plant event reports and non-radiation-related accident reports shall identify tasks for which inadequate training may be contributing to equipment damage, excessive unavailability of equipment, the need for unscheduled maintenance work, the need for repetition of work, unsafe practices or lack of adherence to approved procedures.	Evaluations, Station Rework Evaluation. Results of the investigation reports include, amongst many others, contribution of tasks for which inadequate training may be contributing to equipment damage, excessive unavailability of equipment, the need for unscheduled maintenance work, the need for repetition of work, unsafe practices or lack of adherence to approved procedures. Corrective action plans to eliminate causes include, as appropriate, relevant training programmes and their use in reviewing procedures and instructions. BP-PROG-01.06, Operating Experience Program states: "4.1.1 Internal Operating Experience The process for screening, preparing, and issuing OPEX reports to the industry is described in BP-PROC-00062. Once posted to the industry, these reports then re-enter Bruce Power for screening along with other external OPEX, via processes also described in BP-PROC-00062. In this way Bruce Power events which get shared externally, also get screened along with external OPEX, by any potentially applicable work groups at Bruce Power regardless of the specific source of the OPEX on site. In addition, procedure BP-PROC-00518, Root Cause Investigation, requires as part of the resulting corrective action plans, assignment actions to produce a one or two page Lessons Learned briefing to; a) be published in all site Management Leadership Meeting agendas, and b) be archived on the OPEX web pages under Internal OPEX." BP-PROC-00062, Processing External and Internal Operating Experience "4.2.5 Root Cause Investigation Lessons Learned Briefings Root Cause Investigations are performed at Bruce Power for more significant adverse conditions as per BP-PROC-00518. Staff at Bruce Power should be able to easily see what was investigated, the facts involved in the condition, the cause/s of the condition, the actions being taken to prevent recurrence, and the lessons learned from the RCI. Most RCI investigation reports are too detailed, lengthy, and specialized for everyday use. RCI Lessons Learned	

Article No.	Article Requirement	Assessment	Compliance Category
		Briefings are excellent alternatives. They are good sources of information for Pre-Job Briefings, MLM self-assessment, sharing of OPEX between site facilities, resources for training material, and any other improvement or error prevention activity. BP-PROC-00518 requires an assignment to SECCAPP for the creation of these Lessons Learned Briefings be added to the corrective action plan of all RCIs. These assignments are to be AEA type, and should be due approximately 60 days after the RCI report is expected to be approved by CARB." 4.2.6 Distributing Lessons Contained In Other Internal Condition Records Internal SCRs which are not evaluated by Root Cause Investigations may also contain useful lessons learned for people who work in various internal departments at various site work locations. In order to provide these Lessons Learned in a format easily used during Pre-Job Briefings, work package preparation, or any other process which strives to improve the way Bruce Power completes its business goals, Internal OPEX Briefings are created, emailed to applicable work groups, and archived on the OPEX web pages. 4.2.10 Getting OPEX into Training One of the main objectives of the OPEX Program is to capture OPEX and transfer lessons learned to staff by making updates and/or improvements to training material. The processes for these activities are described in the suite of implementing procedures associated with BP-PROG-02.02, Worker Training and Qualification."	
5.29.	Information on operating experience shall be examined by competent persons for any precursors to, or trends in, adverse conditions for safety, so that any necessary corrective actions can be taken before serious conditions arise.	BP-PROC-00062, Processing External and Internal Operating Experience states "7.10 Senior OPEX Advisor 7.10.1 PARTICIPATE in the COG Weekly Screening Meeting conference call. 7.10.2 DISTRIBUTE relevant OPEX information to appropriate personnel (typically CAPCOs and SMEs). 7.10.3 REVIEW SCRs and CAPs for applicability and select for external posting. 7.10.4 PROMOTE the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.10.5 PREPARE OPEX reports and products (WERs, ENRs, EARs, JIT Briefings, corporate newsletter articles and the like).	C

Article No.	Article Requirement	Assessment	Compliance Category
		7.10.6 PROVIDE periodic status reports on the OPEX program as requested. 7.10.7 MONITOR the OPEX program performance and effectiveness. 7.10.8 COLLECT and ISSUE OPEX program indicators as required by the program owner. 7.10.9 TRAIN, ASSIST, and INTERACT with CAPCOs, SMEs, FLMs and other personnel as required. 7.10.10 ASSIST personnel with Bruce Power investigations and reporting of Bruce Power events. 7.10.11 ASSIST personnel with evaluation of external OPEX. 7.10.12 MAINTAIN the OPEX program consistent with industry standards and guidelines. 7.10.13 REVIEW industry website pages to ensure that applicable OPEX is being received. 7.10.14 ADMINISTER the CSM process and ensure results are appropriately documented." Also refer to: "APPENDIX I: External OPEX Evaluation Table"	
5.30.	As a result of the investigation of events, clear recommendations shall be developed for the responsible managers, who shall take appropriate corrective actions in due time to avoid any recurrence of the events. Corrective actions shall be prioritized, scheduled and effectively implemented and shall be reviewed for their effectiveness. Operating personnel shall be briefed on events of relevance and shall take the necessary corrective actions to make their recurrence less	BP-PROC-00060, Station Condition Record Process section 4.7.1 requires; All corrective actions assigned must be agreed to by the assigned organization (including the assignment type and due date). The name of the person accepting the assignment is included in the assignment description Assignments will be SMART: SPECIFIC - The level of detail should be such that the individual who is assigned to carry out the action or meet the expectation can understand each step, task, action or behaviour required to effectively implement the action or expectation. MEASURABLE - The desired outcome or behaviour should be clearly described such that it can be seen physically (during an observation), or the physical outcome will be obvious when the action has been completed. ACHIEVABLE - The action owner has direct responsibility for the program impacted and accountability and authority to complete the action.	C

Article No.	Article Requirement	Assessment	Compliance Category
	likely.	REALISTIC - The action should strike a balance between the value of the action and the resources required to implement it. TIMELY - Time at risk needs to be managed by implementing actions which are commensurate with the significance of the problem, the resources required to complete the action, and based on interim actions currently in place. BP-PROC-00518 Root Cause Investigation section 4.3.5 requires corrective action to be developed with due consideration to: SMART Corrective Actions as defined in BPPROC-00060, Station Condition Records Corrective Action Risk Assessment to determine whether or not any new hazards or adverse conditions will be introduced into the workplace when the corrective actions have been completed. Each corrective action will be reviewed with a Manager from the fixing organization, work area owner, Safety Specialist, etc., (as appropriate to the corrective action). Conducting a Time at Risk assessment to evaluate the risk (likelihood and consequences that the station or corporation will sustain until the Corrective Actions to Prevent Recurrence (CAPR)s have been implemented and with a view to the mitigation strategy provided by the interim actions). Determine whether training is the cause. When line and Training Management are uncertain as to whether a training intervention corrective action is required or when Line and Training Management cannot agree on a training intervention corrective action, a Request for Performance Analysis Services and Training (REPAST) in accordance with BP-PROC-00175, Training Needs Analysis will be completed. A REPAST is a robust tool designed to systematically arrive at training and non-training intervention recommendations. Develop CAPR & Action Acceptance. Where a variety of possible corrective actions exist, the corrective actions should strike a balance among resources required for implementation, the effectiveness of corrective action, the permanence of corrective actions, cost vs. benefit, and level of significance (risk) of the event/incident. For each root cause, contributing cause, extent of condition and extent of cause the team identifies the best organization to correct the issue. Actions to address root causes are to be identified as “Corrective Actions to Prevent Recurrence” (CAPR) in the investigation report. The investigation report employs a table to document each CAPR action. The table has 5 discrete components: a header section to	

Article No.	Article Requirement	Assessment	Compliance Category
		document administrative details of the CAPR, a Root Cause section, a CAPR Description section, a Challenge & Success Criteria for the CAPR section, and a Method of Verifying the Challenge & Success Criteria for the CAPR section. BP-PROC-00062, Processing External and Internal Operating Experience states: "7.0 Responsibilities 7.1 Chief Executive Officer, Chief Nuclear Officers, Executive Vice Presidents and Vice Presidents 7.1.1 PROMOTE a culture of learning in which the daily use of OPEX information is considered beneficial and important for achieving and maintaining excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.2 Bruce A and Bruce B Plant Managers 7.2.1 ESTABLISH the culture of learning in which OPEX information is considered beneficial and vital for maintaining excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.2.2 REVIEW new SERs and WANO SOERs provided by Senior OPEX Advisors and appoint LTOs for evaluations. 7.3 Department Managers 7.3.1 COMMUNICATE department expectations for the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.3.2 IMPLEMENT processes to support the OPEX program, and ensure integration of OPEX information into department work programs. 7.3.3 PROVIDE the resources necessary to support the OPEX program. 7.3.4 PROVIDE the correct oversight of SOER and SER evaluations, and indicate 7.3.5 REINFORCE the use of OPEX information (examples: during pre-job and pre-evolution briefings, training activities, engineering reviews, self-assessment or self-evaluation activities).	

Article No.	Article Requirement	Assessment	Compliance Category
		7.4 Section Manager - Performance Improvement 7.4.1 REVIEW industry analysis documents such as SOERs in order to be cognizant of contained information, lessons, and recommendations. 7.4.2 IMPLEMENT and MONITOR the OPEX program. 7.4.3 PROMOTE the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.5 Other Section Managers 7.5.1 COMMUNICATE expectations for the use of OPEX information and promote the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety 7.5.2 REINFORCE the use of OPEX information, (examples: during pre-job and pre-evolution briefings, training activities, engineering reviews, self-assessment or self-evaluation activities). 7.5.3 RECOGNIZE examples of the effective use of OPEX. 7.5.4 PROVIDE the resources necessary to support the OPEX program. 7.5.5 IDENTIFY corrective actions in response to OPEX information and implement the actions in a timely manner. 7.6 Corrective Action Program Coordinator (CAPCO) 7.6.1 SUPPORT their applicable area line managers (at all levels), in incorporating the use of OPEX in their departments by assisting staff to use OPEX and lessons learned on a daily basis, in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.6.2 PROVIDE notable OPEX applicable to their area/s to line managers for use in forums such as; section meetings, safety meetings, work group meetings or other group functions. 7.6.3 DISTRIBUTE applicable new OPEX products, reports, or analysis to Staff in their area/s. 7.6.4 ENSURE the people in their area/s are aware of, and know how to find and use OPEX, using the Bruce Power OPEX web page, WANO, INPO, EPRI, or COG web pages. The desktop guides located on the OPEX web page are a valuable tool to use for this. 7.6.5 SCREEN external OPEX information received and route for applicability reviews to SMEs	

Article No.	Article Requirement	Assessment	Compliance Category
		in their sections. 7.6.6 PROVIDE applicability review results to the OPEX Senior Advisor. 7.7 Supervisors (CRSSs, FLMs, SOSs, UTLs, SNOs, CROs, SERMs, etc.) 7.7.1 PROMOTE the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.7.2 UNDERSTAND what OPEX is, how to obtain it, and how it is used to prevent events. 7.7.3 MAINTAIN AWARENESS and seek out current OPEX information from the OPEX web site, the SCR database, or from any other applicable source. 7.7.4 ENCOURAGE the use of OPEX information whenever possible in Pre-Job Briefings, (example, personnel recalling pertinent information that could prevent similar problems that day). 7.7.5 ENCOURAGE their personnel to identify the need for more useful, more applicable OPEX information to their CAPCO or to the OPEX organization when the need arises. 7.7.6 RECOGNIZE examples of the effective use of OPEX. Forward these examples to personnel in the OPEX section. 7.8 FIN Team Supervisors 7.8.1 ENSURE applicable OPEX information is included in FIN team work planning and preparation. 7.9 Task Planners (Assessors) 7.9.1 INCLUDE OPEX documents such as; Bruce Power OPEX JITs, Lessons Learned Briefings, Bruce Power SCRs, COG products, WANO-INPO products, supervisor briefing cards, maintenance bulletins, etc., into Work Packages as per BP-PROC-00543, Task Planning. 7.9.2 REQUEST OPEX information from the respective SME, CAPCO or SA, when having difficulty finding applicable and useful information for work packages. 7.10 Senior OPEX Advisor 7.10.1 PARTICIPATE in the COG Weekly Screening Meeting conference call. 7.10.2 DISTRIBUTE relevant OPEX information to appropriate personnel (typically CAPCOs and SMEs).	

Article No.	Article Requirement	Assessment	Compliance Category
		7.10.3 REVIEW SCRs and CAPs for applicability and select for external posting. 7.10.4 PROMOTE the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety. 7.10.5 PREPARE OPEX reports and products (WERs, ENRs, EARs, JIT Briefings, corporate newsletter articles and the like). 7.10.6 PROVIDE periodic status reports on the OPEX program as requested. 7.10.7 MONITOR the OPEX program performance and effectiveness. 7.10.8 COLLECT and ISSUE OPEX program indicators as required by the program owner. 7.10.9 TRAIN, ASSIST, and INTERACT with CAPCOs, SMEs, FLMs and other personnel as required. 7.10.10 ASSIST personnel with Bruce Power investigations and reporting of Bruce Power events. 7.10.11 ASSIST personnel with evaluation of external OPEX. 7.10.12 MAINTAIN the OPEX program consistent with industry standards and guidelines. 7.10.13 REVIEW industry website pages to ensure that applicable OPEX is being received. 7.10.14 ADMINISTER the CSM process and ensure results are appropriately documented. 7.11 All Staff 7.11.1 COMPLETE OPEX CBT 25663, Introduction To OPEX.7.11.2 USE OPEX information to increase safety and reliability in routine and non-routine situations (pre-job briefs, infrequently performed tests or evolutions, planning work, initial and continuing training and self-assessments, Root Cause Investigations and apparent cause evaluations, etc.). 7.11.3 PROMOTE the use of OPEX in order to maintain excellence in Nuclear Safety Culture including reactor safety, radiation safety, industrial safety and environmental safety."	
5.31.	The operating organization shall be responsible for instilling an attitude among plant personnel that encourages the reporting of	BP-PROC-00062, Processing External and Internal Operating Experience states: "4.2 Nuclear Safety Culture and OPEX at Bruce Power 4.2.1 Learning From OPEX Information and Supporting a Healthy Nuclear Safety Culture is	C

Article No.	Article Requirement	Assessment	Compliance Category
	all events, including low level events and near misses, potential problems relating to equipment failures, shortcomings in human performance, procedural deficiencies or inconsistencies in documentation that are relevant to safety.	Everyone's Responsibility at Bruce Power. The Traits of a Healthy Nuclear Safety Culture include: Personal accountability Questioning attitude Effective safety communication Leadership safety values and actions Decision-making Respectful work environment Continuous learning Problem identification and learning Environment for raising concerns Work processes In order to achieve these behaviors with respect to the OPEX processes, it is recommended that all personnel at Bruce Power should: COMPLETE CBT 25663, Introduction To OPEX. SEEK OPEX that is available. When reviewing OPEX for applicability at Bruce Power, take the approach, "How can this lesson apply here," rather than "Why this lesson does not apply here." SEND OPEX to required users in a timely fashion. COMMUNICATE internal lessons learned to the site. Lessons Learned can originate from Plant Evolutions, Outages, High Risk Evolutions, or Post-Job Critiques. SEND OPEX to other Bruce Power work groups (including the OPEX group who can aid in dissemination). INCORPORATE OPEX into Procedures, Training Material, and System/Component Design, and ensure it is "bases captured" to ensure these valuable lessons are not unwittingly removed at a	

Article No.	Article Requirement	Assessment	Compliance Category
		future date without appropriate review." P-PROC-00060, Station Condition Record Process states: "4.1 SCR Initiation Management supports the Corrective Action Process, by encouraging effective problem Station Condition Record (SCR) identification and correction. PEL 66063, Passport V10 - Station Condition Record (SCR) Process - CBT, provides guidance on initiating and processing SCRs and is available to all staff. An SCR is initiated promptly to document all adverse conditions."	
5.32.	The operating organization shall maintain liaison, as appropriate, with support organizations (manufacturers, research organizations and designers) involved in the design, in order to feed-back information on operating experience and to obtain advice, if necessary, in the event of equipment failure or in other events.	Liaison with support organizations are maintained, as appropriate, in support of root cause investigations and corrective action plans as described in section 5.30 above. BP-PROG-01.06, Operating Experience Program states: "4.0 Program Description Bruce Power operating licenses contain requirements to comply with CSA Standard “N286-05: Management System Requirements for Nuclear Power Plants”. The sections of the Standard which apply to the Operating Experience Program are: Section 5.6 - Experience is sought, shared, and used. Experience gained from the nuclear industry shall be shared and used to make improvements. Section 5.11 - Problems are identified and resolved. Section 5.14.1 - Self-assessment. The goal of this program is to implement processes at Bruce Power to meet the requirements of the CSA Standard by making improvements via; Processing Internal and External Operating Experience information, conducting Focus Area Self Assessments, Benchmarking others, and by attending industry Conferences and Workshops. 4.1 Processing External and Internal Operating Experience (BP-PROC-00062) The objectives of processing External and Internal OPEX are: 1. To use external operating experience information to identify, evaluate and apply lessons learned to improve plant safety, reliability and commercial performance through improvements to	C

Article No.	Article Requirement	Assessment	Compliance Category
		processes, procedures, training, and system/equipment design. 2. Communicate internal experience from the Bruce Site to others in the industry in order to improve nuclear plant safety, reliability, and commercial performance around the world. 4.1.1 Internal Operating Experience Special attention must be given to identifying useful internal OPEX and sharing the lessons learned across the Bruce Site and with the nuclear industry. Bruce Power is obligated to submit internal event information to the industry. This is usually accomplished with a WANO WER Report and a COG OE database posting, which are prepared and posted to WANO and to COG. Reports are prepared for event information that is identified as potentially useful to others in the nuclear industry. The process for screening, preparing, and issuing OPEX reports to the industry is described in BP-PROC-00062. Once posted to the industry, these reports then re-enter Bruce Power for screening along with other external OPEX, via processes also described in BP-PROC-00062. In this way Bruce Power events which get shared externally, also get screened along with external OPEX, by any potentially applicable work groups at Bruce Power regardless of the specific source of the OPEX on site. In addition, procedure BP-PROC-00518, Root Cause Investigation, requires as part of the resulting corrective action plans, assignment actions to produce a one or two page Lessons Learned briefing to; a) be published in all site Management Leadership Meeting agendas, and b) be archived on the OPEX web pages under Internal OPEX. 4.1.2 External Operating Experience 4.1.2.1 WANO Significant Operating Experience Reports (SOERs). WANO produces SOERs which are of much importance to the industry. There are also non-SOER industry analysis recommendations which WANO treats as equivalent to SOER recommendations. These are titled with other terms since they were issued prior to the existence of WANO SOERs (prior to ~1999). WANO Atlanta Centre (WANO-AC) monitors all SOER-level recommendations and maintains a list of those which are of ongoing concern to the industry. This list is called the WANO-AC SOER and Selected Recommendations list. The process for managing WANO SOER and Select List items is described in BP-PROC-00062.	

Article No.	Article Requirement	Assessment	Compliance Category
		4.1.2.2 Other External OPEX Screening and evaluations are carried out on types of external operating experience other than WANO SOERs. COG OE records, INPO Experience Reports (IERs), WANO Event Reports (WERs), United States Department of Energy reports, EPRI reports, and others, may require evaluation depending on applicability to Bruce Power processes, training, or equipment/system design. External OPEX identified as applicable to Bruce Power can lead to the initiation of documented actions. The actions may be to; a) initiate a Station Condition Record as per BP-PROG-01.07, Corrective Action, (specifically BP-PROC-00060, Station Condition Record Process), b) initiate action tracking assignments using BP-PROC-00019, Action Tracking or, c) creating Training Change Requests as per procedures associated with BP-PROG-02.02, Worker Training and Qualification. The process for screening and evaluating external OPEX and for creating documented actions when applicable is described in BP-PROC-00062.	
5.33.	The operating experience programme shall be periodically evaluated to determine its effectiveness and to identify any necessary improvements.	BP-PROG-01.06, Operating Experience Program states: "4.0 Program Description The goal of this program is to implement processes at Bruce Power to meet the requirements of the CSA Standard by making improvements via; Processing Internal and External Operating Experience information, conducting Focus Area Self Assessments, Benchmarking others, and by attending industry Conferences and Workshops." BP-PROC-00137, Focus Area Self-Assessment states: "The Focus Area Self-Assessment (FASA) process is a tool that focuses on specific areas of a Functional Area's activities, processes or performance. It is used by Functional Areas to assess the adequacy and effective implementation of their programs. The results of the assessment are then compared with business needs, the management system, industry standards of excellence and regulatory/statutory or other legal requirements. Focus Area Self Assessments are an integral part of continuous improvement. This procedure provides for the planning, preparation, execution, reporting and tracking of performance improvement opportunities identified during FASAs. The primary outputs of this process are FASA Reports that:	C

Article No.	Article Requirement	Assessment	Compliance Category
		Identify internal strengths and best practices. Identify performance and/or programmatic gap(s) as compared to targets, governance standards and “best in class”. Identify the extent to which established processes are being adhered to and whether the desired level of quality is being achieved. Identify adverse conditions and opportunities for improvement. Identify the specific improvement corrective actions that will be taken to close the performance/programmatic gap." OPEX Program is also audited in accordance with BP-PROC-00635 Audits.	
6.		Plant Commissioning	NA
Requirement 25: Commissioning programme	The operating organization shall ensure that a commissioning programme for the plant is established and implemented.	"Requirement 25: Commissioning programme" are evaluated as applicable to an operating plant in the context of design changes or modifications. Current Bruce Power governance does not cover commissioning of a new plant or a plant undergoing refurbishment or a long-term outage/lay-up. A separate and comprehensive commission program after a refurbishment or a very long shutdown or lay-up would be implemented given the specific circumstances. Assessed in detail under Articles 6.1 through 6.15. The overarching Bruce Power Program that addresses this requirement is the BP-PROG-10.02, Engineering Change Control which states "4.5 Commissioning Modifications and Projects The Commissioning Modifications and Projects process, as documented in BP-PROC-00615, specifies how commissioning is to be carried out for Bruce Power Structures, Systems, Components and significant Tools. It includes requirements for commissioning planning,	C

Article No.	Article Requirement	Assessment	Compliance Category
		specification, execution, and reporting. The expectation is that commissioning will demonstrate that: Installed systems, equipment and components will perform in accordance with specifications and design intent before they are placed into service. Systems, equipment and components, which were altered to facilitate a change, are returned to their original configuration. Commissioning results are properly documented. Systems, equipment and components are ready for turnover. The Commissioning Modifications and Projects process is owned by the Section Manager, Configuration Management Governance." BP-PROC-00615 Commissioning Modifications and Projects states: "1.0 Purpose This process specifies how commissioning is to be performed for Bruce Power Structures, Systems, Components and significant Tools (SSCT). It includes requirements for commissioning planning, commissioning specification, execution and reporting."	
6.1.	The commissioning programme for the plant shall cover the full range of plant conditions required in the design and the safety case. The results shall be used to demonstrate that the behaviour of the plant as built is in compliance with the design assumptions and the licence conditions. Special attention shall be paid to ensuring that no commissioning tests are performed that might place the plant in an unanalysed condition. Commissioning stages, test	BP-PROG-10.02, Engineering Change Control states "4.5 Commissioning Modifications and Projects The Commissioning Modifications and Projects process, as documented in BP-PROC-00615, specifies how commissioning is to be carried out for Bruce Power Structures, Systems, Components and significant Tools. It includes requirements for commissioning planning, specification, execution, and reporting. The expectation is that commissioning will demonstrate that: Installed systems, equipment and components will perform in accordance with specifications and design intent before they are placed into service. Systems, equipment and components, which were altered to facilitate a change, are returned to	C

Article No.	Article Requirement	Assessment	Compliance Category
	objectives and acceptance criteria shall be specified in such a way that the programme is auditable.	their original configuration. "4.9 Commissioning Report The purpose of the Commissioning Report sub-process is to document the following: Commissioning tasks that were completed. Results obtained versus the acceptance criteria. Note: The commissioning report is prepared and issued on completion of commissioning activities. The expectation is that the report be issued within 60 days after completion of commissioning. However, commissioning results and data are assembled prior to modification being declared AFS. The commissioning report refers to the commissioning specification, indicating the results achieved versus acceptance criteria, deviations from design requirements, outstanding problems or deficiencies, open items and follow-up actions required to correct them. The Requirements Traceability Matrix (Reference: DPT-PDE-00006, Design Plan) shall be used as reference when creating the commissioning report. The criteria for when a formal commissioning report, as a controlled document will be required is detailed in BP-PROC-00539, Appendix B, Step 2.0, Risk Controls. Generally, when a commissioning specification is required, a report will also be required. Refer to Appendix F, Commissioning Report Content for the requirements of a formal commissioning report that would be issued as a controlled document. In its simplest form, a commissioning report is a PASSPORT work report on associated commissioning tasks completed and the results obtained."	
6.2.	The commissioning programme shall provide the operating organization and the regulatory body with the means of identifying the hold points in the commissioning process at which approval may be required prior to continuing to the next stage.	BP-PROC-00615 Commissioning Modifications and Projects states: "APPENDIX B: Commissioning Specification Content 4. Safety Requirements Identify requirements pertaining to personnel safety, encompassing both radiological and conventional health and safety hazards, to be demonstrated, verified or proven by commissioning tests. These requirements may be identified in Design Manuals, Manufacturers Manuals,	C

Article No.	Article Requirement	Assessment	Compliance Category
		Safety Reports, Radiation Regulations, OHSA (e.g., Pre-Start Health and Safety Review) and CNSC or TSSA correspondence. 10. Other Requirements Identify additional requirements not covered under the other sections." "Appendix D: Requirements for Commissioning Instructions In addition to generic requirements specified in applicable reference procedures, the commissioning procedures and instructions shall address the following (where applicable): 1. Commissioning Logic - Various activities (steps), interrelationships and sequence necessary to carry out commissioning. These will address the following: a) Commissioning activities specified by the DCP Modification Outline and/or issued DCN. b) Specifically identified concerns and issues related to commissioning identified during the DCN development and the COMS review for the modification. c) Pre-outage commissioning activities, if required. d) Requirements such as system line-up, or work protection, following completion of commissioning to meet AFS. e) Calibration requirements. f) Commissioning test specifications (including tolerances). g) Technical Standards and Safety Authority notification requirements" As stated in BP-PROC-00615 Section 4.1 Commissioning Planning, The FTL consults with stakeholders (conduct a meeting if necessary), to establish context of commissioning of modification, as follows: Scope of modification Risk Classification and Controls (Reference: (BP-PROC-00539, Appendix B) Safety Quality	

Article No.	Article Requirement	Assessment	Compliance Category
		Resources Environment Schedule Outage requirements Budget constraints BP-PROC-00539, Design Change Package states the following: "4.6.1 Commissioning Planning Commissioning planning typically starts when installation planning starts. It must be completed before installation is complete. Commissioning planning includes, when required, preparation of commissioning objectives, specifications and detailed procedures, instructions and plans. The FTL ensures all stakeholders are consulted (conduct a meeting if necessary), to establish context of commissioning of change, as follows: Scope of change. Risk Assessment. Safety. Quality. Resources. Environment. Schedule. Outage requirements. All commissioning activities shall be planned with full alignment with the Work Management processes."	

Article No.	Article Requirement	Assessment	Compliance Category
6.3.	The commissioning programme shall be divided into stages. A review of the test results for each stage shall be completed before commissioning is continued to the next stage. On the basis of the review, a judgement shall be made on whether the commissioning programme can proceed to the next stage. Judgements shall also be made on the basis of the review on whether the succeeding stages will be modified as a consequence of the test results, or because some tests in the stage had not been undertaken, or some tests had been undertaken but had not been completed. The results for some stages may be subject to approval by the regulatory body before commissioning can proceed to the next stage.	BP-PROC-00615 Commissioning Modifications and Projects contains: "Appendix A: Process Map" which is broken up into stages as per Field Team Lead responsibilities. "7.1 Field Team Lead 7.1.1 Is responsible for execution and tracking of the following processes using the associated milestones described in BP-PROC-00539: Commissioning Planning Commissioning Specification Commissioning Instructions Commissioning Work Management Training Commissioning Field Activities Commissioning Completion Assurance Field Changes Commissioning Report" See BP-PROC-00539 -Design Change Package details in section "4.6 Commissioning"	C
6.4.	The commissioning programme shall include all the tests necessary to demonstrate that the plant as built and as installed meets the requirements of the safety analysis report and satisfies the design intent and, consequently, that the plant can be safely operated in accordance with the operational limits and	BP-PROC-00615 -Commissioning Modifications and Projects states: "Appendix B: Commissioning Specification Content 4. Safety Requirements Identify requirements pertaining to personnel safety, encompassing both radiological and conventional health and safety hazards, to be demonstrated, verified or proven by commissioning tests. These requirements may be identified in Design Manuals, Manufacturers Manuals, Safety Reports, Radiation Regulations, OHSA (e.g., Pre-Start Health and Safety	C

Article No.	Article Requirement	Assessment	Compliance Category
	conditions.	Review) and CNSC or TSSA correspondence."	
6.5.	Operating and maintenance procedures shall be validated to the extent practicable as part of the commissioning programme, with the participation of future operating personnel.	BP-PROG-03.01 -Document Management states: "4.0 Program Description Changes are controlled: [CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 5.12] a) Before changes are made to processes and associated documents, they are justified and reviewed b) Change requirements, including the reason for changes, are identified and controlled. c) The level and extent of review depends on the scope, complexity or potential impact of a change on safety, commercial or corporate reputation performance. d) Persons reviewing document changes have an adequate understanding of the original and current requirements, to allow assessment of the effect of the change. Normal operating procedures are prepared on how to operate the plant. Abnormal operating procedures are prepared" "4.1.2 Review 1. All Controlled Documents require review during preparation. The degree of review required is dependent upon the extent of revision. Procedures controlling each type of controlled document shall include measures to assure required reviews are completed. It is the Document Owner's responsibility to identify document reviewers. 2. Review provides content review and input by affected workgroups. Reviewers are expected to provide timely response and comment. Reviews and consultations, at a minimum, should involve those individuals with roles and accountabilities identified in the document. Persons reviewing documents and document revisions should have an adequate understanding of the requirements. 3. Review of a revision of a Controlled Document may, at the author's discretion, be restricted to only the portion of the Controlled Document revised.	C

Article No.	Article Requirement	Assessment	Compliance Category
		4. Review to confirm compliance with licensing, legal, regulatory, quality assurance requirements, safety, etc., may involve the checking of complete Controlled Document (except for large manual type Controlled Documents, such as Station Operating Manuals, Emergency Manuals, etc., where part revisions are permitted). 5. Reviewers shall assess the business impact, including resources to ensure requirements of the Controlled Document can be met. 6. The author shall respond to the reviewer's comments. The Document Owner shall resolve any disagreements. 7. Validation is a formalized process for demonstrating functional adequacy and usability of a procedure. Validation is not mandatory but at the author's discretion for General Procedures. Station Systems procedures are validated based on established criteria." BP-PROC-00615 -Commissioning Modifications and Projects states: "4.3 Commissioning Instructions 2. CONSULT with appropriate personnel as required, such as Station Engineering, Plant Design Engineering, Maintenance, Operations, Equipment Life Cycle Engineering, and Safety and Environment, for input in developing requirements, logic, and commissioning instructions. 4. ENSURE the appropriate technical verification, stakeholder reviews and approvals of the commissioning instructions and procedures are complete." BP-OPP-00002 -Operating Policies and Principles - Bruce A states: "2. Modifications to Procedures Prior approval of the CNSC shall be required for modifications to procedures in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence. Modifications to all operating procedures and to maintenance procedures for safety related systems shall be controlled to ensure that the changes do not render the current licensing submissions invalid. To comply with this principle, modifications to those procedures shall be	

Article No.	Article Requirement	Assessment	Compliance Category
		subject to the following policies: a) Prior approval of the Senior Operations Authority shall be required for modifications to operating or maintenance procedures which could adversely affect the assessment of public risk as stated in current licensing submissions. b) Shift Manager approval shall be required for planned deviations from approved operating procedures or from approved maintenance procedures for safety related systems, except as allowed under Clause c). c) In order to minimize the impact on the health and safety of station staff and the public, on environmental protection or on national security, the Control Room Shift Supervisor may approve deviations from approved operating procedures for safety related systems if the Shift Manager is not available in a timely manner to approve the deviations."	
6.6.	Suitably qualified operations personnel shall be directly involved in the commissioning process. Operating personnel and plant technical staff shall be involved in the commissioning process to the extent necessary to ensure proper preparation for the operational phase.	BP-PROC-00615 -Commissioning Modifications and Projects states: "4.3 Commissioning Instructions 2. CONSULT with appropriate personnel as required, such as Station Engineering, Plant Design Engineering, Maintenance, Operations, Equipment Life Cycle Engineering, and Safety and Environment, for input in developing requirements, logic, and commissioning instructions. 4. ENSURE the appropriate technical verification, stakeholder reviews and approvals of the commissioning instructions and procedures are complete."	C
6.7.	The commissioning programme shall be sufficiently comprehensive as to provide reference data to characterize structures, systems and components. Such reference data shall be retained as they are important for ensuring the safety of the plant and for subsequent safety reviews.	BP-PROC-00615 -Commissioning Modifications and Projects states: "Appendix B: Commissioning Specification Content 2. Performance Requirements (for both Standard and Non-Standard operating conditions) States the modification design requirements and objectives to be measured or proven, allowable deviations, design limitation and assumptions that require validation. Will be validated by demonstrating that the equipment or system has been installed as designed and performs as specified. The Requirements Traceability Matrix (Reference: DPT-PDE-00006, Design Plan) shall be used as reference when creating the commissioning specification documents."	C

Article No.	Article Requirement	Assessment	Compliance Category
		DPT-PDE-00006 -Design Plan states: "Requirements Traceability is achieved by including the information required for the following sections: Basis - This section references the document(s) and section(s) that provide the reason or need for the requirement, and is usually the step or section number of the parent design requirements. It may originate from a Design Input, design manual, operational safety requirements, or other engineering or project documentation. This section is completed when the RTM is initiated, and if additional requirements are identified after the initial requirements baseline, these will be added to the RTM. Requirement - This section references the design requirement section of the design manual and the statement for the functional requirement. This section is completed when the RTM is initiated, but can be added to when additional requirements are identified after the initial design requirement baseline. Example: The system should respond to a change of state input within one millisecond by providing an annunciated alarm. Criteria - This section identifies the testable criteria used to determine that the requirement is met. These criteria should be stated as quantitatively as possible. If the criteria are qualitative, the method for proving the requirement will usually be an engineering analysis. If the criterion is lengthy, a reference to the criteria is acceptable providing that the reference is a controlled document. This section is filled out when the RTM is initiated, AND if additional requirements are identified after the initial design requirement baseline. Additional criteria may be added during the Detailed Design and Implementation phases of project development. Example: Provide alarm within one millisecond of a change of state. Method - This section contains a short statement describing how the criteria will be evaluated, (i.e. via a functional test). This section is filled out when the RTM is initiated; but if additional or alternate methods are required to evaluate the requirement, this section may be altered during later development phases. Design - This section references the Design Documentation and section(s) that detail how this requirement is being met. It is not necessary to restate the design details, since they may be lengthy. Additionally, some requirements may be met by more than one detailed design section.	

Article No.	Article Requirement	Assessment	Compliance Category
		If so, each section should be identified in this column. The intent is to complete this section following the Detailed Design phase. Proof - This section references the specific document(s) and section(s) that contain the actual steps or analyses that will prove that the requirement is met. Possible options include but are not limited to functional tests, pre-operational tests, engineering analyses, vendor tests, or software unit tests. The intent is not to complete this section until a document exists, or is drafted, that performs the actual evaluation. Typically, this occurs in the installation or commissioning phase of the project and is documented within the commissioning report."	
6.8.	All the functions of the operating organization shall be performed at the appropriate stages during commissioning. These functions shall include responsibilities for management, training of personnel, the radiation protection programme, waste management, managements of records, fire safety, physical protection and the emergency plan.	BP-PROC-00539 -Design Change Package states: "4.6.1 Commissioning Planning Commissioning planning typically starts when installation planning starts. It must be completed before installation is complete. Commissioning planning includes, when required, preparation of commissioning objectives, specifications and detailed procedures, instructions and plans. The FTL ensures all stakeholders are consulted (conduct a meeting if necessary), to establish context of commissioning of change, as follows: Scope of change. Risk Assessment. Safety. Quality. Resources. Environment. Schedule. Outage requirements. All commissioning activities shall be planned with full alignment with the Work Management processes."	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00615 -Commissioning Modifications and Projects states: "4.5 Training The purpose of the Commissioning Training sub-process is to ensure any training required for staff to support commissioning activities and operations, or maintenance activities following AFS is provided. Appendix B 4. Safety Requirements Identify requirements pertaining to personnel safety, encompassing both radiological and conventional health and safety hazards, to be demonstrated, verified or proven by commissioning tests. These requirements may be identified in Design Manuals, Manufacturers Manuals, Safety Reports, Radiation Regulations, OHSA (e.g., Pre-Start Health and Safety Review) and CNSC or TSSA correspondence. 8. Environmental Requirements Identify requirements pertaining to environmental requirements, as identified in design documentation, to be demonstrated, verified or proven by commissioning."	
6.9.	Operating procedures and test procedures shall be verified to ensure their technical accuracy and shall be validated to ensure their usability with the installed equipment and control systems. Verification and validation of procedures shall be performed to confirm their applicability and quality, and to the extent possible shall be performed prior to fuel handling operations on the site. This process shall continue during the commissioning phase.	BP-PROC-00615 -Commissioning Modifications and Projects states: "4.3 Commissioning Instructions 2. CONSULT with appropriate personnel as required, such as Station Engineering, Plant Design Engineering, Maintenance, Operations, Equipment Life Cycle Engineering, and Safety and Environment, for input in developing requirements, logic, and commissioning instructions. 4. ENSURE the appropriate technical verification, stakeholder reviews and approvals of the commissioning instructions and procedures are complete." BP-OPP-00002 -Operating Policies and Principles - Bruce A states:	C

Article No.	Article Requirement	Assessment	Compliance Category
	Verification and validation shall also be carried out for procedures for overall operation.	"01.6 Modifications Modifications to station systems and procedures must be controlled to ensure that the changes do not invalidate the licensing basis, particularly in the areas of: Health and safety of station staff and the public, Environment, National security, Compliance with international obligations to which Canada has agreed. Change control programs shall include requirements for adequate review and approval of modifications to station systems or procedures. 2. Modifications to Procedures Prior approval of the CNSC shall be required for modifications to procedures in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence. Modifications to all operating procedures and to maintenance procedures for safety related systems shall be controlled to ensure that the changes do not render the current licensing submissions invalid. To comply with this principle, modifications to those procedures shall be subject to the following policies: a) Prior approval of the Senior Operations Authority shall be required for modifications to operating or maintenance procedures which could adversely affect the assessment of public risk as stated in current licensing submissions. b) Shift Manager approval shall be required for planned deviations from approved operating procedures or from approved maintenance procedures for safety related systems, except as allowed under Clause c). c) In order to minimize the impact on the health and safety of station staff and the public, on environmental protection or on national security, the Control Room Shift Supervisor may approve deviations from approved operating procedures for safety related systems if the Shift Manager is not available in a timely manner to approve the deviations."	
6.10.	From the commencement of commissioning, reviewed and approved arrangements for work	BP-PROC-00615 - Commissioning Modifications and Projects	C

Article No.	Article Requirement	Assessment	Compliance Category
	control, modification control and plant configuration control shall be in place to meet the conditions of the commissioning tests.	"4.4 Commissioning Work Management The purpose of the Commissioning Work Management sub-process is to develop, assess and schedule commissioning work tasks. Complete the following: Note: Any maintenance or corrective work on systems not yet turned over to operations must be done in accordance with approved work management processes, i.e., work is properly planned, scheduled, executed and documented as complete. Work management of the commissioning tasks must be planned consistent with BP-PROC-00543, Task Planning. 1. ENSURE commissioning activities are identified in the PASSPORT Work Management System, and Task Analysis Meetings are conducted as required to define commissioning tasks in modification work orders. Typically, draft commissioning instructions are used as a starting point for task analysis meetings. 2. PROVIDE commissioning instructions to the trades Task Planners for implementation in accordance with BP-PROC-00543, Task Planning. Task Planners (assessors) from the commissioning trades group assess commissioning activities (for resource requirements and materials). 3. ENSURE commissioning activities are scheduled by Work Management per BP-PROC-00329, On-line Work Management, or BP-PROC-00342 Sheet 0004, Planned Outage - Scheduling. 4. ENSURE all commissioning work orders are linked to the appropriate DCN in PASSPORT." BP-OPP-00002 -Operating Policies and Principles - Bruce A states: "01.6 Modifications Modifications to station systems and procedures must be controlled to ensure that the changes do not invalidate the licensing basis, particularly in the areas of: Health and safety of station staff and the public, Environment, National security,	

Article No.	Article Requirement	Assessment	Compliance Category
		Compliance with international obligations to which Canada has agreed. Change control programs shall include requirements for adequate review and approval of modifications to station systems or procedures. 1. Modifications to Station Systems Prior approval of the CNSC shall be required for all modifications to station systems in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence. Modifications to station systems that may have an impact on the ability to control reactor power, cool the fuel or contain radioactivity, or that may affect the integrity of the licensing basis, shall be subject to the following policies: a) The approval of the engineering and technical content of modifications to station systems shall be in accordance with procedures approved by the Vice President, Engineering Division. b) Prior approval of the Senior Operations Authority shall be required for: i) The installation of permanent modifications to station systems. ii) The installation of temporary modifications to the Special Safety Systems, the Reactor Regulating System and the Heat Transport Pump Trip System. Approval shall be required on a case-by-case basis unless the installation of the temporary modification is addressed in procedures which have been approved by the Senior Operations Authority. c) Replacement components in station systems shall preferably be identical to the original component. Non-identical replacement components which have not been classified as acceptable replacements in accordance with procedures approved by the Vice President, Engineering Division shall be treated as modifications. d) Installation of modifications to station systems shall be subject to the following prior authorizations: i) Shift Manager, for permanent modifications. ii) Shift Manager, for temporary modifications unless the authorization is provided in accordance with Clause d) iii).	

Article No.	Article Requirement	Assessment	Compliance Category
		iii) Control Room Shift Supervisor, for temporary modifications for which the conditions for installation are specified in approved operating or maintenance procedures. Temporary modifications to systems or system components that are in a safe state with respect to their credited safety-related or licensing functions, or temporary modifications to systems that are no longer required because the affected reactor units are in a safe shutdown state, are not subject to the requirements of Clauses a), b), or c) provided that, prior to leaving the safe state, the system is returned to its approved design configuration and sufficiently tested to demonstrate its capability in meeting its minimum availability requirements."	
6.11.	Initial fuel loading shall not be authorized until all relevant pre-operational tests have been performed and the results have been accepted by the operating organization and the regulatory body. Reactor criticality and initial power increase shall not be authorized until all necessary tests have been performed and the results have been accepted by the operating organization and the regulatory body, as appropriate. The tests of the commissioning programme shall be successfully completed as a necessary condition for authorization, as appropriate, for normal operation of the plant to be commenced.	This article is not applicable to CANDU plants during a normal shutdown because the fuel remains in the core. This article does apply to CANDU plants undergoing extensive refurbishment, where the core is defuelled and new fuel is loaded at the end of the refurbishment. Extensive documentation related directly to refurbishment or new build situations would be created to address this very special circumstance. Refurbishment and new build situations are not relevant to this Safety Factor.	NR
6.12.	The operating organization shall ensure that interfaces and the communication lines between different groups (i.e. groups for design, for construction, contractors, for commissioning	BP-PROC-00615 - Commissioning Modifications and Projects "4.1 Commissioning Planning 2. CONSULT with stakeholders (conduct a meeting if necessary), to establish context of commissioning of modification, as follows:	C

Article No.	Article Requirement	Assessment	Compliance Category
	and for operations) shall be clearly specified and controlled.	- Scope of modification - Risk Classification and Controls (Reference: (BP-PROC-00539, Appendix B) - Safety - Quality - Resources - Environment - Schedule - Outage requirements - Budget constraints 4.3 Commissioning Instructions Complete the following: 1. PREPARE or ensure preparation of commissioning instructions in accordance with Appendix D, Requirements for Commissioning Instructions. Commissioning instructions shall reference the specific DCP and DCN number(s) and revision level(s). If level of complexity is not otherwise manageable through simple PASSPORT work order task instructions; consider employing a Work Coordination Plan (WCP), as defined in BP-PROC-00771, Work Coordination Plans." BP-PROC-00771- "Work Coordination Plans", states: "1.0 Purpose Work Coordination Plans (WCP) are intended to be used as a narrative document designed to communicate an overview of complex activities requiring special considerations. This overview is to support and ensure appropriate thought and effort are incorporated into the development of Comprehensive Work Packages (CWP) (as defined by BP-PROC-00543, Task Planning) and the development of Work Management schedules. 4.0 Procedure Description	

Article No.	Article Requirement	Assessment	Compliance Category
		This procedure describes the applicability and the process for the preparation, review, implementation, and disposition of Work Coordination Plans (WCP). Work Coordination Plans may be developed for work efforts such as tying together large, complex Modifications that require detailed coordination between multiple work groups, or other activities of such a complex nature that detailed coordinated preparation beyond routine Assessing and Planning is necessary to ensure nuclear safety is maintained."	
6.13.	Authorities and responsibilities shall be clearly specified and shall be delegated to the individuals and groups performing the commissioning activities. The operating organization shall be responsible for ensuring that construction activities are of appropriate quality and that completion data on commissioning activities and comprehensive baseline data, documentation or information are provided. The operating organization shall also be responsible for ensuring that the equipment supplied is manufactured under a quality assurance programme that includes inspection for proper fabrication, cleanliness, calibration and verification of operability.	BP-PROC-00615 - Commissioning Modifications and Projects states: "4.6 Commissioning Field Activities The purpose of the Commissioning Field Activities sub-process is to perform commissioning activities in accordance with approved commissioning instructions. Commissioning shall be performed in accordance with approved commissioning instructions. Complete the following: 1. During commissioning activities, PROVIDE oversight and document commissioning issues, as they arise. 2. If the modification cannot be commissioned according to instructions, ASSESS the problem and initiate the following actions: a) PROVIDE direction to proceed with non-technical changes. b) ISSUE new commissioning procedures or instructions required, in accordance with BP-PROC-00543, Task Planning, and BP-PROC-00771, Work Coordination Plans, as applicable. c) INITIATE correction of installation if modification was installed incorrectly. d) REFER problem to Engineering Project Manager (EPM) if it is determined to be beyond the scope of the approved modification design. e) PROCESS a Field Change in accordance with Section 4.8. 3. ENSURE quality records generated during commissioning phase are collected and processed per BP-PROC-00098, Records Management. Refer to Section 6.0, Records for applicable record retention authorization number. 4. ENSURE commissioning activities are satisfactorily completed, verified, and accepted before entering the AFS phase of the modification.	C

Article No.	Article Requirement	Assessment	Compliance Category
		5. IDENTIFY any open items at completion of commissioning." "Appendix C: Commonly Affected Operations And Maintenance Documents 13. Equipment Bills of Materials (EBOM) - The Level 1 EBOM headers (approved models) must be completed and linked to equipment and component codes in the MEL by completion of installation. This EBOM set up is done by Procurement Engineering (Reference: BP-PROC-00592, Equipment Bill of Materials). All equipment items require the associated UTC to be fitted to the equipment code in PASSPORT via the work reporting process or with the assistance of Procurement Engineering." BP-PROC-00244 -Procurement Engineering states: "1.0 Purpose PE process is applicable to materials, systems, and components that require establishment of technical and quality requirements commensurate with their role relative to nuclear safety and reliability. In addition, the PE process encompasses establishing and sustaining Equipment Bills of Materials for Engineering Change and maintenance activities to ensure plant configuration will be controlled and documented in PASSPORT. 5.5 Other Referenced Documents -BP-PROC-00359, Handling and Acceptance of Vendor Information -BP-PROC-00368, Source Surveillance -BP-PROC-00369, Approved Supplier List Management" BP-PROC-00369 -Approved Supplier List Management states: "1.0 Purpose The purpose of this procedure is to describe the process for the management of the Bruce Power Approved Supplier List (ASL) by controlling the additions of new Suppliers, and the upgrading and re-qualification of existing Suppliers of items and services with Quality	

Article No.	Article Requirement	Assessment	Compliance Category
		Assurance Program requirements." Other related Bruce Power Procedures include: "BP-PROC-00854, Quality Oversight and BP-PROC-00855, Supplier Performance Evaluation Appendix B: CSA Z299.3 Distributors The following CSA Z299.3 elements shall be evaluated to the extent necessary, based on the size and complexity of the Distributor's operation and the requirements of Section 4.4.2" NOTE: The CSA Z299.3 quality program ensures proper fabrication, etc. of manufactured components. BP-PROC-00854, "Quality Oversight" states: "1.0 Purpose This procedure defines the functional requirements and key responsibilities associated with Quality Services processes. The objective of Quality Service is to provide sufficient oversight of suppliers through receipt inspection of material; performance of source surveillance; validation of supplier QA requirements; review of supplier quality performance and correction of quality assurance related issues according to approved procedures that assure best practice and regulatory requirements are applied, and that only correct and accepted items and services are available for use as per established programs. Procedures and processes shall be established that ensure supplier oversight related issues are controlled and documented until dispositioned. Quality Services organization performs a Bruce Power quality assurance function and is responsible to verify activities for compliance with specified requirements and have the authority, access to work areas and the organizational freedom including independence from cost and schedule considerations to: Identify supplier quality related problems and when required, stop further work. Initiate, recommend or provide solution to supplier quality related problems through designated channels.	

Article No.	Article Requirement	Assessment	Compliance Category
		Verify implementation of solutions. Ensure that further processing, delivery, installation or use is controlled until proper disposition of a nonconformance, deficiency or unsatisfactory condition has occurred. Activities associated with implementing the requirements of this procedure will ensure processes are identified and requirements are understood recognizing that reactor safety, industrial safety, radiation safety and environment safety are essential to the achievement of the company's long term goals. 4.1 Receipt Inspection Receipt inspection of items is performed in order to verify conformance with code and purchase order requirements in accordance with BP-PROC-00609, Receiving Inspection. Provisions have been established for the inclusion of receipt inspections to verify purchased materials and equipment conform to the procurement documents and to identify counterfeit and fraudulent materials. Inspections include review of objective evidence of quality furnished by the supplier and physical examination of products upon delivery. Nonconforming materials and equipment are segregated, dispositioned and affected organizations notified of deficiencies. Nonconforming material will be controlled by OSDD during receipt inspection and a combination of OSDD and NCR after acceptance, per BP-PROC-00264, OSDD Process and BP-PROC-00252, Control of Nonconformance Items."	
6.14.	During construction and commissioning, the plant shall be monitored, preserved and maintained so as to protect plant equipment, to support the testing stage and to maintain consistency with the safety analysis report.	BP-PROC-00615 - Commissioning Modifications and Projects states: "2.0 Exceptions While not covered in this procedure, installation check and test activities are part of the Construction Completion Assurance process and must be completed prior to Commissioning. For pressure boundary related modifications, preparation and control of Inspection and Test Plans (ITPs) are addressed by BP-PROC-00047, Pressure Boundary Packages. While non-pressure-boundary ITP preparation is governed by BP-PROC-00877, Modification Installation Quality Assurance. The interface between installation and commissioning phases of a Project, Modification, or Construction activity is detailed in the Design Plan as defined by DPT-PDE-00006, Design Plan." BP-PROC-00877, "Modification Installation Quality Assurance" states:	C

Article No.	Article Requirement	Assessment	Compliance Category
		"4.6.1.1 In Process Inspections In-process inspections are performed for all installations and may commence as equipment and components are installed, or may be scheduled when a specific area or system subsection is completed. Installation activities are tracked and verified in accordance with the work package. Activities associated with the Project Technician's performance of in-process inspections are: Performs inspections and tests (other than pressure test) in accordance with the ITP and accepts or rejects the results. Witnesses tests performed by others and accepts or rejects results. Monitors and tracks installation and inspection status. Coordinates and expedites the resolution of rejected inspections and tests. Coordinates and expedites the resolution of non-conformances in accordance with BP-PROC-00252, Control of Nonconforming Items. Documents inspection and test results. Interfaces with NDE inspections and status. Note: All text fields in an ITP, record, or checklist must be completed; "N/A" shall be used for non-applicable fields. Completed inspections and checks are initialed and dated by the Project Technician who performs the inspection or check. 4.6.1.2 Final Inspection Final inspection is a final and last inspection performed by the Project Technician after installation and test work is complete and released by the installing trades. For PB-related work, this is performed by a qualified PB Inspection Technician in accordance with BP-PROC-00046, Pressure Boundary Field Execution. Activities associated with the Project Technician's performance of final inspections are: Inspects completed items for completeness and conformance to specified requirements. Reviews the ITP and verifies that all steps are complete. Reviews inspection and test records for completeness and adequacy.	

Article No.	Article Requirement	Assessment	Compliance Category
		Completes or arranges for completion of all outstanding non-conformances if possible. If the modification is performed under BP-PROC-00433, Design Change Package, completes Sections E, F and G of FORM-11240, Modification Installation Tracking and Completion Assurance and Section D of FORM-12586, DCN Installation (unless otherwise stated in Section B of FORM-12586 DCN Installation). Note: In the case of operational pressure tests or initial service pressure tests, final inspection and completion assurance shall be completed before those tests are conducted. 4.7.1 Completion Assurance Upon completion of field work, the Project Technician ensures that all the necessary inspection and test activities have been completed. He/she submits the document package to the FLM for completion assurance and filing. For PB installations, field completion assurance is performed in accordance with BP-PROC-00046 and engineering completion assurance is performed as per BP-PROC-00240, Pressure Boundary Engineering Completion Assurance. Activities associated with completion assurance are: Reviewing the ITP and associated records for completeness and accuracy. Final or interim disposition of non-conformances. Interim disposition of open items. Performing the physical system walk-down with the FTL and commissioning team, as required. Internal work packages will include all quality-related documentation. The FLM reviews the completed documents and quality records for completeness, accuracy and legibility and returns the approved work package to the Project Technician. For vendor history dockets, the vendor’s Quality Representative completes Sections A to C, and signs in Section D or E of FORM-13817, Vendor History Docket Cover Sheet. This form can be used to sign over all or part of the completed vendor history docket to Bruce Power (at Bruce Power’s discretion)." BP-OPP-00002 -Operating Policies and Principles - Bruce A states:	

Article No.	Article Requirement	Assessment	Compliance Category
		"01.6 Modifications Modifications to station systems and procedures must be controlled to ensure that the changes do not invalidate the licensing basis, particularly in the areas of: Health and safety of station staff and the public, Environment, National security, Compliance with international obligations to which Canada has agreed. Change control programs shall include requirements for adequate review and approval of modifications to station systems or procedures. These programs shall be effectively implemented in order to identify the impacts of the modifications on the licensing basis. Station personnel who have been certified by the CNSC shall be kept informed of modifications which affect the ability to control reactor power, cool the fuel or contain radioactivity, or which otherwise have an impact on the licensing basis within the scope of responsibility of the certified personnel. 1. Modifications to Station Systems Prior approval of the CNSC shall be required for all modifications to station systems in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence. Temporary modifications to systems or system components that are in a safe state with respect to their credited safety-related or licensing functions, or temporary modifications to systems that are no longer required because the affected reactor units are in a safe shutdown state, are not subject to the requirements of Clauses a), b), or c) provided that, prior to leaving the safe state, the system is returned to its approved design configuration and sufficiently tested to demonstrate its capability in meeting its minimum availability requirements. 4.7.3 Commissioning The FTL takes on the responsibility of resolving any installation issues or deficiencies that may be discovered during commissioning. Refer to BP-PROC-00615, Commissioning of Projects and Construction Activities."	
6.15.	During construction and commissioning, a comparison	BP-PROC-00615 - Commissioning Modifications and Projects states:	C

Article No.	Article Requirement	Assessment	Compliance Category
	shall be carried out between the as built plant and its design parameters. A comprehensive process shall be established to address non-conformities in design, manufacturing, construction and operation. Resolutions to correct differences from the initial design and non-conformities shall be documented.	"4.7 Commissioning Completion Assurance The purpose of the Commissioning Completion Assurance sub-process is to ensure that commissioning work is satisfactorily completed and documented. Note: Additional completion assurance activities for Pressure Boundary installations are described in BP-PROC-00240, Pressure Boundary Engineering Completion Assurance. Additional completion assurance activities for non-pressure boundary installations are described in BP-PROC-00877, Modification Installation Quality Assurance. Complete as follows: 1. REVIEW and DISPOSITION open items identified during commissioning activities with OE. 2. EXPEDITE open items to completion and DOCUMENT items in Milestone 100 ISSUES TRK list as per BP-PROC-00539. 3. RETAIN copies of commissioning records for review during AFS. 4. FORWARD originals of commissioning documentation and test records to Bruce Power Records for retention as permanent Quality Assurance (QA) records, per BP-PROC-00098, Records Management. Refer to Section 6.0, Records for applicable record retention authorization number. 5. For modifications requiring AFS, VERIFY the status of all operational documentation where applicable to the modification (refer to Sections 4.3, Step 7, this document). Note: Electrical and control modifications require that the Control Maintenance Shop reflect the modification prior to AFS to support maintainability. This means that Change Papers (DCN drawings, Field Change Notices, Relay Setting Sheets, Instrument Specification Sheets, etc.) and Instrument Calibration Records be properly filed in the Shop. 6. ENSURE Control Maintenance shop update is complete as per B-CMP-76530-00003, DCN Preparation and Follow-up. 7. INFORM EPM and OE that modification is ready for AFS as per BP-PROC-00539, Section 4.6.3. 4.8 Field Changes The purpose of the Field Changes sub-process is to ensure any minor changes to a DCN are	

Article No.	Article Requirement	Assessment	Compliance Category
		properly reviewed and dispositioned. If any Field Changes are required, DOCUMENT them in Milestone 110 ISSUES TRK as per interfacing document BP-PROC-00539." BP-PROC-00539, Design Change Package states: "1.0 Purpose The Design Change Package (DCP) process, as documented in BP-PROC-00539, specifies the control of modifications to plant systems, structures, components, and significant tools, including temporary modifications. The overall objective is to meet regulatory requirements, ensure safety, and minimize loss to the company through appropriate risk management activities. 4.11 Field Change Notices It is always preferred to do a Revision to the Engineering Change rather than a Field Change Notice. However, if FCNs are initiated, the following restrictions apply: No ECs of FCN type shall be initiated as cross references to ECs of DCP type except DCPS. ECs of FCN type can be initiated only when the parent EC is at “Approved” or “Active” status. Once the AFS has been approved by the Operations Manager (Milestone 710 OPS FIN AFS signed off), any further field modifications, if required, shall be processed as new DCNs. 4.12 Engineering Change Revision All EC types and sub-types can be revised if required however revision of installed TMODs, is not permitted and revision of FCNs is not permitted except for FCNs at Modified status when the revision is required for configuration information updates only (no field work). Typically the revised EC shall have the same type and sub-type as the initial revision. Changes of the type and/or sub-type can be done if required, except as noted in Section 4.12.1. Scope of the revision shall be recorded as an additional item within the notes of the scope milestone in the EC. Additionally, reason for the revision of the EC shall be recorded in the 047	

Article No.	Article Requirement	Assessment	Compliance Category
		REASON Attribute for the new revision. Attention: Add new and revised documents to both the ADL, AEL and EC Topic Notes. All documents that are affected by the EC must remain on the ADL. Documents that no longer apply to the EC may be removed from the ADL provided the document numbers are added to the EC topic notes as evidence of their previous applicability. 4.12.1 Revision of ECs at MODIFIED Status Revisions to ECs cannot be made after AFS except for Configuration Information Only updates. The type and sub-type of the revised EC must remain the same as the original revision. The revision of an EC at MODIFIED status shall satisfy the following requirements and can only be done AFTER AFS: The title of the EC shall have the words - Configuration Information Only Update on the third line. Must be verified by a peer and the completion shall be documented in the appropriate milestone. Must be approved by the approving Design Section Manager of the revised EC and the completion shall be documented in the appropriate milestone. Any of the remaining mandatory milestones shall be either deleted or signed off by the preparer; the justification for signing them off shall be documented in the milestone notes."	
7.		Plant Operations	NA
Requirement 26: Operating procedures	Operating procedures shall be developed that apply comprehensively (for the reactor and its associated facilities) for normal operation, anticipated operational occurrences and accident conditions, in accordance with the policy of the operating organization and the requirements of the regulatory	This is assessed in detail in section 7.1 - 7.6.	C

Article No.	Article Requirement	Assessment	Compliance Category
	body.		
7.1.	The level of detail for a particular procedure shall be appropriate for the purpose of that procedure. The guidance provided in the procedures shall be clear and concise and, to the extent possible, it shall be verified and validated. The procedures and reference material shall be clearly identified and shall be readily accessible in the control room and in other operating locations if necessary. They shall be made available to the regulatory body, as required. Strict adherence to written operating procedures shall be an essential element of safety policy at the plant.	BP-PROG-03.01, Document Management SECTION 4.1.2 Review Item 7 states "Validation is a formalized process for demonstrating functional adequacy and usability of a procedure. Validation is not mandatory but at the author's discretion for General Procedures. Stations System procedures are validated based on established criteria." SECTION 4.1.3 Item 8 states "The controlled document verifier shall: - Apply knowledge/experience to perform a detailed review of the document in terms of technical content, accuracy, format and compliance with policies. - Independently confirm the document was properly prepared and its contents are accurate, complete and comply with all applicable requirements. - Use specific verification processes for Station systems procedures as per approved criteria." GRP-OPS-00050, Requirements For Station Operating Procedure Development And Revision Section 1.0 Purpose states This procedure establishes the requirements for requesting, developing, reviewing, validating, verifying, and approving station operating procedures. Examples of Operating Procedures are: - Abnormal Incident Manual (AIM). - Alarm Response Manual (ARM). - Operating Manual (OM). - Overall Unit Operating Manual (09110). - Operating Memo (OPM). - Safety System Test (SST)"	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-12.01, Conduct of Plant Operations SECTION 4.1 Operator Documents States "Operations Documentation includes: - Operating procedures (Operating Manuals, Operating Memos, Alarm Response Manuals, Safety System tests, etc.). - Operational flowsheets. Procedures for the safe and reliable operation of plant equipment shall be prepared, approved, controlled and readily available to the operating staff. These procedures shall be prepared for all anticipated normal, abnormal and emergency conditions. All operating procedures shall be created as controlled document, in accordance with the requirements of BP-PROG-03.01, Document Management to ensure document lifecycle management requirements are met. (BP-PROC-00068, Controlled Document Life Cycle Management)." BP-PROC-00250 WRITER'S GUIDE FOR STATION SYSTEM PROCEDURES SECTION 1.0 PURPOSE states Station System Procedures provide instructions for the operation, maintenance and testing of systems, structures and components of the plant. This procedure specifies the requirements for Station System procedure format and writing methodology. Well written procedures which use consistent structures, styles and language help reduce human error and promote consistent results. SECTION 4.27 Level of Detail states The Instruction section of the procedure provides step-by-step instructions (action steps) to accomplish the stated purpose of the procedure. Instructions must satisfy the following key criteria. - Be specific and detailed enough to ensure successful, consistent, and safe completion. - Be short, concise, easy to understand, and not subject to interpretation by the user. - Provide an appropriate level of detail to complete each task considering each of the following: -Task Complexity.	

Article No.	Article Requirement	Assessment	Compliance Category
		- Frequency of performance. - Consequences of error. - Performer qualification. - Performer experience. - Requirement for performance consistency. - Provide enough detail to ensure that a minimally qualified inexperienced worker can perform the procedure. Avoid providing more than the required amount of detail to prevent unnecessary complexity and clutter. BP-PROC-00166 General Procedure And Process Requirements Section 1.0 Purpose states this element of the Bruce Power Management System specifies the requirements for administrative process and procedure document formatting and presentation. It establishes standards, methodology and processes necessary to ensure Bruce Power practices reflect a strong commitment to nuclear safety and a consistent approach to procedure quality. Well written procedures that use consistent structures, styles and language help reduce human error and promote consistent results. BP-PROC-12.01 Conduct of Plant Operations, section 4.3 Plant Operation states the following: "….Plant operations shall be conducted within the bounds of the Safe Operating Envelope, license requirements, and approved plant procedures during normal and abnormal conditions. The requirements for plant operations are implemented by the suite of procedures listed in Section 5.3, item 3, Implementing Documents, Plant Operation." This section 5.3 includes GRP-OPS-00038 Bruce A&B Operations Standards and Expectations which state the following: 4.21 Procedure Use and Adherence Expectations Operators are expected to use approved procedures when performing operations that directly manipulate plant equipment. The only exception to this requirement is when taking action in response to an emergency condition in accordance with BP-PROC-00617, Human Performance Tools For Workers, or when the operation has been identified as "Skill-of-the-Trade" in accordance with Section 4.19. If a procedure is not available then do not	

Article No.	Article Requirement	Assessment	Compliance Category
		proceed with the operation until a procedure has been approved. BP-PROC-00617 Section 4.3.2 Procedure Adherence Tool states the following: The Procedure Adherence tool is used to ensure that a procedure is understood and followed. When to Use the “Procedure Adherence” Tool Use this tool anytime the work being done is governed by procedures. Procedure Adherence is required and is non-negotiable.	
7.2.	Procedures shall be developed for normal operation to ensure that the plant is operated within the operational limits and conditions.	BP-OPP-00002, Operating Policies and Principles - Bruce A Introduction section states "The operating Policies and Principles are defined to clearly outline operating boundaries within which the station can operate safely. Within these boundaries detailed operating procedures are written for detailed operating requirements. Procedures are also written for abnormal or emergency conditions which may be accurately defined." Sections 30, 32-36, 40, 43, 50, 54, 55, 60, 62, 63, 71, 73, 75 BP-PROG-12.01, Conduct of Plant Operations SECTION 4.1 Operator Documents states "Procedures for the safe and reliable operation of plant equipment shall be prepared, approved, controlled and readily available to the operating staff. These procedures shall be prepared for all anticipated normal, abnormal and emergency conditions.” BP-PROC-00786, Margin Management SECTION 1.0 Purpose states "This document describes how Bruce Power manages Design and Operating Margins, fulfilling the following main objectives: - Supporting safe and reliable plant operation. - Ensuring plant equipment configuration and performance are consistent with design and licensing requirements.	C

Article No.	Article Requirement	Assessment	Compliance Category
		- Conducting day-to-day operations reflecting consideration of design and operating margins" Section 4.3.2 Establishing Operating Margins states "1. After Engineering defines the operating limits for the SSC, Operations prepares procedures and defines modes of operation to satisfy the design requirements. 2. The Operating organization applies judgment (Reference: GRP-OPS-00030, Operational Decision Making) to ensure conservatism is factored into the operating conditions (margin). The margins may be expressed in terms of operating time, operating cycles or test acceptance criteria. 3. Operations may adjust Engineering established operating ranges to a tighter band or take more conservative actions based on the resultant alarms." Section 4.3.3 Applying Margins states "1. Margins are used in producing/revising Operations and Maintenance procedures. These procedures should provide guidance on identifying when limits are being approached, the corrective or compensatory actions required and the necessary reporting requirements. 2. Instrument calibrations factor margins based on tolerances, instrument uncertainties and drift variances. As found and as left tolerances shall be added in the instrument calibration specifications and relevant component maintenance procedures as the acceptance criteria of the instrument calibrations." Section 4.4 Identifying Low Margin Conditions is summarized below: This section has several subsections to identify low margin conditions using methods such as Surveillance and operator rounds/inspections, maintenance execution, system health monitoring, operational/engineering decision making, TOE, Engineering calculations, Operating experience, Station condition records and to identify conditions that may be represent low margin issues such as physical degradation of equipment, analytical creep, imposition of tighter operating limits to comply with calculations relating to equipment problems and/or long term design inadequacies, new requirements that create operational or design restrictions, operator workarounds and other items. DPT-NSAS-00012, Preparation And Maintenance of Operational Safety Requirements Section 4.0, Procedure Description states "The Operational Safety Requirements (OSR)	

Article No.	Article Requirement	Assessment	Compliance Category
		document is the "operationalization" of the nuclear safety requirements for a given system. In other words, it translates the requirements expressed either explicitly or implicitly in the safety analyses, which are typically organized according to accident type, into system based requirements which can be more easily understood and implemented by site staff. The OSR life cycle consists of the following steps: 1. Identification of the systems requiring an OSR. 2. Preparation of SOE documentation, namely OSRs and associated instrument uncertainty calculations (IUC). 3. Gap analysis and implementation by site staff. 4. Maintenance and revision of the OSRs."	
7.3.	Procedures shall be developed for use in the event of anticipated operational occurrences and design basis accidents. Emergency operating procedures and guidance for managing beyond design basis accidents shall also be developed. Both event based approaches and symptom based approaches shall be used, as appropriate. The related analysis and justifications shall be documented.	Normal operation including anticipated operational occurrences is covered under sections 7.1 and 7.2. In addition, operation-based implementing documents are developed and used for Abnormal Incidents covering design basis accidents and Severe Accident Management Guidance (SAMG) covering beyond design basis accidents including severe accidents. BP-MSM-1, Management System Manual Emergency Management states "Bruce power shall ensure adequate planning and preparation is in place to deal with any emergency situations that could endanger the safety of site staff, impact on the protection of the environment, and/or impact on the safety of members of the public. Bruce power shall manage emergencies in a manner that encompasses mitigation, preparedness, response and recovery." BP-OPP-00002, Operating Policies and Principles - Bruce A Introduction section states: "The operating Policies and Principles are defined to clearly outline operating boundaries within which the station can operate safely. Within these boundaries detailed operating procedures are written for detailed operating requirements. Procedures are also written for abnormal or	C

Article No.	Article Requirement	Assessment	Compliance Category
		emergency conditions which may be accurately defined." BP-PROC-00250 Sht 3, Abnormal Incident Manual (Aim) Management Section 1.0 Purpose states "This instruction provides direction to manage the content, format and organization of Abnormal Incident (AIM) Procedures. AIM Procedures conform to the standards and fulfill the intent of what are sometimes called (external to the company) Emergency Operating Procedures (EOPs). This procedure shall be used in conjunction with BP-PROC-00250, Requirements for Station System Procedures and GRP-OPS-00050, Requirements for Station Operating Procedure Development and Revision." NK21-OM-09034, Abnormal Incidents Manual In summary it provides operations guidance for the following - Loss of Computers - Heat Transport Incidents (including Leaks, LOCA, Tube Rupture, etc) - Loss of secondary cooling - Moderator Incidents - Loss of Instrument Air - Loss of Service Water - Loss of Electrical Power - Loss of Main Control Room - Seismic Event - Spent Fuel Bay event - PRAG and MAAP	

Article No.	Article Requirement	Assessment	Compliance Category
		NK21-OM-03500.1, Impairments of Special Safety Systems and Other Safety Related Systems and NK21-OM-03672, Safety Related System Impairments Manual In summary it provides operations guidance for the following - Loss of Special Safety System - Loss of Standby Support systems GRP-OPS-00050, Requirements for Station Operating Procedure Development and Revision Section 1.00 Purpose states: "This procedure establishes the requirements for requesting, developing, reviewing, validating, verifying, and approving station operating procedures. Examples of Operating Procedures are: - Abnormal Incident Manual (AIM). - Alarm Response Manual (ARM). - Operating Manual (OM). - Overall Unit Operating Manual (09110). - Operating Memo (OPM). - Safety System Test (SST) " BP-PROC-00250 Sheet 0002, Alarm Response Manual Format Section 1.0 Purpose states "This procedure specifies the requirements for Alarm Response Pages (ARP) and shall be used in conjunction with BP-PROC-00250, Station System Procedure Requirements. Alarm Response Page formats are implemented by approved templates."	

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.0 Procedure Description states "ARPs are prepared to allow Operations staff to efficiently manage plant status information and system disturbances or conditions that may result in plant instability." As part of the current SAM program, Bruce Power has issued a number of SAMG documents, including a hierarchy of guides and procedures implementing the Severe Accident Management, Bruce Power Procedure, BP-PROC-00659, under the Technical Support Group User's Guide", Bruce Power Procedure, BP-SAM-00001. The hierarchy defines conditions for entry into a SAM process, and it contains a structured set of SAM tools (e.g., Bruce A – Diagnostic Flow Chart (DCF)", Bruce Power Procedure, BP-SAM-10003, Bruce A – SACRG-1: Initial Response – Background", Bruce Power Procedure, BP-SAM-10001 and Bruce A – SACRG-2: Technical Support Group Functional – Background", Bruce Power Procedure, BP-SAM-10002) to provide a pre-planned, systematic approach to guide the plant response in case of a severe accident.	
7.4.	Operating procedures and supporting documentation shall be issued under controlled conditions, and shall be subject to approval and periodically reviewed and revised as necessary to ensure their adequacy and effectiveness. Procedures shall be updated in a timely manner in the light of operating experience and the actual plant configuration.	BP-MSM-1, Management System Manual Appendix A Document Management states: "Bruce power shall maintain and manage documents during their life cycle in a manner that ensures integrity, security, accessibility, disclosure and preservation while satisfying applicable legal and regulatory requirements. The preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Such documents, including changes thereto shall be reviewed for adequacy and approved for release by authorized personnel." BP-PROG-12.01, Conduct Of Plant Operations Section 4.1 Operator Documentation states: "Procedures for the safe and reliable operation of plant equipment shall be prepared, approved, controlled and readily available to the operating staff. These procedures shall be prepared for all anticipated normal, abnormal and emergency conditions. All operating procedures shall be created as controlled document, in accordance with the	C

Article No.	Article Requirement	Assessment	Compliance Category
		requirements of BP-PROG-03.01, Document Management to ensure document lifecycle management requirements are met. (BP-PROC-00068, Controlled Document Life Cycle Management)." BP-PROG-03.01 Document Management Section 1.0 Purpose states: "The preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Such documents, including changes thereto shall be reviewed for adequacy and approved for release by authorized personnel." Section 4.1 Controlled Life Cycle Management states: "The department manager, business services is the designated process owner for BP-PROC-00068, controlled document life cycle management. Responsibilities include process definition, administration and on-going oversight/monitoring in regard to effectiveness, efficiency and compliance." BP-PROC-00068, Controlled Document Life Cycle Management Section 4.9.6 Periodic Review states: "Document owners should periodically check effectiveness of document and complete reviews as required. 1. A one, two or three year review cycle is mandatory for all Bruce Power Organization Manuals, Policies, Programs and General Procedures. 2. The action tracking module of PASSPORT is used to track these document reviews. This number shall not change during the life of the document. A new review assignment must be created as each review is completed and closed. 4. The review period is assigned by the document owner." Section 4.8 Active Document Use item 1e) states "Identify and deficiencies and/or changes to the controlled doc type and/or subtype to the document author/owner by inputting a Document	

Article No.	Article Requirement	Assessment	Compliance Category
		Change Request (DCR) through eSuite." Section 4.1.1 Initiation states: "the document owner shall review any outstanding Document Change Requests (DCR) for document as well as an Configuration Information Change (CIC) assigned against design documents." Section 4.9.4 Document Change Request states: "it is the responsibility of all staff to report any deficiencies that they find in Controlled documents so that they can be corrected. Deficiencies are documented using the action tracking DCR process." Section 4.9.4.1 Document User provides the instructions for the Document User to create a DCR.	
7.5.	A system shall be established to administer and control an effective operator aids programme. The control system for operator aids shall prevent the use of non-authorized operator aids and any other non-authorized materials such as instructions or labels of any kind on the equipment, local panels, boards and measurement devices within the work areas. The control system for operator aids shall be used to ensure that operator aids contain correct information and that they are updated, periodically reviewed and approved.	BP-PROG-12.01 Conduct of Plant Operations Section 4.3.3 Operator Aids states: "Copies of an approved controlled document/portion of document, flowsheet, or information may be posted in the main control room or field as an aid to assist Operators in performing their duties. These aids shall be tracked and controlled, and quarterly reviews will be performed to ensure all aids are current and undamaged. GRP-OPS-00022, Operator Aids" Section 4.3.4 Equipment Labelling states: Equipment shall be labeled in order to provide accurate information to support error free field operations. Labeling shall be in accordance with design information, meeting standard content and format requirements. GRP-OPS-00023, Equipment Labelling GRP-OPS-00022, Operator Aids Section 4.1 Overall Requirements states: "Operator Aids shall contain correct information properly reviewed, approved and current."	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.1.1 States: "Posted OAs shall be current and approved (stamped or engraved with "Operator Aid Controlled Copy", for procedures and "Operator Field Flowsheet Controlled Copy for Information Use Only", for flowsheets)" Section 4.1.5 states: "Anyone finding an unapproved OA shall remove it and notify the OAC." (Operator Aid Coordinator) Section 4.1.2 states: "OAs shall be posted in a manner that shall not obscure indicators, instruments, or controls. OAs shall be firmly attached and located in close proximity to where they will be used." Section 4.4 Quarterly Review of Operator Aids states: "Field Verifications shall be performed quarterly by operators and recorded on the appropriate form as listed in section 5.7, to verify the following: - Posted OA (Operator Aids) meet rules provided under section 4.1 - Posted OAs are latest revisions of controlled documents - Posted OAs are legible and not damaged - Posted OAs protective enclosures are not damaged."	
7.6.	A clear operating policy shall be maintained to minimize the use of, and reliance on, temporary operator aids. Where appropriate, temporary operator aids shall be made into permanent plant features or shall be incorporated into plant procedures.	GRP-OPS-00001, Operating Memos: Bruce A And Bruce B Section 4.1 General Information Operating memos provide information and approved instructions to Operators for the operation of plant systems and equipment when temporary or abnormal conditions exist. While in effect, they can modify or replace existing permanent operating procedures. Although PASSPORT indicates whether an OP memo is issued, the unit desk copy is used to determine whether the memo is in effect. All other copies are for reference only. Off Hours OP memos may be in effect prior to being issued in PASSPORT.	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.2 Limitations on the Use of OP Memos 1. Operating memos will not be used as a substitute where permanent operating procedures are required. With the exception of category Lay-up, OP memos are limited to six months duration. OP memos greater than six months old will be SCR'd by the op memo SPOC. 4. Operating memos will only be issued against the Abnormal Incident Manual (AIM) for off-hours emergencies. The Station Operations Support manager must be notified so that the AIM can be revised and the OP memo cancelled on the next business day. 5. An OP memo will only come into effect when the required tagging, alignment and flagging have been completed and the unit desk copy of the memo has been signed into effect by the ANO/CRO. 6. Because the use of temporary instructions increases the risk of Operator error, the number and duration of operating memos will be minimized. Under Section 7.0 Responsibilities: Section 7.6.1 Owner The Owner is the person who is required to track the conditions for cancelation of the OP Memo. Ensures the condition for cancellation reference number(s) (Work order, TMOD etc.) is provided, and initiates cancellation of the OP memo when the condition for cancellation has been satisfied.	
Requirement 27: Operation control rooms and control equipment	The operating organization shall ensure that the operation control rooms and control equipment are maintained in a suitable condition.	This is assessed in detail in section 7.7 to 7.9.	C
7.7.	The habitability and good condition of control rooms shall be maintained. Where the design of the plant foresees additional or local control rooms that are dedicated to the control of processes that could affect plant conditions, clear communication lines shall be developed for	Habitability and good condition of control rooms are maintained by implementing housekeeping standards and periodic reviewed during drills. GRP-OPS-00038, Bruce A and B Operations Standards and Expectations Section 4.18, Housekeeping Expectation Operations staff, led by the Shift Manager, shall act as the conscience for the station in the area	C

Article No.	Article Requirement	Assessment	Compliance Category
	ensuring an adequate transfer of information to the operators in the main control room.	of housekeeping. Field Operators will ensure that housekeeping standards are followed by everyone entering their unit. Operators are expected to keep their equipment and areas clean and tidy and to prevent buildup of dirt, oil spills and other chemicals. Portable equipment is kept stowed in designated areas when not in use. Work groups performing activities in the station are expected to clean up afterwards and to restore the area and equipment to a pristine state. This includes the removal of scaffolds; removal of tools, materials and workbenches; replacement of insulation; repainting damaged paintwork; and cleaning up any debris left behind after the work. Standard 1. Shift Crews are assigned specific units for housekeeping oversight. The crew assignments are listed on the Operations WebPages on the corporate Intranet. 2. Deficiencies in Housekeeping will be addressed/cleaned by those causing the problem, with the objective of better than found. Minor issues will be addressed by Field Operating personnel. Those housekeeping Issues that cannot be addressed immediately will be brought to the attention of the Unit Supervising Nuclear Operator and/or the Field Shift Operating Supervisor and entered in the Workplace Inspection System (WIS) database, for follow-up by the Area Owner. 3. When a Work Authorization is ready to be surrendered, the Control Room Operators will assess the need to confirm that the work area has been left in an acceptable state. If inspection by Operations determines the work area is in an unacceptable state, then request the maintenance FLM to ensure the area is brought up to a standard that will allow the work authorization to be surrendered. Surrender of the Work authorization will not be accepted until identified deficiencies have been corrected. 4. Operators will clean their equipment as necessary to prevent build-up of dirt, oil or chemicals around the operating equipment. Oil absorbent pads shall be in place and replaced as frequently as necessary to prevent spread of oils. 5. Housekeeping will be maintained to the defined standard in BP-PROC- 00260, Material Condition and Housekeeping. 6. Observation and Coaching checklist, FORM-12982, CHECKLIST, Housekeeping, should be used to regularly assess and reinforce adherence to these expectations.	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00010 Emergency Preparedness Drills And Exercises Appendix B- Performance Objectives requires habitability of emergency centres to be re-evaluated periodically (every drill) per section 5.1.4 Reactor operations are conducted from the MCR only except in cases where control room is not habitable. BP-PROC-00617, Human Performance Tools for Workers provides guidance for effective communication. Section 4.1.1 Effective Verbal Communication The Effective Verbal Communication tool is used to ensure a common understanding between a Sender and Receiver(s). When to Use the Effective Verbal Communication Tool Use this tool during the operation or alteration of plant equipment, during performance of important procedural steps, or when the safety of personnel, the environment or the plant may be impacted.	
7.8.	The emergency control room and the shutdown panel and all other safety related operational panels outside the control room shall be kept operable and free from obstructions, as well as from non-essential material that would prevent their immediate operation. The operating organization shall periodically confirm that the emergency control room or the shutdown panel and all other safety related operational panels are in the proper state of operational readiness, including proper documentation, communications, alarm systems	GRP-OPS-00038, Bruce A and B Operations Standards and Expectations Appendix B: General Material Condition Housekeeping Inspection Standards Provides Physical Conditions Guidelines Section A1 states: Floors (washrooms, walking and working surfaces) must be - kept clear of clutter, including loose papers, files, piles of paper, excessive or obsolete materials, broken containers, damaged materials and Unnecessary furniture. - Items to be stored should be placed in a designated storage location and not on/under tables/desks - Desks are to be left in an orderly state at the end of the every day - And others. Section A2 states:	C

Article No.	Article Requirement	Assessment	Compliance Category
	and habitability.	Aisles and Passageways must be clear and Unobstructed. Section A4 states: stairs and ramps must be clear and unobstructed, no items stored on landings or stairs. GRP-OPS-00047, Operator Inspections Bruce A and Bruce B Section 4.0, Procedure Description describes the procedure and process of operator routines and field inspections. BP-PROC-00268, Safety System Testing (SST) Program Procedure Section 4.0 Procedure Description The Safety-Related System Testing program is owned by the Manager, Reactor Safety. Engineering Division and is approved by the Vice President, Engineering. The SST program is intended to test Safety-Related SSCs to determine if they are available. The program has a direct link to equipment reliability. The SST program is a requirement of the Bruce A and Bruce B operating licenses. BP-OPP-00002 states the following: 60.3 Secondary Control Area Availability The availability of the monitoring and control functions provided in secondary control areas shall be maximized. In order to comply with this principle: 1. Monitoring and control functions for safety related systems in the secondary control areas shall not intentionally be removed from service without the approval of the Senior Operations Authority. 2. All monitoring and control functions for safety related systems in secondary control areas shall be tested as per OP&P 03.5. 3. Where maintenance is necessary, it shall be done according to policies and limits outlined in OP&P 03.1, 21.4, 34.4, 63.4 and 60.4.	
7.9.	The alarms in the main control room shall be managed as an important feature in operating a plant safely. The plant information system shall be such that off-normal conditions are easily	GRP-OPS-00038, Bruce A&B Operations And Expectations Section 4.11 Annunciation Management Expectation The Control Room Operators shall be aware of their unit annunciation status. The Control Room	C

Article No.	Article Requirement	Assessment	Compliance Category
	recognizable by the operators. Control room alarms shall be clearly prioritized. The number of alarms, including alarm messages from process computers shall be minimized for any analysed operational state, outage or accident condition of the plant. The operating organization shall establish procedures for operators to manage the response to alarms.	Operator or delegate will promptly note new alarms, assign an appropriate priority with respect to other unit conditions and activities, and ensure that all necessary corrective actions are taken. The Control Room Operators anticipate annunciations due to testing or as a result of normal plant operating condition or work activities. These expectations and the following standards also apply to Active Liquid Waste (ALW), Water Treatment Plant (WTP), Water Demineralization Plant (WDP) and Heavy Water Upgrader Control Room Operators Standards Annunciation management is a Skill-of-the Trade as defined by this procedure and incorporates the following principles: 1. The Control Room Operators will ensure that all corrective actions are taken in response to alarms. This includes investigating annunciations that alarm and immediately clear. 2. The Control Room Operators will promptly acknowledge and prioritize new alarms, and will maximize the availability of the annunciation system by: a) Promptly acknowledging alarm windows and CRT messages. b) Resetting alarms only after the appropriate investigation has been initiated. c) Temporarily dealing with repetitive alarms by allowing the cyclic alarm feature to engage. Longer term nuisance alarms should be treated as temporary changes per BP-PROC-00638, Temporary Configuration Change Management. d) Making use of the keyboard cursor feature to avoid long term cluttering of the alarm CRTs. 3. When an annunciation is received, the Annunciation Control buttons shall be pressed one button at a time: SILENCE, ACKNOWLEDGE, RESET 4. For alarms that are expected as part of testing, maintenance or an in-progress evolution, no compensatory actions are required For routinely received alarms similar to the examples noted below, where the response is always to request field Operator investigation, the Control Room Operator may direct field Operator action without reference to the Alarm Response Manual:	

Article No.	Article Requirement	Assessment	Compliance Category
		a) Building drainage sump high level where the sump pump control is normally selected to MANUAL. b) Chemical addition tank low level. 6. For unexpected alarms, the Control Room Operator will refer to and execute the applicable operating procedure. Investigate the cause of the annunciation. If the cause of the annunciation is understood and the actions are successfully correcting the condition, then no further action is required. If the cause cannot be explained, or the actions are not achieving the expected results then immediately inform the Control Room Shift Supervisor. Initiate troubleshooting (e.g., Work Request; Troubleshooting Plant Equipment procedure, Engineering Decision Making (EDM), Station Condition Record). The troubleshooting actions, owner and expected completion time shall be logged until resolution is achieved. 7. Alarm summaries should be reviewed: a) Within 30 minutes of accepting the Unit log (as per GRP-OPS-00031, Conduct of Shift Turnovers). b) Following a transient, once the unit has reached a stable state. This check will ensure that compensatory actions are taken for lower priority alarms that were not necessary to address during the event. c) Safety System Monitoring Computer (SSMC) alarm summaries should be reviewed every shift. 8. Additionally, during Transient Operation: a) It is the Control Room Operator's responsibility to ensure effective annunciation monitoring. Monitoring of annunciations can be delegated to qualified individuals. The responsibilities must be clearly communicated. b) Reset of annunciations shall only be performed after the event has been diagnosed. c) Annunciations will initially be used for diagnosis of the event. The Alarm Response Manual need not be referenced if a procedure can be selected with the available information (annunciations, trends, process response, etc.). 9. Observation and Coaching Checklist, FORM-12961, CHECKLIST, Annunciation and Annunciation Response should be used to regularly assess and reinforce adherence to these expectations.	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00561, Operator Fundamentals Appendix B: Operator Fundamentals Sample Questions For Supervisors These questions are NOT meant to be all inclusive. They are a sampling of the type of questions that can be asked to gauge the Operator's level of understanding of Operator Fundamentals. Monitoring: 1. What are the most important indications to monitor right now? Why? 2. Which indicators are used to verify that you are in compliance with procedures? 3. If X component just failed in the plant: a) What would you see on the Control Room panels? b) Which alarms should come in? c) What would you expect in the field? 4. What are the indications associated with pump cavitation and runout? 5. What are the limits of the indications? 6. Which instruments and indications are most accurate for the given situation (that is, narrow range and wide range)? 7. Which instruments are independent and redundant? BP-PROC-00250 Sheet 0002, Alarm Response Manual Format Section 1.0 Purpose states: This procedure specifies the requirements for Alarm Response Pages (ARP) and shall be used in conjunction with BP-PROC-00250, Station System Procedure Requirements. Alarm Response Page formats are implemented by approved templates. Section 4.0 Procedure Description states:	

Article No.	Article Requirement	Assessment	Compliance Category
		ARPs are prepared to allow Operations staff to efficiently manage plant status information and system disturbances or conditions that may result in plant instability. Individual Alarm Response Pages are numbered with the format outlined in section 4.2 to ensure clearly distinguishable field alarms from control room alarms.	
Requirement 28: Material conditions and housekeeping	The operating organization shall develop and implement programmes to maintain a high standard of material conditions, housekeeping and cleanliness in all working areas.	This is assessed in detail in section 7.10 to 7.12.	C
7.10.	Administrative controls shall be established to ensure that operational premises and equipment are maintained, well lit and accessible, and that temporary storage is controlled and limited. Equipment that is degraded (owing to leaks, corrosion spots, loose parts or damaged thermal insulation, for example) shall be identified, reported and corrected in a timely manner.	BP-PROG-12.01 Conduct of Plant Operations Section 4.3.19 Material Conditions and Housekeeping states: Staged or stored material in the plant shall be controlled to prevent adverse effects on safety and fire loading, as per the requirements of the station license. Operations shall own the housekeeping program. BP-PROC-00260, Material Condition and Housekeeping GRP-OPS-00038, Bruce A&B Operations Standards and Expectations Section 4.18 Housekeeping states: Expectation Operations staff, led by the Shift Manager, shall act as the conscience for the station in the area of housekeeping. Field Operators will ensure that housekeeping standards are followed by everyone entering their unit. Operators are expected to keep their equipment and areas clean and tidy and to prevent buildup of dirt, oil spills and other chemicals. Portable equipment is kept stowed in designated areas when not in use. Work groups performing activities in the station are expected to clean up afterwards and to restore the area and equipment to a pristine state. This includes the removal of scaffolds; removal of tools, materials and workbenches; replacement of insulation; repainting damaged	C

Article No.	Article Requirement	Assessment	Compliance Category
		paintwork; and cleaning up any debris left behind after the work. Standard 1. Shift Crews are assigned specific units for housekeeping oversight. The crew assignments are listed on the Operations WebPages on the corporate Intranet. 2. Deficiencies in Housekeeping will be addressed/cleaned by those causing the problem, with the objective of better than found. Minor issues will be addressed by Field Operating personnel. Those housekeeping Issues that cannot be addressed immediately will be brought to the attention of the Unit Supervising Nuclear Operator and/or the Field Shift Operating Supervisor and entered in the Workplace Inspection System (WIS) database, for follow-up by the Area Owner. 3. When a Work Authorization is ready to be surrendered, the Control Room Operators will assess the need to confirm that the work area has been left in an acceptable state. If inspection by Operations determines the work area is in an unacceptable state, then request the maintenance FLM to ensure the area is brought up to a standard that will allow the work authorization to be surrendered. Surrender of the Work authorization will not be accepted until identified deficiencies have been corrected. 4. Operators will clean their equipment as necessary to prevent build up of dirt, oil or chemicals around the operating equipment. Oil absorbent pads shall be in place and replaced as frequently as necessary to prevent spread of oils. 5. Housekeeping will be maintained to the defined standard in BP-PROC-00260, Material Condition and Housekeeping. 6. Observation and Coaching checklist, FORM-12982, CHECKLIST, Housekeeping, should be used to regularly assess and reinforce adherence to these expectations. BP-PROC-00260, Material Condition and Housekeeping Section 1.0 Purpose States The Operations department has the Obligation to ensure that the Bruce Power facilities are operated safely within the design envelope and to ensure that all materials and equipment deficiencies are identified to the maintenance department. It also states Excellent Material/Equipment condition and high Housekeeping standards are fundamental to safe and efficient Operation. It is the responsibility of all Bruce Power staff to	

Article No.	Article Requirement	Assessment	Compliance Category
		adhere to these standards when performing all system operations, inspection, maintenance, construction or project activities. Upon completion of any planned or routine activities, the area(s) will be in a better condition than before the work/task/activity was started (Better Than As Found [BTAF]). Section 4.0 Procedure Description states The purpose of this procedure is to ensure that the Material/Equipment Condition and Housekeeping Standards, in the appendices of this document, are met and maintained. All Bruce Power Facilities will be inspected. Each facility will be subdivided into inspection and ownership areas. Each area is assigned an accountable line manager Area Owner and an independent, line manager Area Inspector. Inspection areas and associated, accountable Inspectors and Owners, are designated by the facility Department/Section Managers. These areas are grouped into larger housekeeping areas, such as Station Units or Site Buildings and are in turn, assigned an accountable, Management Unit Owner, by the facility Senior Management. A Planned Inspections Coordinator (PIC) will be assigned for each of the major facilities on site, Bruce A, Bruce B and Centre of Site. At the direction of facility Senior Management, each PIC will be the Single Point of Contact for administration of the database and monitoring of facility specific trends. Appendix B: General Material Condition Housekeeping Inspection Standards provides physical conditions guidelines Section B9 states for lighting that “Walking and working areas adequately illuminated during periods of occupancy” Section A1 states: Floors (washrooms, walking and working surfaces) must be - kept clear of clutter, including loose papers, files, piles of paper, excessive or obsolete materials, broken containers, damaged materials and Unnecessary furniture. - Items to be stored should be placed in a designated storage location and not on/under tables/desks - Desks are to be left in an orderly state at the end of the every day	

Article No.	Article Requirement	Assessment	Compliance Category
		Section A2 states: Aisles and Passageways must be clear and Unobstructed. Section A4 states: Stairs and ramps must be clear and unobstructed, no items stored on landings or stairs. Section 4.0 Procedure Description Storage Areas states Temporary Storage areas will be approved and maintained as per BP-PROC-00189, Control of Transient Materials (FORM-11140). Such areas will be included in Planned and General Housekeeping inspections. Additional standards for storage areas, are detailed in the above implementing documents. BP-PROC-00260, Material Condition and Housekeeping Section 1.0 Purpose states: The Operations Department has the obligation to ensure that Bruce Power Facilities are operated safely within the design envelope and to ensure that all material and equipment deficiencies are identified to the Maintenance Department. The Maintenance Department is accountable for the equipment condition at Bruce Power facilities and will ensure that programs are in place to maintain and restore equipment to function as designed. GRP-OPS-00047, Operator Inspections Bruce A and Bruce B Section 4.0, Procedure Description describes the procedure and process of operator routines and field inspections. BP-PROC-00684, Conduct of Maintenance Manual Section 1.0 Purpose states: The primary role of Maintenance is to provide high quality maintenance services for plant	

Article No.	Article Requirement	Assessment	Compliance Category
		structures/ systems/ components (SSC) in a timely, efficient and safe manner, minimizing the requirement for rework in support of safe, reliable plant operation under normal conditions and reliability of plant equipment required to support emergency operations.	
7.11.	An exclusion programme for foreign objects shall be implemented and monitored, and suitable arrangements shall be made for locking, tagging or otherwise securing isolation points for systems or components to ensure safety.	BP-PROC-00464, Foreign Material Exclusion Section 1.0 Purpose states: Foreign material that enters systems or components can cause equipment degradation or inoperability, fuel damage, or high radiation and contamination levels that are spread throughout the plant. Great care and precautions must be taken to avoid the introduction of foreign materials to plant systems or components. This procedure emphasizes the following: - A Focus on Prevention philosophy. - Requires clear expectations and standards be set by station management. - In-process and plant inspections to assure FME requirements are being effectively implemented. Appendix G states: Establishing and Maintaining FMEA (Foreign Material Exclusion Area) identifies FMEA Boundary requirements to control access to the area, nearby work or equipment and system configuration. Section 3.1.13 defines (FMEA) Foreign Material Exclusion Area as: The work area around an open system for mechanical, instrumentation or electrical component, which may be surrounded by a physical boundary with signs. This area requires specific controls to prevent the introduction of foreign material into the system, components or processes during work activities that could impact plant safety or power generation.	C
7.12.	The operating organization shall be responsible for ensuring that the identification and labelling of safety equipment and safety related equipment, rooms, piping and instruments are accurate, legible and well maintained, and that they do not introduce any	GRP-OPS-00023, Equipment Labeling This procedure does not explicitly mention the safety and safety related equipment but rather sets out to ensure that all equipment rooms, piping and instrument labeling is defined in this procedure. Section 4.0 Procedure Description states: 1. Equipment labels, where practical, shall be orientated in a horizontal position.	C

Article No.	Article Requirement	Assessment	Compliance Category
	degradation.	2. Where practical, labels shall be readable without manipulation by facility personnel 3. Equipment labels shall be located to eliminate any possible confusion as to the equipment being identified and shall not obscure other equipment nearby. 5. Permanent equipment identifiers will match the Master Equipment List (MEL) identifiers in PASSPORT. 6. Equipment and component identifiers shall be consistent among the equipment labels and control documents (e.g. design drawings, operational flowsheets, technical procedures, checklists and load lists) Section 7.6 Operations, Maintenance and Engineering staff to report equipment label deficiencies in accordance with this procedure; i.e. to ensure it is well maintained.	
Requirement 29: Chemistry programme	The operating organization shall establish and implement a chemistry programme to provide the necessary support for chemistry and radiochemistry.	This is assessed in Detail in 7.13 to 7.17	C
7.13.	The chemistry programme shall be developed prior to normal operation and shall be in place during the commissioning programme. The chemistry programme shall provide the necessary information and assistance for chemistry and radiochemistry for ensuring safe operation, long term integrity of structures, systems and components, and minimization of radiation levels.	Because this is a currently operating plant, prior to normal operation occurs after an outage or abnormal operation and covered by DPT-CHM-00008, Outage Chemistry Program Section 4.0 Procedure Description The purpose of this document is to identify the requirements and provide instructions for the station Chemistry and Environment organizations to optimize chemistry control during outages to achieve maximum asset protection and support dose reduction initiatives. This document provides chemistry requirements and activities to supplement the system chemistry specifications required for successful planning and preparation prior to an outage, for execution and monitoring during the outage, and for successful preparation for startup when the outage is complete. BP-OPP-00002, Operating Policies And Principles - Bruce A Section 02.4 Chemistry Control Appropriate chemistry control shall be maintained to minimize conditions such as reduction of	C

Article No.	Article Requirement	Assessment	Compliance Category
		heat transfer coefficients, corrosion of components, radiolytic decomposition, activation product formation, and unplanned changes to reactivity. BP-PROG-12.02, Chemistry Management Section 1.0 Purpose states: This program document defines the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with the management of plant chemistry. The objective of plant chemistry management is to establish the optimum conditions for system chemistry and to mitigate conditions that could lead to an adverse effect on plant systems. The chemistry program is designed to embrace the fundamentals of nuclear safety as defined in BP-MSM-1. The program embraces the fundamentals of strong nuclear safety principles and recognizes that reactor safety, industrial safety, radiation safety and environmental safety, are essential to long-term success of the chemistry program. The requirements of this program shall meet the requirements of CSA N286-05 and in particular meet the requirements of Section 6.23, Chemistry Control. Chemistry Program Interfaces are described in Section 4.4. Section 4.4.4 BP-PROG-11.01, Plant Reliability Integration states: The chemistry management program supports equipment reliability by ensuring that system chemistry is measured and controlled to design specifications. The chemistry management program interfaces with equipment reliability by providing chemistry information to plant system health reports and by providing input to lifecycle management plans, which consider the impact of chemistry-related conditions on longer-term life and ageing of components. Engineering inspection reports, condition assessments and other information is shared with the chemistry program such that review and modification of chemistry specification can be modified to ensure that lifecycle goals are achieved over the lifespan of the asset.	
7.14.	Chemistry surveillance shall be conducted at the plant to verify the effectiveness of chemistry control in plant systems and to verify that structures, systems and	BP-OPP-00002, 02.4 Chemistry Control Appropriate chemistry control shall be maintained to minimize conditions such as reduction of heat transfer coefficients, corrosion of components, radiolytic decomposition, activation product formation, and unplanned changes to reactivity.	C

Article No.	Article Requirement	Assessment	Compliance Category
	components important to safety are operated within the specified chemical limit values.	BP-PROG-12.02 Chemistry Management Section 4.0 The CSA standard N286-05 requires, in addition to the generic requirements, that the chemistry program contain specific processes to ensure that chemistry of plant systems is controlled. System Chemistry Specifications are defined in SEC-CHD-00001, Guidelines for Preparing/Revising System Chemistry Specifications which considers the latest EPRI, COG, OPEX information and best industry practices. System chemistry is maintained through three main chemistry department procedures; DPT-CHM-00003, Control of System Chemistry DPT-CHM-00008, Outage Chemistry, and BP-PROC-00197 Chemistry Control Event Management. The chemistry program ensures that key chemistry parameters are monitored in a timely manner to correct and control plant chemistry within industry established guidelines. Sampling requirements are stated in the CYS documents and reporting requirements are implemented by DPT-CHM-00003.	
7.15.	The chemistry programme shall include chemistry monitoring and data acquisition systems. These systems, together with laboratory analyses, shall provide accurate measuring and recording of chemistry data and shall provide alarms for relevant chemistry parameters. Records shall be kept available and shall be easily retrievable.	BP-PROG-12.02 Chemistry Management Section 4.3 Analytical Capability states: Bruce Power shall have Chemistry Laboratories on-site with adequate facilities, instrumentation and qualified staff to provide analytical services to monitor system chemistry parameters in support of the chemistry program….. Bruce Power shall maintain Chemistry monitoring equipment (i.e. on-line analyzers, laboratory instruments) and support systems (e.g. Gaseous Fission Products (GFP), sampling systems, dosing equipment, heating, ventilation and air conditioning (HVAC) in good working order to satisfy the requirements of the chemistry program. DPT-CHM-00003, Control of Chemistry Section 4.2, Chemistry Control Procedures states Chemistry Control Procedures are the principal documents which implement the Chemistry Control Specifications (CYS). CYS documents are written by the Chemistry Programs Department and approved by Plant Design. CCPs are written by station Chemistry technical staff, usually the Responsible System Chemist (RSC), and are verified by the station Chemistry and Environment Department Manager and	C

Article No.	Article Requirement	Assessment	Compliance Category
		approved by Chemistry Programs Department Manager. Section 4.3 Chemistry Laboratory Monitoring of System Chemistry Monitoring system chemistry involves sampling and analysis of the plant systems in accordance with the CCPs in order to verify the effectiveness of the Chemistry Control Program. DPT-CHM-00006, Analytical Capability, in conjunction with the specific Chemistry Laboratory Procedures (CLPs), defines the analytical methods and instrumentation employed by Bruce Power. DPT-CHM-00007, Performance Monitoring describes the processes around intra-laboratory and inter-laboratory testing. This ensures that analysts in the laboratory are able to demonstrate accurate performance of test methodologies in the laboratory compared to outside peer laboratories. The quality control necessary to ensure the chemistry laboratories' test methods and associated instrumentation are properly established, maintained and controlled are defined by DPT-CHM-00006, Analytic Capability. Chemistry laboratory staff shall properly generate and record, and Bruce Power shall retain all chemistry related data produced as per the Document Retention Program. SEC-CHD-00001, Guidelines For Preparing And Revising Chemistry Specifications Section 1.0 Purpose states: Proper chemistry control will maximize equipment life, reliability and long term economic performance whilst contributing to safe and environmentally friendly operation. To promote proper chemistry control, Bruce Power prepares and maintains Chemistry Specification (CYS) documents. The purpose of the CYS is to define chemistry control specifications and rationale for all systems in Bruce Power's Nuclear Generating Units that require chemistry to be controlled during all operating states. Compliance to these specifications and prescribed actions is mandatory. The Bruce Power Chemistry Programs shall strive for the highest standards, taking into account the best international practices, as per the Plant Chemistry Management Program (BP-PROG-12.02). The CYS specifications represent the minimum level of performance and where applicable, account for licensing issues, public and worker safety, plant reliability, environmental protection and product cost. Station staff are expected to optimize chemistry control and are encouraged to	

Article No.	Article Requirement	Assessment	Compliance Category
		impose additional parameters, more stringent administrative limits and apply more frequent sampling schedules. Chemistry Programs staff shall develop and maintain chemistry specifications for each system to protect the asset in all operating states. When a control parameter is outside its defined specification, an Action Level (AL) is entered. Bruce Power has adopted the AL concept from EPRI chemistry guideline documentation. ALs are values of control parameters at which system reliability may be jeopardized or increased radiation field build-up may occur and action must be taken. Deviations from normal chemistry parameters should be investigated. Three ALs are defined, AL 1, AL 2, and AL 3 which represent conditions of increasing severity.	
7.16.	Laboratory monitoring shall involve the sampling and analysis of plant systems for specific chemical parameters, concentrations of dissolved and suspended impurities, and radionuclide concentrations.	DPT-CHM-00003, Control of Chemistry Section 4.2, Chemistry Control Procedures states Chemistry Control Procedures are the principal documents which implement the Chemistry Control Specifications (CYS). CYS documents are written by the Chemistry Programs Department and approved by Plant Design. CCPs are written by station Chemistry technical staff, usually the Responsible System Chemist (RSC), and are verified by the station Chemistry and Environment Department Manager and approved by Chemistry Programs Department Manager. Section 4.3 Chemistry Laboratory Monitoring of System Chemistry Monitoring system chemistry involves sampling and analysis of the plant systems in accordance with the CCPs in order to verify the effectiveness of the Chemistry Control Program. DPT-CHM-00006, Analytical Capability, in conjunction with the specific Chemistry Laboratory Procedures (CLPs), defines the analytical methods and instrumentation employed by Bruce Power. SEC-CHD-00001, Preparing/Revising System Chemistry Specifications Chemistry specifications are developed with consideration given to system materials of construction. Activities associated with system design and modification are addressed by BP-PROG-10.01, Plant Design Basis Management and BP-PROG-10.02 Engineering Change Control which ensures that impacts on system chemistry are evaluated.	C
7.17.	The use of chemicals in the plant, including chemicals brought in by	BP-PROC-00306, Chemical Risk Management	C

Article No.	Article Requirement	Assessment	Compliance Category
	contractors, shall be kept under close control. The appropriate control measures shall be put in place to ensure that the use of chemical substances and reagents does not adversely affect equipment or lead to its degradation.	Section 1.0 Purpose This document establishes administrative controls and guidance necessary to ensure compliance with good industry practices for controlling hazardous materials in the work place. This procedure defined the process required to evaluate and communicate to workers the potential risks associated with hazardous materials usage. The program is designed to protect workers, the station facility, the environment, and plant systems and equipment from uncontrolled or unmanaged use of hazardous materials. All products or materials are chemical in nature. Workers are generally familiar with chemicals being products such as acids, bases, laboratory reagents, bulk chemicals, compressed gases and others. This procedure requires teamwork to ensure that the appropriate chemical products are chosen, used and stored in such a manner as to reduce and manage the risk they intrinsically contain. This is accomplished by assessing the relative risk for each chemical product, applying a coloured label to indicate the assessed risk, and entering this information in PassPort for use when planning, communicating and performing work. The Chemical Risk Management program applies to all product types with some exemptions described in this procedure. To obtain approval of a new hazardous material, the Requestor shall follow the process outlined in Appendix A, Hazardous Material Approval Process. If the material will be used by a contractor, the process outlined in Appendix B, Contractor's Hazardous Material Approval Process, shall be followed. The chemicals are kept under close control using BP-PROC-00306, Chemical Risk Management 3.1.3 Chemical Risk assessment groups (Chemistry, Safety, Environment, Fire) 3.1.4 Chemical risk colour codes and assessment results (Green-Approved for use, Yellow-Conditional Use, Red-Restricted Use, Purple-By Permit Only) 4.1 Product Selections 4.2 New Product Acquisition 4.3 New Hazardous Material Evaluation 4.4 Procurement 4.5 Product Labelling	

Article No.	Article Requirement	Assessment	Compliance Category
		4.6 Product Usage 4.7 Reassessment of Products 4.8 Contractor Use Chemicals Contractor chemical usage must comply with this procedure. See Appendix G for the sponsor's responsibilities. Appendix G describes the responsibilities of the sponsor as 1. Identify the Hazardous Materials required by the contractor or Vendor and follow the appropriate sections in BP-PROC-00306, Chemical Risk Management. 2. The contractor or vendor must be trained prior to doing work in accordance with BP-PROC-00306, Chemical Risk Management. This training must be documented. 3. Ensure the proper use, storage and disposal of chemicals. 4. Report Non-compliance or unsafe Chemical handling. SEC-CHD-00001, Preparing/Revising System Chemistry Specifications states: Chemistry specifications are developed with consideration given to system materials of construction. Activities associated with system design and modification are addressed by BP-PROG-10.01, Plant Design Basis Management and BP-PROG-10.02 Engineering Change Control which ensures that impacts on system chemistry are evaluated. SEC‑CHD‑00004, Guidelines For Performing Process System Chemistry Compatibility Assessments (SSCA) describes chemical compatibility assessments to ensure that the use of chemicals does not adversely affect equipment. An SCCA is an element in the overall assessment of a product or material, which includes worker safety, system life cycle management and waste stream management. The overall program for the acquisition of hazardous materials is described in the document: BP-PROC-00306, Chemical Risk Management Procedure.	

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00197, Chemistry Control Event Section 1.0 Purpose states: The purpose of the Chemistry Control Event (CCE) Management procedure is to ensure that when degraded system chemistry conditions exist, the event is properly identified, documented, monitored, and evaluated. Chemistry Programs evaluates events and determines if a Chemistry Impact Evaluation (CIE) is required. The intent of the Chemistry Impact Evaluation is to provide a written assessment of the CCE's impact to the equipment and to provide operating recommendations given the conditions of the event.	
Requirement 30: Core management and fuel handling	The operating organization shall be responsible and shall make arrangements for all activities associated with core management and with on-site fuel handling.	This is assessed in Detail in 7.18 to 7.29.	C
7.18.	Provision shall be made to ensure that only fuel that has been appropriately manufactured is loaded into the core. In addition, the fuel design criteria and fuel enrichment shall be in accordance with design specifications and shall be subject to approval by the regulatory body as required. The same requirements shall be applied before the introduction of fuel of a new design or of a modified design into the core.	BP-MSM-1, Management System Manual Appendix A Fuel Management Bruce Power shall effectively procure, transfer, store, inspect, insert, shuffle and discharge fuel in a manner that ensures optimum reactor core operation within regulatory, safe operating and nuclear fuel performance limits, that minimizes radiation exposure and that protects fuel from damage throughout the fuel life cycle to achieve Zero defect goal. BP-PROG-12.03, Fuel Management Section 1.0 Purpose states: - Operation of the reactor with fuel of an approved design, manufactured to strict quality - - Operation of the reactor with fuel of an approved design, manufactured to strict quality assurance requirements. BP-PROC-00455, Fuel Procurement	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.2.1 Produce Technical Requirements states The Nuclear Safety Analysis and Support Department determines the technical requirements for the types of fuel that will be used in the Bruce A and B reactors. These requirements are used to specify the material composition, dimensions, tolerances and other physical aspects important for quality manufacturing of the fuel. Section 4.2.2 Establish Contracts states In accordance with BP-PROC-00228, Procurement of Items and Services, Supply Chain evaluates bids and, as applicable, establishes contracts to purchase U3O8, and other components as applicable, and to manufacture fuel bundles with the successful bidders. As part of the establishment of fuel manufacturing contractual agreements, Supply Chain assesses the vendor's fuel manufacturing process and associated quality assurance program against the industry's highest fuel manufacturing quality standards. This includes a comprehensive review of the manufacturing process as well as a complete walk down of the production line by an independent and qualified inspector. Changes to established contracts may occur due to changes in business decisions, or when the required supply falls outside the bounds of the agreement. Supply Chain manages the changes to established contracts in accordance with BP-PROC-00041, Contract Management. 4.3 Execute Contracts 4.3.1 U_3O_8 4.3.2 Uranium Oxide Powder 4.3.3 Fuel Bundles The fuel bundle manufacturer manages the production of fuel bundles and ensures that the technical requirements specified by Bruce Power are met. The technical requirements as well as manufacturing quality assurance programs, are specified in the commercial agreement with the fuel bundle manufacturer. In accordance with BP-PROC-00368, Source Surveillance, Supply Chain ensures that the fuel bundles are inspected by qualified source surveillance personnel on site at the manufacturer before the fuel bundles are transported to the Bruce facilities. From time to time, concessions are requested by the fuel manufacturer. In accordance with BP-PROC-00367, Dispositioning Supplier Concessions, Supply Chain assesses the adequacy of the	

Article No.	Article Requirement	Assessment	Compliance Category
		requested concessions against the technical requirements, involving NSAS as necessary. Following source inspection, the fuel bundle manufacturer makes arrangements for the transport of the fuel bundles; the fuel bundle manufacturer remains responsible for the fuel bundle until Bruce Power accepts the shipment on site. Section 4.4 Receiving Bundles states Fuel and Physics makes arrangements with the fuel manufacturer and with Fuel Handling for shipment scheduling. When a fuel shipment arrives at the station, Fuel Handling proceeds with inspection of the seal for fuel accounting purposes in accordance with international safeguards requirements. The fuel is then transported by Fuel Handling from the unloading area to the fresh fuel storage area, and is kept in storage until it is ready for loading in the reactor. Fuel Handling informs Fuel and Physics that fuel has been received. These fuel handling activities are performed in accordance with BP-PROC-00460, Fuel Handling. Fuel and Physics confirms to Finance that fuel has been received. In accordance with BP-PROC-00422, Nuclear Fuel Inventory Financial Accounting Process, Finance proceeds with payment to the fuel manufacturer. It is also noted that Bruce Power complies with PROL 15.00-2015 where section 5.3 states the following: “The licensee shall not load any fuel bundle or fuel assembly into a reactor unless the use of the design of the fuel bundle or fuel assembly has received prior written consent by the Commission, or a person authorized by the Commission” Accordingly, Bruce Power requested CNSC consent to use 37M fuel in the Bruce A reactors (NK21-CORR-00531-09924).	
7.19.	The operating organization shall be responsible for the development of the specifications and procedures for the procurement, verification, receipt,	BP-PROC-00455, Fuel Procurement Section 4.2 Procurement Contracts Section 4.2.1 Produce Technical Requirements	C

Article No.	Article Requirement	Assessment	Compliance Category
	accounting and control, loading, utilization, relocation, unloading and testing of fuel and core components. A fuelling programme shall be established in accordance with the design assumptions and details shall be submitted to the regulatory body if required. Following refuelling, it shall be confirmed by means of calculations and measurements that the performance of the core meets the safety criteria. It shall also be confirmed that all core alterations comply with approved configurations.	The Nuclear Safety Analysis and Support Department determines the technical requirements for the types of fuel that will be used in the Bruce A and B reactors. These requirements are used to specify the material composition, dimensions, tolerances and other physical aspects important for quality manufacturing of the fuel. BP-PROG-12.03, Fuel Management Section 4.0 Program Description states: The fuel management program starts with the fuel procurement process. As part of this process, fuel is manufactured in accordance with strict design requirements and quality assurance controls. The amount of fuel to be produced is determined on the basis of forecast fuel consumption and target new fuel inventory levels on site. Once received on site, the fuel is stored in dedicated areas, moved from storage locations to the fuelling machine, and loaded in the reactor, normally while at power. These activities are carried out in accordance with the fuel handling process. The core management process specifies the fuel channels to be fuelled and monitors reactor and fuel performance in order to maintain reactor parameters affected by fuelling within operational margins, and well below safety and regulatory limits. Under the fuel handling process, irradiated fuel is discharged from the reactor to the irradiated fuel storage bays where it will be stored for cooling and decay purposes. Eventually, irradiated fuel may be transferred to dry storage containers and shipped to a waste management facility. Preparation of dry storage containers for shipment constitutes the end of the fuel movement life cycle under Bruce Power's responsibility. Throughout the fuel handling process, controls are implemented to manage the risk associated with out-of-core criticality. Also the fuel handling process includes fuel accounting activities to meet business needs as well as regulatory requirements associated with Canada's International Safeguards Agreement. The following subsections provide more details on the fuel management program implementing processes. SECTION 4.1 Fuel Procurement states: The fuel procurement process is owned by the Section Manager, Fuel and Physics and is described in BP-PROC-00455, Fuel Procurement. Section 4.2 Fuel Handling states:	

Article No.	Article Requirement	Assessment	Compliance Category
		The fuel handling process is owned by the Manager, Reactor Safety Engineering and is described in BP-PROC-00460, Fuel Handling. Section 4.3 Core Management states: The core management process is owned by the Section Manager, Fuel and Physics and is described in BP-PROC-00452, Core Management.	
7.20.	The operating organization shall be responsible for establishing a safe reactivity management programme under a strong management system for quality. Decisions on, and the planning, evaluation, conduct and control of, all operations or modifications involving the fuel that are liable to affect reactivity control shall be undertaken by using approved procedures and respecting predefined operational limits for the core.	BP-MSM-1, Management System Manual Appendix A Fuel Management states Bruce Power shall effectively procure, transfer, store, inspect, insert, shuffle and discharge fuel in a manner that ensures optimum reactor core operation within regulatory, safe operating and nuclear fuel performance limits, that minimizes radiation exposure and that protects fuel from damage throughout the fuel life cycle to achieve Zero defect goal. BP-PROG-12.03, Fuel Management Section 1.0 Purpose states This program document defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with all aspects of the fuel management process. The objectives of the fuel management program are: - optimum reactor core operation within operating and regulatory limits; - operation of the reactor with fuel of an approved design, manufactured to strict quality assurance requirements; - prevention of fuel damage throughout the fuel life cycle and timely removal of failed fuel from the core; - as low as reasonably achievable radiation exposure associated with fuel and Cobalt 60 activities; - fulfilling Bruce Power’s obligations under Canada’s Safeguards Agreement; - adequate support for fuel and fuel channel inspection;	C

Article No.	Article Requirement	Assessment	Compliance Category
		- prevention of out-of-core criticality associated with enriched uranium fuel; - implementation of processes and procedures for all program activities required for the safe and reliable use of nuclear fuel. Under Section 6.0 Responsibilities, Section 6.1 states: The designated Business Process Owner responsible for discharging the related duties as they apply to this Level 2 program, BP-PROG-12.03, Fuel Management. The BP-MSM-1 Sheet 2 identifies the designated Business Process Owners responsible for discharging the related duties as they apply to the Level 3 implementing processes. For example, on page 88, the Department Manager, Fuel & Physics has the following responsibilities: • Monitor site processes and programs to provide guidance to managers and staff in decision making regarding reactor safety requirements. • Provide reactor physics problem analysis support and technical advice to the Divisional Manager, Reactor Safety Engineering in support of the Site. Reactor Physics analysis includes neutronic trip assessment, fuel safety, and core power configurations. • Provide reactor fuelling strategies. • Monitor, trend, and assess compliance with power, gap, and reactivity limits and develop strategies to ensure limits are not violated. • Assess completed safety analysis to ensure alignment with the plant in the reactor physics are and ensure outputs of analysis are used correctly. Provide governance and support for the Fuel Management Program.	
7.21.	A comprehensive core monitoring programme shall be established to ensure that core parameters are monitored, analysed for trends and evaluated to detect abnormal behaviour; to ensure that actual core performance is consistent with core design requirements; and to ensure that the values of key operating parameters are recorded and retained in a logical, consistent and retrievable	Core monitoring procedure BP-PROC-00452, Core Management establishes the process that governs the activities associated with managing the fuel while residing in the reactor core. The Core Management process starts with the loading of fuel bundles in the reactor, and ends with unloading of the fuel from the reactor. The entry and exit interface is with the Fuel Storage and Handling process (BP-PROC-00460). The process comprises activities associated with: (1) a new reactor core; (2) a subcritical reactor; and (3) a critical reactor. Each state is addressed in detail. For example, under 4.3 Critical Reactor, Section 4.3.1 Core Monitoring the following is described: Several reactor parameters are monitored to ensure that limits associated with the fuel are respected. Some of these parameters can be monitored directly from process measurements (e.g., bulk reactor power; flux tilts). However, many parameters (e.g., bundle and channel powers), cannot be directly measured and must rely on calculations done using the computer	C

Article No.	Article Requirement	Assessment	Compliance Category
	manner.	software called Simulation Of Reactor Operation (SORO). SORO is computer software that contains the neutronic diffusion equations necessary to calculate the power distribution across the core for each bundle. SORO is owned by the Nuclear Safety Assessment and Support Department and is maintained under BP-PROC-00363. At least twice a week, power histories, zone levels and FINCH channel power data is provided to Fuel and Physics by the control room operator in accordance with NK21-OM-37000-4.7/NK29-37000-4.1. Fuel and Physics inputs this data into SORO to generate a representation of the power distribution in the reactor. This is called a SORO production run. In practice, a SORO production run is performed almost every business day. The parameters that are monitored by Fuel and Physics in accordance with SEC-RP-00007 and by the control room operator in accordance with specific operating procedures is described for each of the following and specific procedures identified where relevant. Maximum Bundle Power Maximum Channel Power Minimum power for Low Flow Trip Channels Minimum reactor power SORO Accuracy (SORO-FINCH Error) Excess Reactivity Fuel Defects Channel Gap Management Flux Tilts Average Zone Level Average Fuel Discharge Burnup	
7.22.	Reactivity manipulations shall be made in a deliberate and carefully controlled manner to ensure that	In addition to fuel and core management aspects described in articles 7.20 and 7.21 respectively, reactivity manipulations are made automatically by the Reactor Regulating System (RRS) as described in various sections of BP-PROC-00452.	C

Article No.	Article Requirement	Assessment	Compliance Category
	the reactor is maintained within prescribed operational limits and conditions and that the desired response is achieved.	BP-PROC-00452, Core Management Section 4.3.3 Power Manoeuvres states: By power manoeuvres, we mean changes in power level, including power cycling, power increases (e.g., after a derate; during start up), and power reductions (e.g., derate; transition to shutting down). When the reactor needs to derate by more than 4 to 5% FP, a specific derate profile may be required from Fuel and Physics where the depth and rate of power reductions would be limited to avoid zone levels limiting low. The derate profile is issued to Power Marketing (BP-PROG-07.01) and then communicated to the control room for implementation under BP-PROG-12.01.03.01. During power manoeuvres, limits need to be respected in order to maintain fuel integrity and to ensure that we remain within the assumptions of the Safety Report. These limits are documented in the following Fuel and Physics Procedures: - Compliance with Reactor Physics Limits – SEC-RP-00007 - Fuel and Physics Procedures for Reactor Power Raise Units 3-8 SEC-RP-00009 The control room operator performs the power maneuvers under BP-PROG-12.01.03 with input from Fuel and Physics, either via the maximum reactor power form, or via limitations identified in the operating procedures. The operating procedures under BP-PROG-12.01.03 that involve power maneuvers that may impact fuel performance are: Bruce A: Turbine Unloading - NK21-OM-09110-2.1 Heatup - NK21-OM-09110-3.6 Turbine Runup - NK21-OM-09110-3.7 Turbine Loading - NK21-OM-09110-3.9 Controlled Power Manoeuvre - NK21-OM-09110-4.6 Operation in Poison Prevent Mode - NK21-OM-09110-4.7 Generation Rejection and Recovery - NK21-OM-09110-5.6	

Article No.	Article Requirement	Assessment	Compliance Category
		Reactor Stepback - NK21-OM-09110-5.16 Reactor Setback - NK21-OM-09110-5.17 Actions on Total Loss of 250 Vdc Power in the Switchyard - NK21-OM-09110-5.18 Response to Grid Upsets - NK21-OM-09110-5.19	
7.23.	The operating procedures for reactor startup, power operation, shutdown and refuelling shall include the precautions and limitations necessary to maintain fuel integrity and to comply with the operational limits and conditions throughout the lifetime of the fuel.	BP-MSM-1, Management System Manual Appendix A Fuel Management Bruce Power shall effectively procure, transfer, store, inspect, insert, shuffle and discharge fuel in a manner that ensures optimum reactor core operation within regulatory, safe operating and nuclear fuel performance limits, that minimizes radiation exposure and that protects fuel from damage throughout the fuel life cycle to achieve Zero defect goal. BP-OPP-00002 Operating Policies and Principles- Bruce A Sections 30.1 to 30.4 provide requirements on control of reactivity, Reactor Power Limits, Reactor Channel Power Limits and Fuel Bundle Power Limits that maintain fuel integrity and to comply with the operational limits and conditions throughout the lifetime of the fuel. Section 33.1 requires, “A heat sink which is capable of absorbing the heat produced in the fuel shall always be in service” Section 33.7 requires, “Individual channel flow shall be verified during all on-power fuelling operations.” “Flow in all channels shall be verified” BP-PROC-00452, Core Management Section 4.0 Procedure Description states: The Core Management element of the Fuel Management program encompasses activities associated with the fuel in the reactor. The Core Management process starts with the loading of fuel bundles in the reactor, and ends with unloading of the fuel from the reactor. The entry and exit interface is with the Fuel Storage and Handling process (BP-PROC-00460). Under Section 4.2 Subcritical Reactor, Section 4.2.2 Approach to Critical states: Whether there have been shutdown refueling activities or not during an outage, core	C

Article No.	Article Requirement	Assessment	Compliance Category
		management activities are required when the reactor is approaching criticality. The approach to critical activities are governed by four operating procedures under BP-PROG-12.01.03, depending on the condition of the outage: - Approach to critical after a poison out outage, with less than 1 ppm of Gadolinium in the moderator (NK21-OM-09110-3.10; NK21-OM-09110-3.3.1). - Approach to critical with more than 1 ppm of Gadolinium in the moderator with power indication remaining above -7.0 decades (RRS remains in control) (NK21-OM-09110-3.11; NK21-OM-09110-3.3.2). - Approach to critical with reactor power indication below -7.0 decades, but with criticality expected to be above -5.5 decades (NK21-OM-09110-3.12; NK21-OM-09110-3.3.3). - Approach to critical with reactor power criticality expected below -5.5 decades (Bruce A - case by case procedure; Bruce B, NK29-OM-09110-3.3.4, to be produced). All approach to critical transitions are carried out by the control room operator in accordance with the procedures referenced above, with varying degree of assistance from Fuel and Physics, as follows: - For all approach to critical transitions, Fuel and Physics produces an estimate of the power level at critical, which is the end point for the approach to critical. - Fuel and Physics will be present in the control room to assist the control room operator during an approach to critical transition as long as reactor power is monitored using startup instrumentation. Under 4.3 Critical Reactor, 4.3.1 Core Monitoring (See article 7.21 for details)	
7.24.	Radiochemistry data that are indicative of fuel cladding integrity shall be systematically monitored and analysed for trends so as to be able to monitor whether fuel cladding integrity is maintained under all operating conditions.	BP-MSM-1, Management System Manual Appendix A Fuel Management states Bruce Power shall effectively procure, transfer, store, inspect, insert, shuffle and discharge fuel in a manner that ensures optimum reactor core operation within regulatory, safe operating and nuclear fuel performance limits, that minimizes radiation exposure and that protects fuel from damage throughout the fuel life cycle to achieve Zero defect goal. Fuel Cladding is an international term which refers to the Fuel Pencil Sheath as per BP-PROC-00452, Core Management.	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 7 Fuel Defects states: A through wall hole or a crack in a fuel pencil sheath means that radioactive fission products such as Iodine can escape to the primary heat transport system. Several issues result from high fission products content in the PHT, including: increase radioactive source term in case of an accident; increased dose to maintenance workers; reduced effectiveness of instrumentation such as that found in the DN monitoring system. In accordance with SEC-RP-00015, Fuel and Physics regularly monitor the Iodine concentration in the PHT; where available, the gaseous fission product (GFP) monitoring system is used, and in all cases, chemistry Iodine samples are also monitored. A performance indicator is the Fuel Reliability Index (FRI) which is a measure of the Iodine concentration levels for each unit averaged over a three month period. This performance indicator is a WANO performance indicator. A fuel defect is suspected when the trends suggest Xenon and Iodine concentration levels are higher than the background level. This will trigger an increased frequency of delayed neutron (DN) scans, which attempt to locate the channel that contains the defect. Fuel and Physics monitor DN scans and may be able to identify a candidate channel. If a candidate channel is identified, Fuel and Physics will request fuelling of the channel by issuing an FCO. Indication that a defect was effectively discharged is provided by a decline of Xenon and Iodine concentrations in the PHT. Further indication occurs as part of the Fuel Handling and Storage process (12.03.02) where Fuel Handling may detect high radiological fields when the bundles are discharged from the fuelling machine. Final confirmation is obtained, again as part of 12.03.02, when a contractor organization inspects the suspected bundles on behalf of Fuel Handling.	
7.25.	Appropriate methods shall be established to identify any anomalous changes in the activity of coolant and to perform data analysis for fuel defects to determine their nature and severity, their location, their probable root causes and the	BP-PROC-00452, Core Management Section 7, Fuel Defects states: A through wall hole or a crack in a fuel pencil sheath means that radioactive fission products such as Iodine can escape to the primary heat transport system. Several issues result from high fission products content in the PHT, including: increase radioactive source term in case of an accident; increased dose to maintenance workers; reduced effectiveness of instrumentation such as that found in the DN monitoring system.	C

Article No.	Article Requirement	Assessment	Compliance Category
	necessary corrective actions.	In accordance with SEC-RP-00015, Fuel and Physics regularly monitor the Iodine concentration in the PHT; where available, the gaseous fission product (GFP) monitoring system is used, and in all cases, chemistry Iodine samples are also monitored. A performance indicator is the Fuel Reliability Index (FRI) which is a measure of the Iodine concentration levels for each unit averaged over a three month period. This performance indicator is a WANO performance indicator. A fuel defect is suspected when the trends suggest Xenon and Iodine concentration levels are higher than the background level. This will trigger an increased frequency of delayed neutron (DN) scans, which attempt to locate the channel that contains the defect. Fuel and Physics monitor DN scans and may be able to identify a candidate channel. If a candidate channel is identified, Fuel and Physics will request fuelling of the channel by issuing an FCO. Indication that a defect was effectively discharged is provided by a decline of Xenon and Iodine concentrations in the PHT. Further indication occurs as part of the Fuel Handling and Storage process (12.03.02) where Fuel Handling may detect high radiological fields when the bundles are discharged from the fuelling machine. Final confirmation is obtained, again as part of 12.03.02, when a contractor organization inspects the suspected bundles on behalf of Fuel Handling. BP-PROC-00518, Root Cause Investigation Section 1.0 Purpose states: The objective of the Corrective Action Program is to identify and eliminate or mitigate adverse conditions that have resulted in undesirable impacts on Nuclear Safety (including: Reactor Safety, Radiation Safety, Personnel Safety and Environmental Safety Management), business loss and corporate reputation. The RCI/ERCI process is used to identify the root cause of an event (which includes accidents) and incidents so that proper corrective action can be initiated to prevent the reoccurrence of similar events and incidents in the future.	
7.26.	For fuel and core components, handling procedures shall be developed to ensure the controlled movement of	-BP-MSM-1, Management System Manual Appendix A Fuel Management states:	C

Article No.	Article Requirement	Assessment	Compliance Category
	unirradiated and irradiated fuel, proper storage on the site and preparation for transport from the site. The plans for storage of unirradiated and irradiated fuel shall be submitted to the regulatory body for approval, if so required.	Bruce Power shall effectively procure, transfer, store, inspect, insert, shuffle and discharge fuel in a manner that ensures optimum reactor core operation within regulatory, safe operating and nuclear fuel performance limits, that minimizes radiation exposure and that protects fuel from damage throughout the fuel life cycle to achieve Zero defect goal. BP-PROC-00460, Fuel Handling Section 4.3 New Fuel Storage states: New fuel boxes will be moved from the New Fuel Receiving Room (elevation 619 in Unit 0) to approved storage areas. A small inventory of new fuel is maintained in the New Fuel Loading Room (Unit 0, Elevation 641). When the fuel inventory in the New Fuel Loading Room is low, Operations Auxiliary personnel will transfer new fuel boxes from the relevant storage area to the New Fuel Receiving Room (Unit 0, elevation 619) in accordance with NK21/29-OM-35100-09.00, Transfer New Fuel between Storage Locations, and then from the New Fuel Receiving Room to the New Fuel Loading Room in accordance with NK21/29-OM-35100-05.00, Crane New Fuel to New Fuel Room. Operations Auxiliary personnel update NuFLASH (Nuclear Fuel Location and Storage History) after each of these fuel movements. Section 4.4 New Fuel Load states Nuclear Fuel personnel move fuel bundles from the fuel box in the New Fuel room to the inspection table, inspect the fuel and load the NFTM in accordance with NK21/29-OM-35100-2.0, Load New Fuel Transfer Mechanism. If the bundle condition is not acceptable, then the bundle is rejected in accordance with NK21/29-OM-35100-12, Process Reject New Fuel Bundle and an SCR is initiated. NSAS will evaluate the fuel for acceptability for use or return to the manufacturer. Nuclear Fuel personnel update NuFLASH after each fuel movement. If, after loading the NFTM, it becomes necessary to transfer new fuel bundles back to the New Fuel Loading Room before it is loaded in the fuelling machine, Nuclear Fuel personnel transfer the bundles to the New Fuel Loading Room in accordance with NK21/29-OM-35100-18.00, Remove New Fuel Bundles from NFTM. Then, Nuclear Fuel contacts Fuel and Physics personnel who update NuFLASH for abnormal fuel movements. Section 4.5 Fuelling states:	

Article No.	Article Requirement	Assessment	Compliance Category
		“As described under BP-PROC-00452, Core Management, Fuel and Physics specify the fuel channels to be fuelled in the form of fuelling runs. A fuelling run consists of a selection of fuel channels that need new fuel. Each channel in a fuelling run will normally require between 2 and 8 bundles of new fuel, and the total number of fuel bundles in a run normally adds up to 16. A fuel change order (FCO) is associated with each fuel channel of the run, and the selection of fuelling runs specified by Fuel and Physics is provided on the fuelling list. The fuelling list is communicated to the unit ANO, and the FCOs are provided to the Fuel Handling control room operator. The unit ANO determines, with Fuel Handling Control Room Operators, when fuelling of the unit may proceed. In accordance with NK21-OM-37000-04.02.01, Refuelling Operations or NK29-OM-37000-04.03, to Perform a Fuelling Run on a Reactor Unit, the unit ANO determines the sequence of channels to be fuelled within the run, controls the fuelling machine flow injection, interacts with Fuel Handling Control Room Operators and monitors the condition of the reactor throughout the fuelling of the reactor.” Further details are provided on the steps to be followed during fuelling process including the requirements for fuelling when the reactor is shut down. Nuclear Fuel personnel update NuFLASH throughout the fuelling process. Section 4.6 Irradiated Fuel Discharge states: Discharging of irradiated fuel is carried out in the AUTO mode. Fuel Handling Control Room Operators move the fuelling machine head containing irradiated fuel from the reactor face to the irradiated fuel port. Irradiated fuel is transferred two bundles at a time to the racks in the primary irradiated fuel bay via the irradiated fuel discharge mechanism. If discharging suspected failed fuel, Nuclear Fuel personnel will monitor the radioactivity levels while discharging each bundle pair in accordance with NK21-OM-35300-05.02 or NK29-OM-35310/35320-03.05, Dry Sipping. Suspected failed fuel will be placed aside during the discharge process for future inspection. Nuclear Fuel personnel update NuFLASH throughout the discharge process. Section 4.7 Primary Irradiated Fuel Bay Storage states: Once irradiated fuel has been discharged on a rack, Nuclear Fuel personnel move a full rack containing 12 irradiated fuel bundles to the transfer stand where irradiated fuel is transferred	

Article No.	Article Requirement	Assessment	Compliance Category
		from the rack to a tray. Each tray is capable of holding 24 bundles and requires two sets of racks to fill. The loaded tray is then moved to the PIFB storage area. The procedures used for these actions are as follows: - NK21-OM-35300-04.03, Irradiated Fuel Movement Using Manual Tools - NK29-OM-35310/35320-03.01, Manually Install Racks on Conveyor Input - NK29-OM-35310/35320-03.02, Move Full Racks from Conveyor Output to Transfer Stand - NK29-OM-35310/35320-03.03, Move a Full Tray from Transfer Stand to Normal Storage Area - NK29-OM-35310/35320-03.04, Manually Place New Tray on Transfer Stand. Nuclear Fuel personnel update NuFLASH as a result of these fuel movements. Section 4.9 Secondary Irradiated Fuel Bay Storage states: In accordance with SEC-RP-00014, Irradiated Fuel Transfers, Fuel and Physics personnel specify which irradiated fuel trays should be transferred from the PIFB to the SIFB. Operations Auxiliary personnel carry out the transfer from the PIFB to the SIFB in accordance with the following procedures: - NK21-OM-35350-04.01, Transfer Two Irradiated Fuel Trays from Primary Bay to Secondary Bay - NK21-OM-35350-04.02, Receive Two Irradiated Fuel Trays in the Secondary Bay - NK29-OM-35350-03.01, Transfer Irradiated Fuel Trays to Secondary Bay The irradiated fuel that is transferred to the SIFB for storage purposes must have been cooled in the PIFB for at least 6 months due to heat load limitations in the SIFB. It is possible from time to time to transfer single bundles or elements from bundles cooled less than six months to the secondary bay for the purposes of shipment flask loading, provided activity limitations are adequately considered. This evaluation will be performed by NSAS personnel on a case by case basis. Operations Auxiliary personnel update NuFLASH as a result of these fuel movements. Irradiated fuel must be stored in the SIFB for at least 10 years before being transferred to dry storage. Section 4.10 Dry Storage states:	

Article No.	Article Requirement	Assessment	Compliance Category
		Fuel and Physics personnel authorize irradiated fuel bundle transfers to DSC modules. Empty DSC modules are transferred to the tray to module transfer mechanism (TMTM) in the SIFB in accordance with the following procedures: - NK21-OM-35390-07.00, Transfer Empty DSC Modules into SIFB - NK21-OM-35390-08.00, Transfer Empty DSC Module to TMTM - NK29-OM-35390-04.04.02, Transfer Empty DSC Modules into SIFB - NK29-OM-35390-04.04.03, Transfer Empty DSC Modules to TMTM Fuel bundles are transferred from storage trays from the SIFB into a DSC module using the TMTM. Prior to loading into the DSC, fuel bundles are inspected. If a defect bundle is found, it will not be loaded in the DSC and the entire tray will remain in the SIFB. If all bundles in a tray pass the inspection, then the bundles are loaded into the DSC module. A DSC module holds 96 fuel bundles. These activities are carried out by Fuel Handling in accordance with the following procedures: - NK21-OM-35390-10.00, Transfer Fuel from Trays to Modules - NK29-OM-35390-04.05, Operations to Transfer Fuel from Trays to Modules Loaded DSC modules are transferred by Operation Auxiliary personnel to an inspection area where the IAEA may carry out the inspection of the module. Then, the module is loaded into the DSC; a DSC contains 4 DSC modules, or 384 fuel bundles. These activities are carried out in accordance with the following procedures: - NK21-OM-35390-09.00, Transfer Loaded Modules for IAEA Verification - NK21-OM-35390-18.00, Transfer of Loaded Modules from IAEA Inspection Area to DSC - NK29-OM-35390-04.06, Transfer of Loaded Modules for IAEA Inspection - NK29-OM-35390-04.07, Transfer of Loaded Modules from IAEA Inspection Area to DSC Operation Auxiliary personnel update NuFLASH as a result of these fuel movements. Under 4.11 Irradiated Fuel Shipment, Section 4.11.1 Dry Storage Container Shipment states: When a DSC shipment is planned, Operation Auxiliary personnel transfer the loaded DSC to the Truck Bay, proceed to a final contamination survey of the DSC and of the Truck, and provide the necessary shipment papers to the Truck driver. This is done in accordance with the following	

Article No.	Article Requirement	Assessment	Compliance Category
		procedures: - NK21-OM-35390-19.00, Transfer Loaded DSC from Loading Bay to Truck Bay - NK21-OM-35390-20.00, Prepare Loaded DSC for Shipment - NK21-OM-35390-21.00, Draining DSC - NK21-OM-35390-22.00, Vacuum Drying DSC - NK21-OM-35390-23.00, Shipping a Loaded DSC - NK29-OM-35390-04.08, Loaded DSC Handling - NK29-OM-35390-04.10, Shipping a Loaded DSC In accordance with SEC-RP-00020, Dry Storage Container Shipment, Fuel and Physics personnel prepare the ICD form with irradiated fuel shipment information, and send the information to the CNSC shortly after shipment receipt is confirmed by receiver. 4.11.2 Post Irradiation Examination Shipment states: Post irradiation examinations are performed offsite. Therefore, fuel that requires PIE examination needs to be transported to the offsite location. Operation Auxiliary personnel will obtain a transportation license from the CNSC, and will organize irradiated fuel transportation for post irradiation examination in accordance with procedure B-CTP-35400-00001, Irradiated Fuel Shipping.	
7.27.	The packaging, carriage and transport of unirradiated and irradiated fuel shall be carried out in accordance with appropriate national regulations for domestic transport and, in the event of international transport, with the IAEA Regulations for the Safe Transport of Radioactive Material [8].	BP-MSM-1, Management System Manual Appendix A Fuel Management Bruce Power shall effectively procure, transfer, store, inspect, insert, shuffle and discharge fuel in a manner that ensures optimum reactor core operation within regulatory, safe operating and nuclear fuel performance limits, that minimizes radiation exposure and that protects fuel from damage throughout the fuel life cycle to achieve Zero defect goal. See Article 7.26 for a detailed assessment.	C

Article No.	Article Requirement	Assessment	Compliance Category
7.28.	Before any fuel handling takes place, the operating organization shall ensure that an authorized, trained and qualified person is present, who shall be responsible for control and handling of the fuel on the site in accordance with written procedures. Access to fuel storage areas shall be limited to authorized personnel.	Fuel handling is performed by authorized operators qualified under the following procedures: GRP-OPS-00054, Operations Training - Fuel Handling Control Room Operator Co-Pilot Procedure. This procedure provides direction and requirements for candidates seeking qualification as a Fuel Handling Control Room Operator (FH CRO). This procedure covers co-piloting in the position of a Fuel Handling CRO2 and a Fuel Handling CRO3. BP-PROC-00604, Non-Licensed Operator Continuing Training. NLO Continuing Training is mandatory for the following Key Qualification Training Programs: TQD-00019, Non-Licensed Operators - Generating Units. TQD-00030, Non-Licensed Operators - Unit 0. TQD-00031, Non-Licensed Operators - General Services. TQD-00032, Non-Licensed Operators - Fuel Handling. TQD-00089, Fuel Handling Control Room Operator Initial Training requirements are covered by TQD-00092, Fuel Handling Control Room Operator Continuing Training. BP-PROC-00460, Fuel Handling SECTION 4.5 FUELING states The fuelling list is communicated to the unit Authorized Nuclear Operator (ANO), and the Fuel Change Orders (FCOs) are provided to the Fuel Handling control room operator. The unit ANO determines, with Fuel Handling Control Room Operators, when fuelling of the unit may proceed. In accordance with NK21-OM-37000-04.02.01, Refuelling Operations or NK29-OM-37000-04.03, to Perform a Fuelling Run on a Reactor Unit, the unit ANO determines the sequence of channels to be fuelled within the run, controls the fuelling machine flow injection, interacts with Fuel Handling Control Room Operators and monitors the condition of the reactor throughout the fueling of the reactor. The fuel handling process execution and access to fuel handling facilities are limited to authorized personnel as the requirements of this process meets the requirements of the following: Nuclear Safety & Control Act and Class 1 Nuclear Facilities Regulations, which include obligations under the Bruce A and Bruce B Nuclear Power Reactor Operating Licenses	C

Article No.	Article Requirement	Assessment	Compliance Category
		CSA N286-05, Management System Requirements for Nuclear Power Plants (genera management system requirements Clause 5) RD-336: Accounting and Reporting of Nuclear Material CNSC Regulatory Standard S 99, Reporting Requirements for Operating Nuclear Power Plants (March 2003) INFCIRC/164: Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons	
7.29.	Detailed auditable accounts shall be maintained as required for the storage, irradiation and movement of all fissile material, including unirradiated and irradiated fuel, for at least as long as the regulatory body requires in regulations.	BP-PROC-00460, Fuel Handling Section 4.1.3 Nuclear Fuel Accounting states: In accordance with licence safeguards conditions, Bruce Power must maintain a record of movement of nuclear substances associated with fuel, and provide regular reports to the CNSC on fuel movement. All nuclear substances contained in the fuel are accounted for in the Nuclear Fuel Location And Storage History (NuFLASH) computer code. NuFLASH is updated in accordance with NK21/NK29-OM-35030 NuFLASH, every time fuel bundles are moved from one location to another, until irradiated fuel is transferred to the waste management facilities. All operating procedures that cause fuel movement contain the requirement to update NuFLASH. Also, the composition of nuclear substances in the fuel changes while it is irradiated in the reactor. Fuel and Physics update NuFLASH every month to account for the change in fuel bundle composition for each bundle discharged to the bay. Every month, Fuel and Physics prepare fuel accounting reports for submission to the CNSC to satisfy requirements of RD-336, Accounting and Reporting of Nuclear Material; the CNSC will use this information to report to the IAEA, in compliance with Canada's safeguards agreement. Section 4.2 New Fuel Receiving states: Operations Auxiliary provides confirmation of shipment contents to Fuel and Physics personnel who then upload shipment information into NuFLASH. Fuel and Physics prepares the ICD form with received fuel shipment information, and sends the information to the CNSC and the IAEA shortly after shipment arrival.	C

Article No.	Article Requirement	Assessment	Compliance Category
		Section 4.3 New Fuel Storage states: Operations Auxiliary personnel update NuFLASH after each of these fuel movements. Section 4.4 New Fuel Load states: Operations Auxiliary personnel update NuFLASH after each of these fuel movements.	
8.		Maintenance, Testing, Surveillance And Inspection	NA
Requirement 31: Maintenance, testing, surveillance and inspection programmes	The operating organization shall ensure that effective programmes for maintenance, testing, surveillance and inspection are established and implemented.	This is assessed in detail in articles 8.1 to 8.17	C
8.1.	Maintenance, testing, surveillance and inspection programmes shall be established that include predictive, preventive and corrective maintenance activities. These maintenance activities shall be conducted to maintain availability during the service life of structures, systems and components by controlling degradation and preventing failures. In the event that failures do occur, maintenance activities shall be conducted to restore the capability of failed structures, systems and components to function within acceptance criteria.	Equipment Reliability Program BP-PROG-11.01 establishes performance and condition monitoring scope including compliance with RD/GD-98 requirements. System and component performance monitoring, testing and walkdowns are augmented by engineering programs. Assessments of the performance and condition of systems and components for continued operation are performed in accordance with predefined acceptance criteria based on the associated engineering requirements. Activity specific reports are integrated under system and component health reports for planning of maintenance, life cycle management and obsolescence management. BP-PROG-11.04-Maintenance (including, Predictive, Preventative and Corrective) is implemented to support the Equipment Reliability Program. These Programs are executed through BP-PROG-11.02 Inage Work Management and BP-PROG-11.03 Outage Work Management programs. High level descriptions of these programs are discussed below. BP-MSM-1, Management System Manual Appendix A Plant Maintenance Management states: Bruce Power shall focus on predictive and preventative maintenance to support enhanced equipment reliability and improved safety operational performance.	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-OPP-00002, Operating Policies And Principles Bruce A Section 03.1 Maintenance states A maintenance program shall exist to ensure that the design degree of system effectiveness is maintained. BP-PROG-11.01, Equipment Reliability Section 4.0 Program Description states: The overall Objective of the equipment reliability program is to ensure that all systems important to safety (SIS) shall meet their defined design and performance criteria defined levels of reliability the life of the NPP. Section 4.1.3 PM Implementation states: BP-PROC-00780 describes the process for carrying out Preventive Maintenance to support continuous improvement of the Equipment Reliability Program. Preventive maintenance covered by this procedure includes periodic, predictive and planned maintenance. It covers preventive maintenance performed during operation and during outages. Preventive maintenance includes tasks scheduled for components on the MEL (such as pumps, motors, tanks, etc.) and inspection programs carried out for components not on the MEL (such as piping, building structures, feeders, etc.). The procedure outlines the interface with the Work Management system (BP-PROG-11.02, On-line Work Management Program, and BP-PROG-11.03, Outage Work Management) in order to assess and schedule periodic, predictive and planned maintenance for SSCs on a prioritized basis. It describes the development and application of a standard set of post maintenance tests to verify important SSC functions and the effectiveness of the maintenance performed. BP-PROC-00780 also describes the development and use of model work orders to carry out preventive maintenance, the PM deferral process, and the reporting and use of as-found condition data (BP-PROC-00501, Integrated Preventive Maintenance Program). The PM process includes responsibilities for: Maintenance, to review PM work packages prior to execution and execute work package; Work Management, to schedule PM work orders; Operations, to verify the adequacy of post maintenance testing prior to authorizing work and perform an operability determination to determine if equipment can be returned to service; and Engineering (SCE, RSE and Program Engineer), to provide technical justification, as	

Article No.	Article Requirement	Assessment	Compliance Category
		appropriate, for PM deferrals and to review and use as-found condition data. There is no preventive maintenance for a run to failure SCC; however, corrective or deficient maintenance and post-maintenance testing will be performed. If the SSC involves a pressure boundary system, the requirements of BP-PROG-00.04, Pressure Boundary Quality Assurance Program, shall be satisfied for all PM activities. The owner of the Preventative Maintenance Implementation process is the Equipment Reliability Integration Department Manager. BP-PROG-11.01 Equipment Reliability Section 4.1.5 Equipment Reliability Problem Identification And Resolution states: BP-PROC-00782, Equipment Reliability Problem Identification and Resolution, describes the problem resolution process, with reference made to BP-PROG-01.07, Corrective Action. It describes the process to follow when a critical SSC experiences an unplanned failure or when performance is seen, through Performance Monitoring by the SCE/RSE, to have degraded. This element of the Equipment Reliability process corresponds to the Corrective Action component of AP-913. Required Corrective Maintenance or Deficient Maintenance of Critical Components (i.e. Corrective Critical or Deficient Critical) is executed according to BP-PROG-11.04, Plant Maintenance Program. For an unplanned critical SSC failure, the relevance to nuclear safety is assessed and either an equipment apparent cause or root cause investigation of the degradation or failure shall be initiated in accordance with the BP-PROC-00060, Station Condition Record Process. Corrective actions are determined, including providing feedback to the Continuing Equipment Reliability Improvement process. Corrective Actions are tracked in accordance with BP-PROC-00019, Action Tracking. The CCE, SCE and RSE are involved in the apparent cause or root cause investigation. BP-PROG-11.04, Plant Maintenance Section 4.4 Structures, Systems Or Components (SSC) Monitoring (BP-PROC-00698) Evaluations of function and performance of SSCs need to be completed against a set of	

Article No.	Article Requirement	Assessment	Compliance Category
		baseline criteria to monitor equipment reliability and performance. The following elements are key in a SSC monitoring program: Section 4.4.1 Condition Monitoring states: The process for SSC current condition and potential for future failure are governed by BP-PROG-11.01 and dependent on specific system or component may include periodic inspections, vibration monitoring, thermography or other identified processes. Section 4.4.2 Surveillance states: Regular field walkdowns and systems checks are completed by Responsible System Engineers and Operations and are governed by DPT-PE-00009, System and Component Performance Monitoring Walkdowns and GRP-OPS-00038, Bruce A and B Operations Standards and Expectations. Section 4.4.3 Testing states: To ensure SSCs meet design reliability targets, regular testing may be required. Governance of testing falls under BP-PROG-11.01. Specifically, BP-PROC-00268, Safety System Testing (SST) Program Procedures provides the framework for the SST program, which is governed by the Power Reactor Operating License (PROL). BP-PROC-00217, M&TE Calibration Program Requirements defines the requirements needed to ensure M&TE performs correctly and in accordance with standards.	
8.2.	The operating organization shall establish surveillance programmes for ensuring compliance with established operational limits and conditions and for detecting and correcting any abnormal condition before it can give rise to significant consequences for safety.	Bruce Power Operating Policies and Principles BP-OPP-00002, states the following: Any operating conditions or restrictions included in the Operating Licence for Bruce Nuclear Generating Station A shall be observed as part of the Operating Policies and Principles. BP-OPP-00002 sets out the system and component operating limits to assure compliance with the PROL. Compliance with these limits is integrated in the operating procedures and surveillance and testing requirements. BP-PROC-00268 Safety Related System Testing (SST) program has been designed to meet the following primary objectives: 1. Demonstrate that the special safety, safety support and standby safety systems meet their design targets for equipment reliability. 2. Ensure that the requirements of Operating Policies and Principles (OP&P's) are met.	C

Article No.	Article Requirement	Assessment	Compliance Category
		3. Notify the Canadian Nuclear Safety Commission (CNSC), as per the Operating License, of Safety Related System component failures and impairments discovered by the testing program in accordance with S-99, Reporting Requirements for Operating Nuclear Power Plants. 4. Provide meaningful failure rate data on Safety Related System operation. The SST program forms part of the integrated and coordinated Equipment Reliability Program (BP-PROG-11.01) through Performance Monitoring (BP-PROC-00781) based on the INPO Equipment Reliability Process description (AP-913). NK21-OM-03672, Safety Related System Impairments provides operating staff with guidance and criteria for identifying, classifying and responding to impairments of the four Special Safety Systems and various Safety Support Systems. Prompt action in this area will contribute to maximizing availability of respective systems and in turn reduce adverse consequences in the event of a serious process upset. Bruce A has recently completed its baseline Safe Operating Envelope (SOE) project which consisted of documenting the limits and conditions derived from the safety analysis in Operational Safety Requirements (OSRs), completing the corresponding Instrument Uncertainty Calculations (IUCs), and performing Gap Assessments to verify the requirements are completely and accurately reflected in the station operating documentation. The baseline project and subsequent programmatic SOE activities aim to ensure that the operating limits and conditions in station operating documentation remain aligned with safety analysis upon which the station is licensed as required by the relevant codes and standards in particular CSA N290.15-10, "Requirements for the safe operating envelope of nuclear power plants" which is expected to be incorporated into the new PROL. The SOE project is being implemented using the following procedures: BP-PROC-00363, “Nuclear Safety Assessment” DPT-NSAS-00012, “Preparation and Maintenance of SOE Requirements” DPT-RS-00015, “Safe Operating Envelope Gap Assessment”	
8.3.	The operating organization shall develop procedures for all maintenance, testing, surveillance and inspection tasks. These procedures shall be prepared,	BP-PROG-11.04, Plant Maintenance Bruce Power’s maintenance strategy consists of “Preventive Maintenance” which includes “Periodic” (servicing, parts replacements periodic inspections), “Predictive” (monitoring, testing, in-service inspections), and “Planned” (condition based servicing, refurbishment, parts replacement) and “Non-Preventive Maintenance” which refers to maintenance for “Run-to-	C

Article No.	Article Requirement	Assessment	Compliance Category
	reviewed, modified when required, validated, approved and distributed in accordance with procedures established under the management system.	Failure” and “Unplanned Failure” events. Section 4.2.2 Policies, Processes and Procedures BP-PROG-11.04 has a suite of implementing procedures which include site wide applicable procedures as well as task specific maintenance procedures. Governance of document hierarchy falls within the requirements set out in BP-PROG-01.02, Bruce Power Management System (BPMS) Management. These procedures are maintained, reviewed and updated as per BP-PROG-03.01, Document Management. SECTION 4.5.3 Maintenance Procedures states: BP-PROC-00693 and BP-PROC-00694 deal specifically with format, development and the revision process of Maintenance procedures. Maintenance procedures associated with SSCs are written to comply with BP-PROC-00250, Writer’s Guide for Station System Procedures. BP-PROC-00617, Human Performance Tools for Workers defines procedure classification and the adherence to and stop work and deviation process (should a procedure be inadequate) associated with procedure use. Plant inspection, testing and surveillance activities are also covered under Equipment Reliability Program and associated procedures such as BP-PROC-00387 Plant Inspection, BP-PROC-00334, Periodic Inspection, BP-PROC-00268 Safety System Testing Program Procedure as described in Section 8.2 above.	
8.4.	Data on maintenance, testing, surveillance and inspection shall be recorded, stored and analysed for confirming that the operating performance is in accordance with the design intent and with requirements for the reliability and availability of equipment.	BP-OPP-00002, Operating Policies and Procedures, Bruce A 04.1 Operating Records states: Records shall be maintained of operation, maintenance, testing, inspections, personnel radiation exposures, chemical and radioactivity release, environmental monitoring, licensed materials, qualifications of certified staff and security arrangements, as required to meet regulatory requirements. Recording storage and analysis requirements are described in the specific procedures associated with maintenance, surveillance and inspection programs. These procedures identify applicable regulations codes and standards associated with the specific activity. They also include associated requirements including evaluation and acceptance criteria for applicable inspection methods as well as analyses to demonstrate fitness for continued service are implemented. All records arising from BP-PROG-11.01 are identified in implementing procedures and must be	C

Article No.	Article Requirement	Assessment	Compliance Category
		done in compliance with BP-PROC-00098, Records Management. For example DPT-PE-00010 System Health Reporting DPT-PE-00011 Component Health Reporting procedures provide guidance on the inputs and outputs of the System Health Reports such as performance, reliability and availability status of systems and components. Similarly, as stated in section 6.0 Section of BP-PROG-11.04 Plant Maintenance, all records arising from this program are detailed in the associated procedures.	
8.5.	The frequency of maintenance, testing, surveillance and inspection of individual structures, systems and components shall be determined on the basis of: (a) The importance to safety of the structures, systems and components, with insights from probabilistic safety assessment taken into account; (b) Their reliability in, and availability for, operation; (c) Their assessed potential for degradation in operation and their ageing characteristics; (d) Operating experience; (e) Recommendations of vendors.	BP-MSM-1, Management System Manual Appendix A Operating Experience states: Bruce Power shall use Operating experience from within Bruce Power and worldwide to identify, evaluate and apply lessons learned in order to prevent adverse conditions or to improve performance with respect to plant safety, reliability and cost. BP-PROG-11.01, Equipment Reliability Section 4.1.1 states: BP-PROC-00778 Describes the process for the Responsible Systems Engineer (RSE), with support from Reactor Safety, Corporate & Station Component Engineers and Design engineering (including Environmental Qualification) to identify SSC's Important to maintaining safe reliable power operation BP-PROC-00778, Scoping And Identification Of Critical SSCs, Section 4.1 Identify Important Functions describes that the safety related and essential non-safety related items are identified using Probabilistic Risk Assessment (PRA). It states that safety related and essential non-safety related are those structures and systems identified in the Safety Related System List (BP-PROC-00169) as well as, components identified as Single Point Vulnerability (SPV) (BP-PROC-00666) and Systems identified as "important to safety as defined by the station PRA (DPT-RS-00012, Risk Significant System Decision Methodology). The methodology utilizes the site Probabilistic Risk Assessments (PRAs) and identifies Systems Important to Safety as required by S-98, Reliability Programs for Nuclear Power Plants.	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-11.01, Equipment Reliability Section 4.1.2 Continuing Equipment Reliability Improvement states: BP-PROC-00779, Continuing Equipment Reliability Improvement, describes the process for development and optimization of the preventive maintenance technical basis and PM tasks to support a documented Preventive Maintenance program, for the SSCs identified in Section 4.1.1. The technical basis for a SSC PM strategy is identified through a Bruce Power Technical Basis Assessment (TBA) as per BP-PROC-00534, Technical Basis Assessment. Industry templates are available for major component types, and identify failure mechanisms, monitoring and mitigating tasks and task frequencies, based on external OPEX (as per BP-PROG-01.06, Operating Experience Program). Selected templates are configured by the strategy owner (i.e. by the CCE with support from the SCE or the RSE) for Bruce Power application through a TBA using Bruce Power OPEX to create a Bruce Power PM Template. The Bruce Power PM Template identifies planned, periodic, and predictive tasks and frequencies, on a structure or component type basis. Where there is not a suitable industry template, a TBA is conducted by the strategy owner to support development of the PM templates. The TBA identifies failure and degradation mechanisms, and develops monitoring and mitigation tasks for those mechanisms. The TBA provides a technical basis for the PM strategy for this equipment, as implemented by BP-PROC-00789, Preventive Maintenance Template Control and Revision. TBAs also summarize the current performance and condition of an SSC (including assessment of any age-related failures or indications of significant material degradation). The TBA considers external and internal OPEX to aid in understanding active and potential ageing degradation. The TBA also identifies monitoring and mitigation tasks and task frequencies, to be input to Bruce Power templates and executed by BP-PROC-00780, PM Implementation Process, and identifies major issues to BP-PROC-00783, Long Term Planning and Life Cycle Management. Recommendations of vendors is part of BP-PROC-00534, Technical Basis Assessment section 4.3 Data Gathering and Review which states “In order to generate an effective TBA, it is necessary to obtain information externally from available industry sources and internally in Bruce Power space about the function, condition, issues and solutions for the component type. The focus of the search should be in the area of potential failures, repairs/corrective strategies, failure mechanisms, and recommended inspection tasks and frequencies. The OEM / Vendor	

Article No.	Article Requirement	Assessment	Compliance Category
		may provide recommendations for monitoring and mitigating tasks which may be used as the starting point for the development of the maintenance strategy. In addition inspection, surveillance and testing requirements are based on the potential degradation mechanisms, ageing impacts and their frequencies comply with those prescribed in the PROL and associated OSRs, codes and standards (e.g. CSA N285.4).	
8.6.	A comprehensive and structured approach to identifying failure scenarios shall be taken to ensure the proper management of maintenance activities, using methods of probabilistic safety analysis as appropriate.	PRA which is a comprehensive and structured approach is used in establishing SSCs important to safety as described in DPT-RS-00012 Systems Important to Safety Decision Making. Results of DPT-RS-00012 are used for establishing the scope of Equipment Reliability and Maintenance Programs. Section 1.0 Purpose states the following: The purpose of this procedure is to describe the methodology and process involved in determining which station systems are Systems Important to Safety. This process utilizes the site Probabilistic Risk Assessments (PRAs) and identifies Systems Important to Safety as required by S-98, Reliability Programs for Nuclear Power Plants. This procedure details how Systems Important to Safety are identified, ranked, and screened. This procedure also includes the criteria for monitoring the performance of Systems Important to Safety. In addition, Failure Modes & Effects Analysis (FMEA) approach is also used in establishing maintenance strategy as described in BP-PROC-00534, Technical Basis Assessment. Section 1.0 Purpose states: The primary objective of the TBA is to provide a baseline for the maintenance strategy of the component type and to document this information using the included maintenance template. In order to develop the maintenance template, a Failure Modes & Effects Analysis (FMEA) will be produced in this report. The FMEA will list the degradation mechanisms that cause or influence the failure modes of the component type. Mitigating tasks will be identified, up to and including the complete replacement or major overhaul of the component type, and appropriate frequencies for these tasks will be populated in the maintenance template. Section 4.4 provides more details on creating an FMEA table. An FMEA is a systematic approach of using qualitative analysis for the purpose of identifying failure modes or potential failure modes and evaluating their consequences.	C
8.7.	New approaches that could result	New approaches are generally driven by internal and external OPEX and best industry practices.	C

Article No.	Article Requirement	Assessment	Compliance Category
	in significant changes to current strategies for maintenance, testing, surveillance and inspection shall be taken only after careful consideration of the implications for safety and after appropriate authorization, as required.	Maintenance, testing, surveillance and inspection activities of SSCs that have an impact on plant safety are governed by regulatory requirements as well as well-structured and systematic approach in establishing strategies for their implementation. As such, appropriate authorizations are obtained prior to implementation of such new approaches. In specific cases such as implementation of a new non-destructive examination methodology per CSA N285.4, performance demonstration of the procedures, equipment and people to be employed in the inspection process is required per the governing standard. In addition, BP-PROG-12.01 section 4.3.21 states the following : Criteria shall be provided for identifying High Risk Evolutions (HREs) and Infrequently Performed Tests and Evolutions. A managed process shall be used to identify error likely situations, compensatory measures, and critical steps, and to provide guidance on planning, briefings, and oversight requirements. BP-PROC-00474 High Risk and Infrequently Performed Tests and Evolutions	
8.8.	A comprehensive work planning and control system shall be implemented to ensure that work for purposes of maintenance, testing, surveillance and inspection is properly authorized, is carried out safely and is documented in accordance with established procedures.	Maintenance testing, surveillance and inspection activities are performed in compliance with BP-PROG-11.02 On-Line Work Management Program, BP-PROG-11.03 Outage Work Management and their implementing procedures for the planning and scheduling of associated activities. These programs interface with BP-PROG-12.01, Conduct of Plant Operations and its implementing procedures for authorization BP-PROG-11.03 implementing documents are: • BP-PROC-00342, Planned Outage Management • BP-PROC-00343, Forced Outage Management BP-PROG-11.02 implementing documents are: • BP-PROC-00327, New Work Initiation • BP-PROC-00328, Work Prioritization and Approval • BP-PROC-00329, On-Line Work Management Process • BP-PROC-00340, Emergency Maintenance • BP-PROC-00439, Seasonal Readiness • BP-PROC-00589, Work Management and Outage Fundamentals • BP-PROC-00771, Work Coordination Plans • BP-PROC-00735, Long Range Cycle Planning Process	C

Article No.	Article Requirement	Assessment	Compliance Category
8.9.	An adequate work control system shall be established for the protection and safety of personnel and for the protection of equipment during maintenance, testing, surveillance and inspection. Pertinent information shall be transferred at shift turnovers and at pre-job and post-job briefings on maintenance, testing, surveillance and inspection.	BP-PROG-12.01 Conduct Of Plant Operations Section 4.3.10 Authorization of Work states: Unless specifically exempted, all work affecting plant systems shall require an approved Work Authorization. GRP-OPS-00033 Authorization of Work describes the process for obtaining authorization to do work in general, as well as the process for preparing, approving, issuing, accepting and surrendering FORM-11129, Work Authorization. Administration and function of the Work Control Area is also described. BP-PROG-12.01 Conduct Of Plant Operations Section 4.4 Work Protection states Worker safety shall be the primary focus and highest priority at all times. Management has a legal responsibility under the Occupational Health and Safety Act and Regulations (OHSA) to provide and maintain a safe work environment and to take all reasonable precautions for the protection of workers. When work protection is required as prescribed in BP-SM-00070, Bruce Power Safety Rules, Section 4.1.8, Safe Conditions for Work on Energized Systems and 4.2.1, Electrical Work: General Requirements, it will be administered in accordance with the requirements of BP-WPP-00003, Work Protection Program. This procedure interfaces with the following governing documents: BP-WPP-00004, Approved Isolation Procedure, Approved Work Protection Procedures and Local Instruction Notice or Code Departure Contents and Revisions Control BP-WPP-00005, Personal Protection Tag Out BP-WPP-00006, Work Protection Monitoring BP-WPP-00007, Caution Tag Procedure BP-WPP-00008, Boundary Point Procedure BP-WPP-00009, Hold Off Procedure Work protection is also supported by two other plant and equipment control procedures. BP-PROC-00734 Plant Status Control requires: ‘the status of all plant components shall be controlled at all times to maintain configuration control and to ensure personnel safety.	C

Article No.	Article Requirement	Assessment	Compliance Category
		Manipulations of components must be authorized by the proper authority, and tracked using an approved process'. BP-PROC-00907 Protected Equipment Program requires: 'practices shall be defined and used to reduce the risk to the plant/unit of equipment being accidentally operated or disabled when there has been a loss of redundancy. Practices shall include the use of barriers, signs, tags, and hardened barriers as well as communications to plant staff'. Pertinent information shall be transferred at shift turnovers GRP-OPS-00031 Conduct Of Shift Turnovers. BP-PROC-00685 Maintenance Work Execution SECTION 4.2.1 Pre-Job Briefing states: ENSURE the Pre-Job briefing addresses all necessary items for the work order task to ensure maintenance alterations are properly performed and restored as applicable to the work activity. Under Section 4.5 Completing Work, Section 4.5.1 Worker, item 10 states: Participate in Post-Job Debriefing and completion of PWA portion of Form 11024 Pre-Job Briefing and Post-Job Debriefing Checksheet	
8.10.	The work control system shall ensure that plant equipment is released from service for maintenance, testing, surveillance or inspection only with the authorization of designated operations department staff and in compliance with the operational limits and conditions. The work control system shall also ensure that permission to return equipment to service following maintenance, testing, surveillance and inspection is given by the operating personnel. Such	BP-PROG-12.01 Conduct Of Plant Operations Section 4.3.10 Authorization of Work states: Unless specifically exempted, all work affecting plant systems shall require an approved Work Authorization. GRP-OPS-00033 Authorization of Work describes the process for obtaining authorization to do work in general, as well as the process for preparing, approving, issuing, accepting and surrendering FORM-11129, Work Authorization. Administration and function of the Work Control Area is also described. Work authorization process is supported by BP-PROC-00771, Work Coordination Plans. Work Coordination Plans (WCP) are intended to be used as a narrative document designed to communicate an overview of complex activities requiring special considerations. This overview is to support and ensure appropriate thought and effort are incorporated into the development of Comprehensive Work Packages (CWP) (as defined by BP-PROC-00543, Task Planning) and the development of Work Management schedules. Appendix B of BP-PROC-00771 provides specific guidance on nuclear safety considerations. In addition, High Risk Evolutions (HREs) and Infrequently Performed Tests And Evolutions must	C

Article No.	Article Requirement	Assessment	Compliance Category
	permission shall be given only after the completion of a documented check that the new plant configuration is within the established operational limits and conditions and, where appropriate, after functional tests have been performed.	follow BP-PROC-00474, High Risk and Infrequently Performed Tests and Evolutions (IPTEs). BP-PROC-00669, Post Maintenance Testing procedure establishes the overall Post Maintenance Testing (PMT) program and shall be applied to maintenance activities performed on installed plant equipment. The objective of the PMT program is to assure that the component, after any maintenance or repair has been completed, will fulfill its design function. The tests selected must be appropriate to the maintenance or repair performed. The PMT covers aspects from visual inspection, checks and verifications made during maintenance work, to demonstrate a component's ability to perform its design function. The PMT goal is to provide assurance that a component and its associated subsystem has been sufficiently checked out and tested after maintenance to ensure the tested component provides a high degree of confidence that it is capable of performing its design and safety function.	
8.11.	Coordination shall be maintained between different maintenance groups (e.g. maintenance groups for mechanical, electrical, instrumentation and control, and civil equipment). Coordination shall also be maintained between maintenance groups and operations groups and support groups (e.g. groups for fire protection, radiation protection, physical protection and non-radiation-related safety). The operating organization shall make arrangements with the external grid operator to ensure that appropriate procedures are applied in maintaining the connections of the plant to the external grid.	BP-PROG-11.02 On-Line Work Management Program SECTION 4.4.2 Work Coordination Plans states: This document is designed to provide an overview of activities that require special considerations. The purpose of this document is to ensure appropriate thought and coordination of effort are incorporated into the development of Comprehensive Work Packages and Work Management schedules for activities requiring complex coordination. Note: Work Coordination Plans are intended to provide description of scope and sequence and do not direct the operation or manipulation of station systems and components. The details associated to work coordination plans are incorporated in the Bruce Power Procedure BP-PROC-00771, Work Coordination Plans. BP-PROC-00771, Work Coordination Plans Section 4.0, Procedure Description states: This procedure describes the applicability and the process for the preparation, review, implementation, and disposition of Work Coordination Plans (WCP). Work Coordination Plans may be developed for work efforts such as tying together large, complex Modifications that require detailed coordination between multiple work groups, or other activities of such a complex nature that detailed coordinated preparation beyond routine Assessing and Planning is	C

Article No.	Article Requirement	Assessment	Compliance Category
		necessary to ensure nuclear safety is maintained.	
8.12.	A management system for managing and correcting deficiencies shall be established and shall be used to ensure that operating personnel are not overly burdened. This system shall also ensure that safety at the plant is not compromised by the cumulative effects of these deficiencies.	The objective of the Corrective Action Program BP-PROG-01.07 is to identify and eliminate or mitigate adverse conditions that have resulted in or could result in loss. This program is applicable to all Bruce Power staff, including contractors. Adverse Condition includes***:*** An incident, event or an error-likely situation related to people, plant, environment or process that has resulted in loss or has the potential to result in loss. This includes problems (per N286-05), such as designs, documents, tools, materials, parts, processes, services, and practices that do not meet requirements. All adverse conditions and non-conformances are to be promptly identified, documented and reported. All station SCRs are reviewed by Operations to determine if operability of a safety related system is impacted. Operability evaluations are performed by Engineering in accordance with BP-PROC-00014, Technical Operability Evaluation. Events and incidents are reported according to the guidance provided in BP-PROC-00059, Event Response and Reporting. Immediate action to secure the area and prevent (further) loss is to be taken where and when it is safe and appropriate to do so. This assists in meeting the requirements of the BP-PROG-00.06, Health and Safety Management. Written event reporting to regulatory agencies is done in accordance with BP-PROC-00165, Reporting to CNSC - Power Reactor (an implementing procedure for BP-PROG-06.03, CNSC Interface Management). For most events, significant events and significant conditions adverse to quality, the causes will be determined and corrective action will be taken to correct, and where appropriate, prevent their recurrence. Any corrective actions taken to address identified causes are to be tracked to completion. Effectiveness will be verified for actions taken to prevent recurrence. Adverse conditions are trended and periodically analyzed for adverse trends. Where warranted, corrective actions are put in place to address adverse trends. Periodic assessment of the effectiveness of the program will be done based on the results and recommendations obtained from verifications and audits. In order to minimize undue burden on operating personnel, implementing documents of BP-PROG-01.07 ensure that all adverse conditions are corrected by the right organization using a systematic and comprehensive set of processes. This program is implemented by the following document(s): BP-PROC-00019, Action Tracking BP-PROC-00059, Event Response and Reporting	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00060, Station Condition Record Process BP-PROC-00252, Control of Nonconforming Item BP-PROC-00412, Trending, Analyzing and Reporting of SCRs BP-PROC-00506, Effectiveness Reviews (ER) BP-PROC-00518, Root Cause Investigation BP-PROC-00519, Apparent Cause Investigation BP-PROC-00644, Common Cause Analysis	
8.13.	The operating organization shall ensure that maintenance work during power operation is carried out with adequate defence in depth. Probabilistic safety assessment shall be used, as appropriate, to demonstrate that the risks are not significantly increased.	BP-PROG-11.02, On-Line Work Management Program Section 1.0 Purpose states This program document defines the fundamental business need, constituent elements, functional requirements, implementing approaches and key responsibilities associated with the On-Line Work Management Program. The objective of the On-Line Work Management Program is to support nuclear safety and foster a nuclear safety culture through the incorporation of the following guiding principles and values: 1. Provide timely identification, screening, scoping, planning, scheduling, preparation and execution of work necessary to maximize the availability and reliability of station equipment and systems. 2. Manage the risk associated with work through the proactive identification of situations or activities that could jeopardize or adversely impact safety margins and enable the development of mitigation strategies. 3. Identify the impact of work to the station and work groups, and protect the station from unanticipated transients that result from work. BP-PROC-00691 R000 - Maintenance Program Structure And Strategy Section 4.3 Maintenance Process Section 4.3.1 Plan states The PLAN part of the maintenance is selecting the RIGHT MAINTENANCE to do AT THE RIGHT TIME. This involves analysis of safety, risk, reliability, Failure Mode and Effect Analysis (FMEA), PM/CM rationality checks, material costs, total maintenance effort expended and operating experience to achieve cost effective maintenance tailored to its safety and production significance. 1. Each plant system, subsystems, subsystem functions, subsystem functional failures and component dominant failure modes will be defined and documented. This will be done using the	C

Article No.	Article Requirement	Assessment	Compliance Category
		following tools. a) The Bruce Power Probabilistic Risk Assessment (BBRA) which analyzes the plant components to establish the risk of a particular component failure on the integrity of the reactor core. Probabilistic Safety Analysis (PSA) does this by estimating the frequency of undesirable events and incorporating plant designs, components and system reliability, operating procedures and human interaction to develop a critical equipment list. b) Reliability Centered Maintenance (RCM) which is used to analyze which components are critical to sustaining the reliability of the plant. RCM is done by establishing system boundaries, developing a critical equipment list based on its function or failure effect on nuclear safety, personnel safety and environment or power production. RCM uses Failure Mode and Effect Analysis (FMEA) which identifies failure modes, determines the probability of occurrence and the significance of each failure mode. c) The analysis of RCM, FMEA and PSA are combined to categorize components regarding their impact on nuclear safety and plant reliability. Four categories are produced: Category 1-Equipment very important to plant safety and operation, Category 2-Equipment still important to safety and operation, but less than Category 1, Category 3-Equipment that is more cost effective to maintain than let fail and Category 4-Equipment with no proactive maintenance. This data is used for inclusion in the Preventive Maintenance Program. DPT-RS-00004 – Risk Assessment Of Proposed Changes to Engineering, Operations, Surveillance And Maintenance Section 1.0 Purpose states The purpose of this procedure is to describe the process to be used in performing risk assessments in order to evaluate proposed changes (PCs) to engineering, operations, surveillance and maintenance programs, assess their acceptability with respect to Bruce Power vulnerabilities and means to lower risk as necessary. DPT-RS-00006 - Outage And Inage Risk Management Section 1.0 Purpose states “The purpose of this procedure is to describe the process to be used for Outage and Inage Risk Management with respect to Bruce Power safety goals and licensing requirements applicable to reliability and risk. This process assesses and monitors risk during the planning and execution phases of shutdown (Outage), operating (Inage) and refurbishment (Return to Service) work. Recommendations are made to assist in managing the Reactor safety risks associated with operating a Nuclear Power Plant. Bruce Power uses a risk Informed Decision Making Process, therefore deterministic requirements are also included.	

Article No.	Article Requirement	Assessment	Compliance Category
		DPT-RS-00003 - Evaluation Of Risk Outside The Scope Of The PRA Section 1.0 Purpose states Provide a procedure for assessing the nuclear safety risk of operating in a specific plant configuration, which is expected to be in place for a limited period of time, and which is not within the scope of the existing station Probabilistic Risk Assessment (PRA).	
8.14.	Corrective maintenance of structures, systems and components shall be performed as promptly as practicable and in compliance with operational limits and conditions. Priorities shall be established, with account taken first of the relative importance to safety of the defective structures, systems and components.	BP-PROG-11.04, Plant Maintenance Section 4.3.2 Corrective Maintenance states: Restoring SSCs to full capability by repairing, overhauling or replacing one or more of its functions is referred to as Corrective Maintenance. BP-PROC-00606, Fix-it-Now (FIN) Team Procedures and BP-PROC-00496, Troubleshooting Plant Equipment in addition to the Work Management process provide the guidance for initiating and performing failure diagnosis and completing maintenance. BP-PROC-00638, Temporary Configuration Change Management and BP-PROC-00467, Maintenance Alterations Process and define the requirements for controlling temporary changes until repair or approved modification is made. In addition, Corrective Action Program BP-PROG-01.07 ensures all adverse conditions and non-conformances to be promptly identified, documented and reported. All station SCRs are reviewed by Operations to determine if operability of a safety related system is impacted. Operability evaluations are performed by Engineering in accordance with BP-PROC-00014, Technical Operability Evaluation. These processes support timely execution in accordance with the safety significance of the adverse condition that requires corrective maintenance.	C
8.15.	The operating organization shall establish suitable arrangements to procure, receive, control, store and issue materials (including supplies), spare parts and components.	BP-PROG-11.04, Plant Maintenance Section 4.6 Spare Parts and Procurement states that Procurement, receipt, storage and issuance of spare parts, tools and materials is as per BP-PROG-05.01, Supply Chain requirements also taking into account BP-PROG-10.01, Plant Design Basis Management and BP-PROG-00.04, Pressure Boundary Quality Assurance Program requirements. The process for manufacturing of replacement parts on site is defined in SEC-SM-00014, Site Manufacturing which also fulfills ISO-9001:2000 requirements	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROG-05.01, Supply Chain Section 4.0 Program Description states: "This program must ensure that activities related to the specification, purchase, receipt, storage, issuance and return of items and services are adequately planned, implemented and controlled." Related sections are: 4.1 Procurement of Items and Services 4.1.1 Inventory Planning 4.1.2 Purchasing 4.3 Warehouse Operations 4.3.1 Receiving 4.3.1 Storage and Handling 4.4.1 Receiving Inspection BP-PROC-00262, Warehouse Operations, Section 4 provides implementation details	
8.16.	The operating organization shall be responsible for using these arrangements for the procurement of materials (including supplies), spare parts and components and for ensuring that their characteristics are consistent with applicable safety standards and with the plant design.	BP-PROC-00244 Procurement Engineering Section 4.1.3 Implementation And Maintenance Requirements states: PE process shall ensure that the requirements originated from the applicable standards and codes defined in Section 5.0 are met. Where applicable, PE procedures shall incorporate industry best practices described in Electrical Power Research Institute (EPRI) guidelines listed in Section 5.0.	C
8.17.	The operating organization shall ensure that storage conditions are adequate and that materials (including supplies), spare parts	BP-PROC-00262, Warehouse Operations Section 4.3 Storage provides details as follows:	C

Article No.	Article Requirement	Assessment	Compliance Category
	and components are available and are in proper condition for use.	Section 4.3.1 The storage levels of items may range from controlled environment i.e., temperature, humidity, dust and light to uncontrolled general storage, i.e., outside storage. Storage Categories A, B, C and D defined in SEC-PE-00014, Selection of Shipping, Storage and Handling Requirements, support ANSI N45.2.2 or equivalent requirements. Storage facilities provided by Warehouse that ensure item storage meets the requirements of SEC-PE-00014 are described in BP-PROC-00307, Control of Handling, Storage and Shipping. BP-PROC-00307 also describes monitoring of storage areas and periodic maintenance of items, to ensure items remain in a condition fit for use. Section 4.3.2 Items and materials with limited shelf life are identified as such in the items Cat ID as established by PE in SEC-PE-00015, Selection of Item Shelf Life Requirements. Storage and monitoring requirements are implemented by Warehouse in accordance with DPT-MM-00007, Item Shelf Life Management.	
Requirement 32: Outage management	The operating organization shall establish and implement arrangements to ensure the effective performance, planning and control of work activities during outages.	Assessed in Detail in articles 8.18 to 8.24.	C
8.18.	Outage planning shall be a continuing, improving process involving past, present, next scheduled and future outages. Reference points shall be determined and shall be used to track pre-outage work.	BP-MSM-1, Management System Manual Section Outage Work Management Bruce Power shall ensure that the work performed on a unit will be analyzed, planned, implemented, and controlled when the unit is shutdown, such that maintenance, inspections and modifications are performed safely and on the basis of value to maintaining safe, reliable and lowest cost operation; this shall include selecting and controlling the scope of work, analyzing and informing risks related to work planning and scheduling, coordinating work execution and closing out the outage.	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00342,SHT 0003 Planned Outage - Planning and Preparation Section 4.9 Internal and External Industry Lessons Learned states: The OEM ensures that in planning an outage WMCs take into account lessons learned from previous outages. OEM - Outage Execution Manager Prior to every outage the Performance Improvement (OPEX) team assembles a briefing package of outage related Operating Experience. The OEM provides a list of scope (either Level 1 or Level 2 WBS) to Performance Improvement (OPEX) in order to develop a briefing package specific to each outage. The Briefing folder contains examples of questions to be asked before completing work based on Operating Experience. The OPEX briefing folder contains operating experience on Conventional Safety and Human Performance. It also has a section of Operating Experience relating to the scope of the outage. The examples of Operating Experience are divided into work areas for ease of use. The Performance Improvement (OPEX) team also issues the CANDU Owners Group (COG) Briefing folder. This is an industry wide collection of Operating Experience that has a section dedicated to Outages. The briefing folders are handed out at the MLM or can be obtained from a member of the Performance Improvement (OPEX) team. BP-PROC-00342,SHT 0001 Planned Outage - Preparation Milestones Section 4.2 Outage Preparation Milestones SECTION 4.2.2 The Pre-outage Performance Indicators are designed to focus management attention on the Outage Preparation Milestones and the schedule for Pre-outage preparation. The performance indicators found on the Integrated Outage Solution (IOS) web page shall be used to monitor pre-outage preparation. Appendix A is an example of a pre-outage performance indicator.	
8.19.	In the processes for planning and performing outage activities,	BP-PROC-00342 SHT0003 - Planned Outage - Planning And Preparation	C

Article No.	Article Requirement	Assessment	Compliance Category
	priority shall be given to safety related considerations. Special attention shall be given to maintaining the plant configuration in accordance with the operational limits and conditions.	Section 1.0 Purpose states: Bruce Power establishes shutdown safety as a top outage priority. Shutdown Safety is a key outage success factor and an outage goal. Performance indicators have been established for events resulting from; a loss of decay heat removal, challenges to shutdowns safety function or result in unplanned increased risk conditions. These indicators are monitored throughout the outage with particular focus on control, cool, contain and off site power availability. Policies and procedures are in place to address conservative decision making to maintain sufficient safety margins. BP-PROC-00771, Work Coordination Plans (WCP) are intended to be used as a narrative document designed to communicate an overview of complex activities requiring special considerations. This overview is to support and ensure appropriate thought and effort are incorporated into the development of Comprehensive Work Packages (CWP) (as defined by BP-PROC-00543, Task Planning) and the development of Work Management schedules. During preparation of the WCP following aspects are evaluated for applicability and addressed as appropriate: • Nuclear Safety-Appendix B of BP-PROC-00771 provides specific guidance on nuclear safety considerations. • Conventional safety • Radiation protection • Chemistry control • Environmental impacts • Relevant regulations, codes and standards • Environmental qualification • H_2/D_2 Hazard • Hot Work • Plant status control • Boundary points BP-PROC-00734 Plant Status Control requires: ‘the status of all plant components shall be controlled at all times to maintain configuration control and to ensure personnel safety. Manipulations of components must be authorized by the proper authority, and tracked using an	

Article No.	Article Requirement	Assessment	Compliance Category
		approved process'. BP-PROC-00907 Protected Equipment Program requires: 'practices shall be defined and used to reduce the risk to the plant/unit of equipment being accidentally operated or disabled when there has been a loss of redundancy. Practices shall include the use of barriers, signs, tags, and hardened barriers as well as communications to plant staff'.	
8.20.	The operating organization shall be responsible for issuing programmes and procedures for outage management and for the provision of adequate resources for ensuring safety during shutdown operations.	BP-PROG-11.03, Outage Work Management Section 1.0 Purpose This program document defines the fundamental business need and, constituent elements, functional requirements, implementing approached associated with Outage Work Management. The purpose of Outage Work Management Program is to identify the controls associated with planning, implementation, and control of work performed on a reactor unit when the unit is shutdown such that maintenance, inspections, and modifications are performed safely and on the basis of value to maintaining safe, reliable and lowest cost operation. This includes selecting and controlling the scope of work, planning, scheduling, coordinating work execution, and closing out the outage. The implementing documents for this are the following: BP-PROC-00342 - Planned Outage Management BP-PROC-00342 SHT0001 - Planned Outage - Preparation Milestones BP-PROC-00342 SHT0002 - Scope Review Process BP-PROC-00342 SHT0003 - Planned Outage - Planning And Preparation BP-PROC-00342 SHT0004 - Planned Outage - Schedule Development BP-PROC-00342 SHT0005 - Planned Outage - Execution BP-PROC-00342 SHT0006 - Planned Outage - Close Out BP-PROC-00343 - Forced Outage Management	C

Article No.	Article Requirement	Assessment	Compliance Category
		BP-PROC-00342 SHT0003, Planning And Preparation, Section 1.0 Purpose states the following: Bruce Power establishes shutdown safety as a top outage priority. Shutdown Safety is a key outage success factor and an outage goal. Performance indicators have been established for events resulting from; a loss of decay heat removal, challenges to shutdowns safety function or result in unplanned increased risk conditions. These indicators are monitored throughout the outage with particular focus on control, cool, contain and off site power availability. Policies and procedures are in place to address conservative decision making to maintain sufficient safety margins. Senior Management: Participate in outage preparations and defence in depth reviews Provide oversight during outages on key work activities presenting increased risk Review changes to approved outage schedules to ensure the effect on shutdown safety risk is understood. This document details what is expected from all members of staff involved in the planning and preparation of a planned outage. It details the pre-outage organization, system windows and work sequencing, identification of pre requisites, the resource requirements and the expectations of members of the pre-outage organization. Other tools used to plan and prepare a planned outage are also discussed. Section 4.2 Work Sequencing states: The initial step for any planned outage is Scope Identification (as per BP-PROC-00342, Sheet 0002). Once all known scope has been identified and a pre-outage organization has been established the work is divided into manageable system windows. The next step in developing a plan for an outage is work sequencing. Many different departments assist in developing the logic for work sequencing. WMCs are assigned individual system windows in order to sequence and manage work that may be competing for resources, lay down space or access. The pre-outage organization works as a team to ensure work within a system window has minimal impact on other work. The work within a specific work window is sequenced by WMC with the assistance of the pre-outage organization. Task Analysis Meetings (TAMs) are held by WMCs in order to understand the work and its effects on the outage fully. TAMs allow the WMCs to pull all elements of the system window together in order to identify and best manage schedule conflicts. The work within a system window can have an effect on where the system window can be scheduled. With the assistance of the Pre-outage organization, WMCs must ensure that the	

Article No.	Article Requirement	Assessment	Compliance Category
		sequencing of system windows and work within system windows: 1. Does not violate Bruce Power Operating Policies and Principles (as defined in BP-OPP-00001 and BP-OPP-00002). 2. Does not contravene Reactor Safety, Industrial Safety, Radiological Safety, or Environmental Safety. 3. Maintains defense in depth. 4. Does not have a detrimental effect to the timely completion of interfacing work. 5. Keeps critical path work on schedule. As always, the priority when sequencing work is public and worker safety. When sequencing work within an outage the pre-outage organization will ensure that the work can be completed with the available resource without effecting safety or the outage duration. Specific detail on the expectations of pre-outage organization members when planning and sequencing work is detailed in the following sections. Section 4.2.2 Radiation Safety states: During the planning stages of an outage the Outage Safety Support representative performs the following activities to ensure radiation safety: 2. A resource plan is produced by Radiation Safety detailing work that requires Radiation Safety personnel. Obtain and train radiation safety green-men resources. Section 4.2.5 Maintenance states: 1. From the approved scope determine how maintenance resources will be organized. Identify any special maintenance requirements, prerequisites, materials, procedures, and jumpers relevant to the scoped work. 2. Provide adequate resource to execute scope. The Maintenance Manager must provide confirmation to the OEM that the maintenance cost of the outage is as stated in the business plan. Section 4.2.8 Project Management and Construction states: The Project Management & Construction (PMC) outage representative ensures the following: 3. Provide adequate resource to execute scope. The Project Manager must provide confirmation	

Article No.	Article Requirement	Assessment	Compliance Category
		to the OEM that the projects' cost of the outage is as stated in the business plan. Section 4.2.9 Outage and Maintenance Services states: Most of the reactor maintenance work during an outage is contracted to external specialist organizations. Outage and Maintenance Services representative performs the following: 5. Manage the contracts and work requirements of contractors performing reactor maintenance work. A resource profile will be completed and provided to the OEM. Section 4.2.10 Supply Chain states: During the planning of an outage, a Supply Chain SPOC will be assigned and will support the pre-outage organization with the following: 4. Allocating appropriate Supply Chain resources to support sourcing activities, the RFQ and RFP/Tender process, contract negotiation/award and where appropriate utilizing Key Suppliers through Key Supplier Agreements. 12. Produce resource plan for stores Section 4.3 Prerequisites states: Agreement for resource allocation is reached at weekly on-line work management meetings attended by the outage prerequisite WMC and CST. Section 4.6.1 Outage Preparation Meetings states: The preparation meetings allow the OEM and his team to be updated on outage preparation and any problems. It also gives the outage organization the opportunity to hear about the progress of other system windows. This is important during the planning stages of the outage as it enables the anticipation of possible issues caused by interfacing system windows or resources. Section 4.7 Preparation Metrics states: Milestone #23: Resource Profile and Agreements in place	
8.21.	The tasks, authorities and responsibilities of the groups and persons involved in preparing, conducting or assessing outage schedules and activities shall be	Roles and responsibilities are defined in section 7.0 of the following documentation. BP-PROC-00342, Sht0003 Planned Outage - Planning And Preparation 7.1 Outage Execution Manager (OEM)	C

Article No.	Article Requirement	Assessment	Compliance Category
	set out in writing and shall be followed by all the plant staff and contractor staff who are involved.	7.2 Work Management Coordinator (WMC) 7.3 Cost and Schedule technician 7.4 Reactor Safety Representative 7.5 Radiation Safety 7.6 Conventional Safety 7.7 operations 7.8 Maintenance 7.9 Engineering 7.10 Chemistry 7.11 Project Management and construction BP-PROC-00342,SHT0004, Planned Outage - Schedule Development 7.1 Outage Execution Manager (OEM) 7.2 Lead CST Scheduling 7.3 Work Management Coordinators 7.4 Cost and Scheduling Technician BP-PROC-00342,SHT0002, Planned Outage - Scope Review Process 7.1 Outage Execution Manager 7.2 Department Manager, Outages 7.3 Work Management Coordinator (WMC) 7.4 Cost and Schedule technician (CST) 7.5 Scope Review Board (SRB)	

Article No.	Article Requirement	Assessment	Compliance Category
		7.6 Scope Review Panel (SRP) BP-PROC-00617, Human Performance Tools For Workers, is applicable to all Bruce Power employees and contractors. Section 4.3.2 Procedure Adherence Tool states the following: The Procedure Adherence tool is used to ensure that a procedure is understood and followed. When to Use the "Procedure Adherence" Tool Use this tool anytime the work being done is governed by procedures. Procedure Adherence is required and is non-negotiable.	
8.22.	The interfaces between the group responsible for outages and other groups, including groups on the site and off the site, shall be clearly defined. Operating personnel shall be kept informed of current activities for maintenance, modification and testing.	BP-PROG-11.03, Outage Work Management Section 1.0, Purpose This program document defines the fundamental business need and, constituent elements, functional requirements, implementing approached associated with Outage Work Management. The purpose of Outage Work Management Program is to identify the controls associated with planning, implementation, and control of work performed on a reactor unit when the unit is shutdown such that maintenance, inspections, and modifications are performed safely and on the basis of value to maintaining safe, reliable and lowest cost operation. This includes selecting and controlling the scope of work, planning, scheduling, coordinating work execution, and closing out the outage. BP-PROC-00342 SHEET 0005, Planned Outage - Execution Section 4.1 Coordination states: The coordination of an outage involves the integration of work groups and the execution of interrelated work practices. It is important that all work groups adopt effective communication practices during the execution of a planned outage so any progress barriers or safety issues can be anticipated or avoided. Good communication during the outage also means that, should a problem present itself, the appropriate personnel are able to react early and the problem can be resolved in a timely manner. For further information on expectations on managing and executing work during an outage, see BP-PROC-00342, Sheet 0008.	C

Article No.	Article Requirement	Assessment	Compliance Category
		The main distribution method of relevant information is the regular outage meetings as detailed in this procedure and BP-PROC-00342, Sheet 0007, Outage Control Centre Requirements, and the Outage Control Centre shift logs (Operator Shift Logs). In order for the meetings to be successful, the work groups involved, must coordinate and prioritize the information to be presented at the meetings. The Work Management Coordinator (WMC) has a key role in the coordination of an outage as they form part of a team that enables a link between system windows. The WMCs work as a team to anticipate and highlight issues with other work groups before problems arise. The coordination of information during an outage makes it possible for issues to be anticipated and resolved before they happen. However, discovery work is inevitable. Should a problem arise, the role of the WMC is to coordinate actions to minimize and mitigate the consequences on the outage schedule by the safest means. The WMC coordinates the work within a system window and its interfaces. Work Group Coordinators focus on the specifics of work within a system window.	
8.23.	Optimization of radiation protection, optimization of non-radiation-related safety, waste reduction and control of chemical hazards shall be essential elements of outage programmes and planning, and this shall be clearly communicated to relevant plant staff and contractors.	The following programs and procedures provide direction on radiation protection, non-radiation-related safety, waste reduction and control of chemical hazards. Optimization and minimization of hazards and waste is an integral part of these programs and procedures. BP-PROG-00.06 Health and Safety Management BP-PROG-12.05 Radiation Protection Program BP-PROC-00306 Chemical Risk Management Procedure BP-PROC-00389, Conventional Safety Programs BP-PROC-00878 Radioactive Waste Management Bruce Power governance as related to outage programs and planning addresses these aspects specifically. BP-PROC-00342 SHT0003 - Planned Outage - Planning and Preparation provides detailed guidance on planning aspects as described in sections: 4.2.1 Reactor Safety 4.2.2 Radiation Safety 4.2.3 Conventional Safety	C

Article No.	Article Requirement	Assessment	Compliance Category
		4.2.7 Chemistry Per section 4.10 An Outage Handbook is compiled and issued for every planned outage to assist all members of staff with understanding the Outage. The handbook provides a brief overview of the outage and summarizes important plant work rules to help individuals, particularly new personnel or contractors. The Outage Handbook contains information on the following: - Specific outage objectives, goals and management expectations - Details on Event Free Tools, the use of OPEX, Reactor Safety, Industrial Safety, Radiological Safety, and Environmental Safety. - Information on Dosimetry, Foreign Material Exclusion (FME), Hot Work (work with the potential to cause fire), Material Safety Data Sheets, Work in Confined Spaces. - Information on waste minimization and disposal. In addition to the above, these activities are supported by corporate-wide programs on the same subjects as follows: BP-PROC-00306, Chemical Risk Management Section 1.0 Purpose states: This document establishes administrative controls and guidance necessary to ensure compliance with good industry practices for controlling hazardous materials in the work place. This procedure defines the process required to evaluate and communicate to workers the potential risks associated with hazardous materials usage. The program is designed to protect workers, the station facility, the environment, and plant systems and equipment from uncontrolled or unmanaged use of hazardous materials. BP-PROC-00181, Waste Minimization Plan Section 1.0 Purpose states: The purpose of the Waste Minimization Plan is to encourage work groups to reduce waste when completing work/tasks and to raise awareness about waste minimization. Work groups are expected to complete FORM-11803, Waste Minimization Plan and include in work plans. FORM-11803, is the tool used by workgroups to think about and plan the waste they generate and to	

Article No.	Article Requirement	Assessment	Compliance Category
		come up with ways to reduce this waste. This form will be filled in and attached to work-plans and used in pre-job briefs. Work groups are also encouraged to use existing recycling programs as per BP-PROC-00219, Conventional Materials Recycling and Composting to minimize waste to landfill. BP-PROC-00219, Conventional Materials Recycling programs BP-PROC-00888, Conventional And Hazardous Waste Management Program Section 1.0 Purpose states: The purpose of this procedure is to ensure that Bruce Power is in compliance with applicable federal, provincial and municipal regulations and corporate requirements affecting the generation, handling, storage, and disposal of conventional and hazardous waste, including Polychlorinated Biphenyl (PCB) waste. This document applies to all Bruce Power facilities and projects undertaken by others on behalf of Bruce Power	
8.24.	A comprehensive review shall be performed after each outage to draw lessons to be learned.	BP-PROC-00342 Sheet 0006, Planned Outage Close-Out Section 4.5 Lessons Learned states: Lessons Learned are any suggestions or good ideas on improvements to the outage process. They can originate from any member of staff. Lessons Learned are mainly identified during preparation and execution phases as per BP-PROC-00342, Sheet 0005, Planned Outage - Execution. The OEM or delegate reviews the Lessons Learned and those that need action before start-up will go to a Scope Review Panel to be approved. All outage Lessons Learned will be reviewed after the outage during Close-Out. The OEM reviews and consolidates Lessons Learned for the post outage workshop. The Outage Report should state what the Lessons Learned are and what is being done about the issue. Disposition of all lessons learned are need/value dependant. All OLL are entered into the SCR database. The OEM of the next outage also uses previously identified Lessons Learned, to improve the next outage as applicable. Section 4.6 SCR Review states: Outage Lessons Learned are entered into the SCR database with OLL in the title. Refer to BP-	C

Article No.	Article Requirement	Assessment	Compliance Category
		PROC-00342, Sheet 0005, Planned Outage - Execution. BP-PROC-00343, Forced Outage Section 4.6 Forced Outage Report states: The OEM compiles a report on the outage for key stakeholders that comprises: - Executive Summary: including outage duration, cause of the forced outage. - Performance Summary: a review of outage goals and how the forced outage was executed. - Work completed: a review of all scope (completed, deleted and deferred). - Safety Report: a review of radiation, conventional and reactor safety issues as appropriate to the forced outage. - Any other significant issues. - Lessons learned. SECTION 7.1 Responsibilities of Outage Execution Manager states: 7.1.7 Collects and dispositions Lessons Learned.	
9.		Preparation For Decommissioning	NA
Requirement 33: Preparation for decommissioning	The operating organization shall prepare a decommissioning plan and shall maintain it throughout the lifetime of the plant, unless otherwise approved by the regulatory body, to demonstrate that decommissioning can be accomplished safely and in such a way as to meet the specified end state.	Assessed in detail under Articles 9.1 through 9.6. The overarching Bruce Power procedure that addresses this requirement is the BP-MSM-1 - Management System Manual which states: "Decommissioning The Lease Agreement between Bruce Power and Ontario Power Generation Incorporated (OPGI) places an obligation on OPGI to carry out and make appropriate financial arrangements for decommissioning of the Bruce Nuclear facilities following termination or expiry of the lease.	NR

Article No.	Article Requirement	Assessment	Compliance Category
		During the period of the lease, Bruce Power and OPGI shall consult and cooperate with one another to ensure that the Regulatory requirements for decommissioning are met. Consistent with good utility practices, Bruce Power during its tenancy period shall: 1. Operate and maintain the leased premises in a manner which is consistent with Good Utility Practices, including keeping all appropriate records and preserving and keeping in good standing all Permits. 2. Ensure that it does not do anything or permit any other person to do anything which will have the effect of increasing the cost of decommissioning in any material respect. Licensing Acquisition and Renewal Bruce Power shall acquire, maintain and renew corporate regulatory licenses required in support of procurement, design, construction/installation/commissioning, operations and decommissioning activities including those of a safety or commercial nature." The business arrangement between Bruce Power and OPGI identifies the decommissioning obligation to be with OPGI. Bruce Power is not responsible for planning the decommissioning of the plant and as such, it is not relevant to assess this article against Safety Factor 11 "Procedures".	
9.1.	The decommissioning plan shall be updated in accordance with changes in regulatory requirements, modifications to the plant, advances in technology, changes in the need for decommissioning activities and changes in national policies [9].	BP-MSM-1 -Management System Manual states: "Decommissioning The Lease Agreement between Bruce Power and Ontario Power Generation Incorporated (OPGI) places an obligation on OPGI to carry out and make appropriate financial arrangements for decommissioning of the Bruce Nuclear facilities following termination or expiry of the lease. During the period of the lease, Bruce Power and OPGI shall consult and cooperate with one another to ensure that the Regulatory requirements for decommissioning are met. Consistent with good utility practices, Bruce Power during its tenancy period shall: 1. Operate and maintain the leased premises in a manner which is consistent with Good Utility Practices, including keeping all appropriate records and preserving and keeping in good standing all Permits. 2. Ensure that it does not do anything or permit any other person to do anything which will have the effect of increasing the cost of decommissioning in any material respect.	NR

Article No.	Article Requirement	Assessment	Compliance Category
		Licensing Acquisition and Renewal Bruce Power shall acquire, maintain and renew corporate regulatory licenses required in support of procurement, design, construction/installation/commissioning, operations and decommissioning activities including those of a safety or commercial nature." The business arrangement between Bruce Power and OPGI identifies the decommissioning obligation to be with OPGI. Bruce Power is not responsible for planning the decommissioning of the plant and as such, it is not relevant to assess this article against Safety Factor 11 "Procedures".	
9.2.	A human resource programme shall be developed for ensuring that sufficient motivated and qualified personnel are available for the safe operation of the plant up to final shutdown, for conducting activities in a safe manner during the preparatory period for decommissioning and for safely carrying out the decommissioning of the plant.	The first part of the article: "A human resource programme shall be developed for ensuring that sufficient motivated and qualified personnel are available for the safe operation of the plant up to final shutdown" is covered under Article 3.0 and its associated requirements. BP-PROG-02.01 -Worker Staffing states: "1.0 Purpose This program document defines the fundamental business need, functional requirements, constituent elements, and key responsibilities associated with the Worker Staffing Process. The objective of Worker Staffing is to recruit, orient, and deploy staff that possess the competencies required for maintaining staffing levels consistent with the requisite organization structure, and includes the subsequent release of staff. 4.0 Program Description One of our key business drivers is the effectiveness and engagement of our human capital: Bruce Power Employees. It is therefore essential that all talent management activities, including recruiting, result in attracting highly skilled and motivated individuals into the organization. An effective onboarding and orientation process for New Employees is an important step in establishing a relationship where Employee Development can be nurtured into superior on-the-job performance and tangible business results. The following sub-sections identify the key elements of the Worker Staffing Process, the associated requirements, and the approaches used to satisfy these requirements. To achieve its	C

Article No.	Article Requirement	Assessment	Compliance Category
		objective, this program must consider all requirements associated with the Business Management and Resource Management programs as they pertain to Worker Staffing. 4.4.1 Employee Development & Retention BP-PROG-02.04, Worker Development & Performance Management, BP-PROG-02.02, Worker Training and Qualification, and other processes related to employee engagement and retention ensures that employees' development, training, and performance is managed and linked to our long term business needs. Appropriate employee development contributes to the retention, engagement, and increase in productivity levels of skilled employees as well as reduce and/or delay voluntary attrition that are unrelated to retirements. Lower attrition rates and improved productivity ratios increase the Return on Investment on our Human Capital Asset: Bruce Power Employees." BP-PROC-00468 - Workforce Planning Process states: "4.0 Procedure Description 1. Identify the HR implications of the Company's Long Term Business Plan. The WFP conducts a risk analysis on the long term workforce model, critical skills, yearly and long term staffing budgets." The following part of this article: "for conducting activities in a safe manner during the preparatory period for decommissioning and for safely carrying out the decommissioning of the plant." is not relevant to Bruce Power Safety Factor 11. BP-MSM-1 -Management System Manual states: "Decommissioning The Lease Agreement between Bruce Power and Ontario Power Generation Incorporated (OPGI) places an obligation on OPGI to carry out and make appropriate financial arrangements for decommissioning of the Bruce Nuclear facilities following termination or expiry of the lease. During the period of the lease, Bruce Power and OPGI shall consult and cooperate with one	

Article No.	Article Requirement	Assessment	Compliance Category
		another to ensure that the Regulatory requirements for decommissioning are met. Consistent with good utility practices, Bruce Power during its tenancy period shall: 1. Operate and maintain the leased premises in a manner which is consistent with Good Utility Practices, including keeping all appropriate records and preserving and keeping in good standing all Permits. 2. Ensure that it does not do anything or permit any other person to do anything which will have the effect of increasing the cost of decommissioning in any material respect. Licensing Acquisition and Renewal Bruce Power shall acquire, maintain and renew corporate regulatory licenses required in support of procurement, design, construction/installation/commissioning, operations and decommissioning activities including those of a safety or commercial nature." The business arrangement between Bruce Power and OPGI identifies the decommissioning obligation to be with OPGI. Bruce Power is not responsible for planning the decommissioning of the plant and as such, it is not relevant to assess this article against Safety Factor 11 "Procedures".	
9.3.	In the preparatory period for decommissioning, a high level of operational safety shall be maintained until the nuclear fuel has been removed from the plant.	BP-MSM-1 -Management System Manual states: "Decommissioning The Lease Agreement between Bruce Power and Ontario Power Generation Incorporated (OPGI) places an obligation on OPGI to carry out and make appropriate financial arrangements for decommissioning of the Bruce Nuclear facilities following termination or expiry of the lease. During the period of the lease, Bruce Power and OPGI shall consult and cooperate with one another to ensure that the Regulatory requirements for decommissioning are met. Consistent with good utility practices, Bruce Power during its tenancy period shall: 1. Operate and maintain the leased premises in a manner which is consistent with Good Utility Practices, including keeping all appropriate records and preserving and keeping in good standing all Permits. 2. Ensure that it does not do anything or permit any other person to do anything which	NR

Article No.	Article Requirement	Assessment	Compliance Category
		will have the effect of increasing the cost of decommissioning in any material respect. Licensing Acquisition and Renewal Bruce Power shall acquire, maintain and renew corporate regulatory licenses required in support of procurement, design, construction/installation/commissioning, operations and decommissioning activities including those of a safety or commercial nature." The business arrangement between Bruce Power and OPGI identifies the decommissioning obligation to be with OPGI. Bruce Power is not responsible for planning the decommissioning of the plant and as such, it is not relevant to assess this article against Safety Factor 11 "Procedures".	
9.4.	For a multiple unit plant, appropriate measures shall be put in place to ensure that common systems and common equipment remain fully available to support the safe operation of all the generating units.	BP-OPP-00002 - Operating Policies and Principles - Bruce A states: "01.6 Modifications Modifications to station systems and procedures must be controlled to ensure that the changes do not invalidate the licensing basis, particularly in the areas of: - Health and safety of station staff and the public, - Environment, - National security, - Compliance with international obligations to which Canada has agreed. 1. Modifications to Station Systems Prior approval of the CNSC shall be required for all modifications to station systems in accordance with the Bruce Nuclear Generating Station A Power Reactor Operating Licence. Modifications to station systems that may have an impact on the ability to control reactor power, cool the fuel or contain radioactivity, or that may affect the integrity of the licensing basis, shall be subject to the following policies: a) The approval of the engineering and technical content of modifications to station systems shall be in accordance with procedures approved by the Vice President, Engineering Division.	C

Article No.	Article Requirement	Assessment	Compliance Category
		b) Prior approval of the Senior Operations Authority shall be required for: i) The installation of permanent modifications to station systems. ii) The installation of temporary modifications to the Special Safety Systems, the Reactor Regulating System and the Heat Transport Pump Trip System. Approval shall be required on a case-by-case basis unless the installation of the temporary modification is addressed in procedures which have been approved by the Senior Operations Authority. c) Replacement components in station systems shall preferably be identical to the original component. Non-identical replacement components which have not been classified as acceptable replacements in accordance with procedures approved by the Vice President, Engineering Division shall be treated as modifications. d) Installation of modifications to station systems shall be subject to the following prior authorizations: i) Shift Manager, for permanent modifications. ii) Shift Manager, for temporary modifications unless the authorization is provided in accordance with Clause d) iii). iii) Control Room Shift Supervisor, for temporary modifications for which the conditions for installation are specified in approved operating or maintenance procedures. 03.6 Availability of Safety Related Systems A safety related system, or portion thereof, shall be available whenever the reactor units are in a state where the system is required to provide its safety related function as credited in the Safety Report and subsequent analyses, unless one of the following conditions exists: 1. Alternatives, as noted below, ensure that no significant increase in public risk results from removing the system from service: a) An alternate system for the safety related system, as specified within the Operating Policies and Principles, is available while the safety related system is unavailable. b) Alternate conditions, as specified within the Operating Policies and Principles, make it acceptable for the safety related system to be unavailable. c) Compensating measures, established in procedures approved by the Senior Operations	

Article No.	Article Requirement	Assessment	Compliance Category
		Authority ensure that the unavailability of the system does not result in a significant increase in the assessed public risk as stated in current licensing submissions. 2. Senior Operations Authority approval and CNSC concurrence shall be obtained prior to removing a safety related system from service if its removal from service could result in a significant increase in the assessed public risk as stated in current licensing submissions." In addition to the above, system availability requirements are provided for all systems in sections 21 through 75 and associated Appendices.	
9.5.	The operating organization shall be aware, over the operating lifetime of the plant, of the needs in relation to future decommissioning. Experience and knowledge with regard to contaminated or irradiated structures, systems and components gained in modification and maintenance activities at the plant shall be recorded and retained to facilitate the planning of decommissioning. Complete and reviewed information shall be compiled to be transferred to the organization responsible for managing the decommissioning phase.	BP-MSM-1 -Management System Manual states: "Decommissioning The Lease Agreement between Bruce Power and Ontario Power Generation Incorporated (OPGI) places an obligation on OPGI to carry out and make appropriate financial arrangements for decommissioning of the Bruce Nuclear facilities following termination or expiry of the lease. During the period of the lease, Bruce Power and OPGI shall consult and cooperate with one another to ensure that the Regulatory requirements for decommissioning are met. Consistent with good utility practices, Bruce Power during its tenancy period shall: 1. Operate and maintain the leased premises in a manner which is consistent with Good Utility Practices, including keeping all appropriate records and preserving and keeping in good standing all Permits. 2. Ensure that it does not do anything or permit any other person to do anything which will have the effect of increasing the cost of decommissioning in any material respect."	C
9.6.	The implications for safety of the activities in the transitional phase prior to the commencement of decommissioning shall be assessed and shall be managed so as to avoid undue hazards and to ensure safety.	BP-MSM-1 -Management System Manual states: "Decommissioning The Lease Agreement between Bruce Power and Ontario Power Generation Incorporated (OPGI) places an obligation on OPGI to carry out and make appropriate financial arrangements for decommissioning of the Bruce Nuclear facilities following termination or expiry of the lease. During the period of the lease, Bruce Power and OPGI shall consult and cooperate with one another to ensure that the Regulatory requirements for decommissioning are met.	C

Article No.	Article Requirement	Assessment	Compliance Category
		Consistent with good utility practices, Bruce Power during its tenancy period shall: 1. Operate and maintain the leased premises in a manner which is consistent with Good Utility Practices, including keeping all appropriate records and preserving and keeping in good standing all Permits. 2. Ensure that it does not do anything or permit any other person to do anything which will have the effect of increasing the cost of decommissioning in any material respect." BP-OPP-00002 - Operating Policies and Principles - Bruce A states: "03.6 Availability of Safety Related Systems A safety related system, or portion thereof, shall be available whenever the reactor units are in a state where the system is required to provide its safety related function as credited in the Safety Report and subsequent analyses, unless one of the following conditions exists: 1. Alternatives, as noted below, ensure that no significant increase in public risk results from removing the system from service: a) An alternate system for the safety related system, as specified within the Operating Policies and Principles, is available while the safety related system is unavailable. b) Alternate conditions, as specified within the Operating Policies and Principles, make it acceptable for the safety related system to be unavailable. c) Compensating measures, established in procedures approved by the Senior Operations Authority ensure that the unavailability of the system does not result in a significant increase in the assessed public risk as stated in current licensing submissions. 2. Senior Operations Authority approval and CNSC concurrence shall be obtained prior to removing a safety related system from service if its removal from service could result in a significant increase in the assessed public risk as stated in current licensing submissions."	

B.2. CSA N292.3-14: Management of Low and Intermediate-Level Radioactive Waste

In support of the review tasks listed in Section 5, a detailed assessment of CSA N292.3-14 has been performed in Table B2.

Table B2: CSA N292.3-14: Management of Low and Intermediate-Level Radioactive Waste

Article No.	Clause Requirement	Assessment	Compliance Category
6.1	A waste broker that processes (see Clause 6.3 for waste processor requirements) or repackages radioactive waste before transferring it to another party shall a) confirm through characterization or other means that the radioactive waste meets the appropriate waste acceptance criteria of the management facility receiving the radioactive waste; and b) prepare new documentation and label the package prior to shipment.	Bruce Power performs waste broker activities through internal processes/procedures. To address a) BP-PROC-00878 - Radioactive Waste Management states: "4.4 Radioactive Waste Packaging, Transport and Storage Following segregation, radioactive wastes are processed and packaged by CvM staff in preparation for: 1. Shipment to Ontario Power Generation (OPG) for disposal at their on-site landfill located on the Bruce Power Site in accordance with BP-PROC-00196, Landfill Waste Acceptance Criteria; or 2. Shipment to OPG for disposal at their Western Waste Management Facility (WWMF) as Low or Intermediate Level Waste in accordance with BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste; or 3. Shipment to EnergySolutions Bear Creek Facility in Tennessee for processing in accordance with BP-PROC-00711, Waste Acceptance Guidelines for Energy Solutions. Radioactive waste is prepared for shipment in accordance with BP-PROC-00188, Radioactive Material Transportation, specifically: - BP-RPP-00013, Radioactive Shipments, for off-site shipments. - BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material, for transfer of radioactive waste to on-site	C

Article No.	Clause Requirement	Assessment	Compliance Category
		licensed facilities, including OPG. Note: Waste that has been determined to be free releasable for disposal to a facility outside Bruce Power (e.g., a recycling or compost facility) is transported to the central waste staging yard at Bruce Power by Bruce Power staff in accordance with BP-PROC-00196 and BP-PROC-00888. 7.2 Qualified Personnel Ensure radioactive waste is properly handled, segregated and labelled in accordance with BP-RPP-00010." BP-RPP-00013 - Radioactive Shipments states: "4.0 PROCEDURE DESCRIPTION This procedure applies to road shipments of Nuclear substances only. Shipments by air, sea or rail are infrequent, and subject to additional regulations coordinated through the Radiation Protection Programs. Trans-border shipments shall be made in consultation with the Transport Coordinator. The Bruce Power liaison is the Transport Coordinator." "Table of Contents 4.0 PROCEDURE DESCRIPTION 4.1 Management Expectations	

Article No.	Clause Requirement	Assessment	Compliance Category
		4.2 Making a Radioactive Shipment (Off Site) 4.3 Confirming Receiver Information for a Radioactive Shipment 4.4 Surveying Radioactive Material Before Packing for Shipment 4.5 Packaging Radioactive Material for Shipment 4.6 Surveying Radioactive Material After Packing for Shipment 4.7 Safety Marking for Shipment 4.8 Processing a Radioactive Package for Shipment 4.9 Receiving a Radioactive Shipment 5.0 REFERENCES AND ASSOCIATED FORMS 6.0 RECORDS" b) The above procedures in BP-RPP-00013 - Radioactive Shipments detail the requirement for new documentation and labeling the package prior to shipment. Additional procedures supporting compliance with this clause. BP-PROC-00107 - OPG Waste Acceptance Criteria for Radioactive Waste states: "1.0 PURPOSE This procedure, an implementing document of BP-PROC-00878, Radioactive Waste Management, outlines the acceptance criteria for Low and Intermediate Level Waste (L&ILW) at Ontario Power Generation's (OPG) Western Waste Management Facility (WWMF) as defined by OPG in W-PROC-WM-0025, Waste Acceptance Criteria for L&IL Radioactive Waste."	

Article No.	Clause Requirement	Assessment	Compliance Category
		BP-PROC-00133 - Hazardous Waste Management Requirements states: "4.3 Hazardous Waste Disposal 4.3.1 Waste Manifest System There are two options for manifesting hazardous wastes for transportation across the site boundary; an electronic format or a paper format. The paper format is preferred. See BP-PROC-00478. Bruce Power shall not transfer a particular hazardous waste beyond the site boundary until all conditions are satisfied. • The waste has been identified and registered (or re-registered). Reference Section 4.1. [R-20] [R-21] • Payment of the applicable MOE fees has been made. • Posted on the MOE website. [R-21] • Bruce Power's chosen off-site waste transportation system and waste disposal facility must be operated under a Certificate of Approval or Provisional Certificate of Approval. [R-14] [R-15] [R-16] [R-17] 4.3.1.1 Paper Format Waste Manifests For any transfer of hazardous waste beyond the site boundary, Bruce Power shall use the Waste Generator Number and the Hazardous Waste Classes assigned by the MOE under our number to complete Part A of the Waste Manifest. [R-20] [R-21] After the waste has been transferred to the carrier then do the following with the Waste Manifest. [R-44] • Check that Part A is complete. • Check that Part B is complete. • Copy 1 (WHITE) is kept and sent to the Director within three working days of transfer.	

Article No.	Clause Requirement	Assessment	Compliance Category
		• Send the electronic equivalent same day as shipment of waste. • Copy 2 (GREEN) is kept and is retained by Bruce Power as an official record for two years minimum. • Copies 3-6 are sent along with the carrier. After the waste has been transferred to the Waste Receiver then complete the following: [R-22] • Three working days after the waste receiver has accepted the waste, then Copy 6 (BROWN) is sent to Bruce Power. This is to be retained (two years minimum). To ensure Waste Manifests are completed accurately, FORM-12503, Checklist for Completing Ministry of Environment Waste Manifests, must be completed for each hazardous waste shipment and verified by the TDG certified Site Hazardous Waste Coordinator (SWC) or a TDG certified delegate. 4.3.1.2 Electronic Format Waste Manifests For any transfer of hazardous waste beyond the site boundary, Bruce Power shall use the Manual, Waste Generator Number and the Hazardous Waste Classes assigned by the MOE under our number to complete electronic Waste Manifest. [R-20] [R-21] Bruce Power must perform the following: [R-48] [R-49] • Complete Part A of the electronic manifest according to the Manual. • Ensure that the carrier has access to a computer that has internet capability to access the HWIN database. • Ensure the carrier completes Part B of the manifest. • Ensure the carrier submits electronically to the MOE Director (Reg. 347), the manifest with Part A and Part B completed. • If the carrier requests a paper copy of the electronic manifest then ensure that the document is printed out and handed over to the carrier.	

Article No.	Clause Requirement	Assessment	Compliance Category
		• 4.3.1.3 Hazardous Waste Delivery Confirmation • If Bruce Power cannot confirm delivery of hazardous waste to the intended receiving facility to another receiving facility approved to accept the waste within four weeks then: • Bruce Power shall orally report to the MOE Director (Reg. 347). [R-23] • A Station Condition Record is required to document the MOE reportable event. 4.3.3 Mixed Waste If the mixed waste meets the criteria for storage of radioactive oils at Ontario Power Generation Western Waste Management RWOS#2 then follow the instructions from BP-PROC-00107, Waste Acceptance Criteria for Low & Intermediate Level Radioactive Waste. If the mixed waste is aqueous-based and meets the criteria for Active Liquid Waste Treatment (Section 4.5.3) then proceed to process the waste on-site. If the mixed waste meets none of the criteria then a business proposal must be submitted to the Waste Specialist. The business proposal must outline the available options (i.e., do nothing; explore options with Ontario Power Generation or other external contractor as appropriate)." 4.6 Off-site Waste Disposal Facilities 4.6.1 Ontario Power Generation Inc. Facilities 1. Ontario Power Generation Western Waste Management Facility RWOS#2 can accept mixed waste provided it meets the conditions in BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste, Section 4.8. 2. Ontario Power Generation Inc. acts as the waste carrier.	

Article No.	Clause Requirement	Assessment	Compliance Category
		3. Waste Manifests do not apply, as the radioactive waste load statement system is sufficient. 4.6.2 Other Provincial Waste Disposal Facilities • Be operated under a Certificate of Approval or Provisional Certificate of Approval. [R-14] [R-15] [R-16] [R-17] • Meet the Standards for Waste Management Systems. [R-18] • Waste Manifest is completed (Section 4.3.1). 4.6.3 Out-of-Province, Canadian Waste Disposal Facilities Currently only PCB waste is transferred directly to an out-of-province waste disposal facility. Refer to Section 2.3 for disposal procedures. In the case that non-PCB contaminated waste requires a direct shipment to disposal via an out-of-province facility then the following must be considered. • A Waste Manifest issued under TDG Act or an equivalent manifest issued by another Canadian jurisdiction may be used for the purposed of compliance with Reg. 347. [R-40] • Copy 1 (WHITE) or electronic equivalent must be sent to the appropriate official in the jurisdiction of where the waste is transferred or received within three working days. Send the electronic equivalent same day as shipment of waste. • A copy of Copy 1 (WHITE) or electronic equivalent must be sent to the MOE Director (Reg. 347) within three working days. Send the electronic equivalent same day as shipment of waste. • The out-of-province waste receiver must complete Part C of the Waste Manifest. [R-41] [R-42] • The out-of-province waste receiver sends Waste Manifest Copy 6 (BROWN) to Bruce Power within three working days OR in the case of electronic manifest, Part C is completed by	

Article No.	Clause Requirement	Assessment	Compliance Category
		the receiver and is complete and accurate. [R-43] [R-47] • Waste Manifest is completed (Section 4.3.1). 4.6.4 Foreign Waste Disposal Facilities Radioactive hazardous waste that does not meet BP-PROC-00107, Waste Acceptance Criteria for Low & Intermediate Level Radioactive Waste, is a candidate for sending waste to a foreign waste disposal facility. This involves a radioactive shipment across international borders. The following must be considered in arranging waste to be destroyed in this manner: • Confirm which portions of the following gets support from the Law Division: • Canadian Environmental Protection Act 1999, Division 8 • Nuclear Safety and Control Act and Regulations • Export and Import of Hazardous Waste Regulations (SOR/92-607) • Reg. 347, Section 24 • Submit Notices to Regulatory Agencies within the time frame specified (e.g., CNSC, Department of Foreign Affairs, etc.). • Get support from Commercial Services Department with Subject Matter Experts in Contracts and Purchasing to initiate a Purchase Service for waste transportation and waste destruction. • Obtain Export/Import documentation (permits, Customs declarations, shipping papers, etc.). • Waste Characterization sampling must be performed on waste as per chosen contractor's specifications. Get support from Chemistry Department and external laboratory to perform waste characterization analyses. • Get support from Bruce Power's Radioactive Transport Coordinator for packaging and shipping instructions. • Get Support from Emergency Measures Department for	

Article No.	Clause Requirement	Assessment	Compliance Category
		radioactive transportation accident issues. • Get Waste Destruction Certificates from contractor after waste has been destroyed."	
6.2	A waste carrier shall sign the shipping manifest when accepting charge and control from the consignor (i.e., from the waste generator or waste broker). Note: A waste carrier is not normally required to have a licence from the CNSC to transport radioactive waste containing nuclear substances, but is subject to the provisions of the Packaging and Transport of Nuclear Substances Regulations and the Transportation of Dangerous Goods Regulations. There may be exceptions where the waste carrier is the same organization that has responsibility for the radioactive waste and where a separate licence is required, i.e., special arrangement shipments; see Section 26 of the Nuclear Safety and Control Act.	BP-RPP-00013 - Radioactive Shipments states: "4.8 Processing a Radioactive Package for Shipment Initiate preparation of FORM-11125, SAF, and other shipping documentation as required: Note: The Transportation Officer will countersign corresponding section of the SAF after reviewing the SAF for regulatory compliance. FORM 11125 is "Shipment Advice Radioactive Material Form" subsequent step "Complete SAF: Shipper must print name, sign and date and enter TDG Class 7 certificate number in the 'Cosignor Declaration" section of the SAF when offering package to Driver for Transport. Ensure the Driver prints name, signs and dates, and enters in the Carrier section of the SAF."	C
6.3	In addition to processing waste, a waste processor shall a) characterize the processed waste to confirm that it meets	To address a) BP-PROC-00878 - Radioactive Waste Management states:	C

Article No.	Clause Requirement	Assessment	Compliance Category
	the waste acceptance criteria of the waste management facilities receiving the radioactive waste; b) prepare new documentation and labels for the processed radioactive waste package prior to shipment; and c) maintain required information and records on radioactive waste received, processed, and transported in accordance with the requirements of the AHJ.	"4.4 Radioactive Waste Packaging, Transport and Storage Following segregation, radioactive wastes are processed and packaged by CvM staff in preparation for: 1. Shipment to Ontario Power Generation (OPG) for disposal at their on-site landfill located on the Bruce Power Site in accordance with BP-PROC-00196, Landfill Waste Acceptance Criteria; or 2. Shipment to OPG for disposal at their Western Waste Management Facility (WWMF) as Low or Intermediate Level Waste in accordance with BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste; or 3. Shipment to EnergySolutions Bear Creek Facility in Tennessee for processing in accordance with BP-PROC-00711, Waste Acceptance Guidelines for Energy Solutions. Radioactive waste is prepared for shipment in accordance with BP-PROC-00188, Radioactive Material Transportation, specifically: BP-RPP-00013, Radioactive Shipments, for off-site shipments. BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material, for transfer of radioactive waste to on-site licensed facilities, including OPG. Note: Waste that has been determined to be free releasable for disposal to a facility outside Bruce Power (e.g., a recycling or compost facility) is transported to the central waste staging yard at Bruce Power by Bruce Power staff in accordance with BP-PROC-00196 and BP-PROC-00888. 7.2 Qualified Personnel Ensure radioactive waste is properly handled, segregated and labelled in accordance with BP-RPP-00010."	

Article No.	Clause Requirement	Assessment	Compliance Category
		BP-PROC-00107 R005 - OPG Waste Acceptance Criteria for Radioactive Waste states: "1.0 PURPOSE This procedure, an implementing document of BP-PROC-00878, Radioactive Waste Management, outlines the acceptance criteria for Low and Intermediate Level Waste (L&ILW) at Ontario Power Generation's (OPG) Western Waste Management Facility (WWMF) as defined by OPG in W-PROC-WM-0025, Waste Acceptance Criteria for L&IL Radioactive Waste." To address b) BP-RPP-00013 - Radioactive Shipments contains: Section "4.7 Safety Marking for Shipment" which includes the steps and details of preparing new documentation and labels for processed radioactive waste packages prior to shipment. To address c) BP-PROC-00188 - Radioactive Material Transportation states: "4.6 Oversight and Inspection 4.6.1 Document Control The Transport Coordinator shall review all documents related to radioactive material transportation on an ongoing basis and revise the associated documentations as per BP-PROC-00166 to ensure continued compliance. The Transport Coordinator is responsible for ongoing oversight and	

Article No.	Clause Requirement	Assessment	Compliance Category
		maintenance of transfer permits for conditional transfers and all associated forms. Transport documents shall be prepared by trained, qualified staff and approved by the Transport Coordinator or delegate as per BP-RPP-00013 and BP-RPP-00033. 4.6.2 Record Control The PTNSR requires that every person who packages radioactive material in a IP-2, IP-3 or Type A package to keep a record of the following information and documents concerning the package: 1. Technical specifications of its design. 2. Type, quantity and physical form of the radioactive material that it is designed to contain. 3. Any document that demonstrates that the package meets the requirements of the IAEA TS-R-1 Regulations, including the written quality assurance program; and 4. Instructions for packaging, transport, receiving, maintenance and un-packaging. The records referred to above shall be retained for the period ending two years after the date on which the packaging occurs and the records of certificates shall be maintained and kept current by the Transport Coordinator. Additional documents may be required to be retained as per associated Record Retention Authorization (RRA) or upon request from the Transport Coordinator. All transport documents shall be sent to the Records Department quarterly under their associated RRA as per BP-PROC-00098, Record Management, for retention purposes." Bruce Power complies with the requirements of the WWMF and Energy Solutions. The waste processor is ultimately responsible for complying with this clause and Bruce Power is compliant with	

Article No.	Clause Requirement	Assessment	Compliance Category
		their aspects of these requirements.	
7.1	Radioactive waste characterization shall be conducted in accordance with the requirements of CSA N292.0.	CSA N292.0 "General Principles for the Management of Radioactive Waste and Irradiated Fuel" radioactive waste characterization requirements are extracted as follows: "5.9 Waste characterization" CSA N292.0 Clause "5.9.1 Waste characterization should be performed to determine, or verify, the properties of the waste to assist with a) defining segregation and safe handling requirements; b) defining waste package type, packaging materials, and packaging method requirements; c) determining or finalizing conditioning, processing, and disposition options; and d) verifying suitability for the intended disposition path. Note: Waste characterization may be conducted at any time during the waste life cycle." 5.9.1 REQUIREMENTS ARE ADDRESSED BY: W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMP Waste Acceptance Criteria states:	C

Article No.	Clause Requirement	Assessment	Compliance Category
		"Waste oils and scintillation fluids are currently shipped to the Western Waste Management Facility (WWMF) for incineration or temporary storage before they are incinerated. All other liquid waste types are characterized and are either treated on-site or shipped to off-site vendors for treatment and/or disposal. Aqueous wastes in some instances are neutralized and fed through the Active Liquid Waste Treatment System. In most cases, they are shipped off-site for treatment/disposal. Organic solvent wastes are not shipped to the WWMF because in many cases they do not meet the Waste Acceptance Criteria (WAC). By virtue of their volatility, they fail the flash point criteria and are therefore not acceptable for interim storage. They are also not candidates for treatment on-site and so are sent to vendors for disposition. Likewise, miscellaneous radioactive liquid wastes are sent off-site for destruction/disposal." AND BP-RPP-00010, Segregation and Handling of Radioactive Waste states: "1.0 PURPOSE The procedure details how staff shall segregate and dispose of routine solid waste and disposition contaminated liquid wastes as per governing document BP-PROC-00878, Radioactive Waste Management. "APPENDIX A: SEGREGATION GUIDELINES INCINERABLE, COMPACTABLE, NON-PROCESSABLE, METAL MELT" with details identified in the table.	

Article No.	Clause Requirement	Assessment	Compliance Category
		APPENDIX B: LIKELY CLEAN SOLID WASTE FROM ZONE 2 APPENDIX C: DISPOSING OF NON-TRITIATED ACTIVE SOLID WASTE FROM ZONE 3 APPENDIX D: DISPOSING OF TRITIATED SOLID WASTE APPENDIX E: DISPOSING OF FLOOR SWEEPINGS AND MOP HEADS APPENDIX F: DISPOSING OF SCRAP METAL APPENDIX G: DISPOSING OF RADIOACTIVE CONTAMINATED LIQUID WASTE" AND BP-PROC-00107, OPG Waste Acceptance Criteria for Radioactive Waste states: "1.0 PURPOSE This procedure, an implementing document of BP-PROC-00878, Radioactive Waste Management, outlines the acceptance criteria for Low and Intermediate Level Waste (L&ILW) at Ontario Power Generation's (OPG) Western Waste Management Facility (WWMF) as defined by OPG in W-PROC-WM-0025, Waste Acceptance Criteria for L&IL Radioactive Waste. 3. The requirements for handling and segregation of radioactive waste prior to transfer to OPG's WWMF. This is defined in BP-RPP-00010, Segregation and Handling of Radioactive Waste. 4. The process for transfer of radioactive waste to OPG's WWMF.	

Article No.	Clause Requirement	Assessment	Compliance Category
		This is defined in BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material. 5. The processes used by Civil Maintenance Waste Handlers to process radioactive waste. These are described in B-SMP-79100-00004 4.1.5 Waste Characterization Requirements The eventual long-term permanent storage and/or disposal of L&ILW received at OPG's WWMF may be accomplished only if the characteristics (radiological, chemical and physical) are known (measured or estimated). Bruce Power shall identify typical L&ILW streams and then apply good waste management practices, reasonable assumptions, and available source term data to provide acceptable waste characterization estimates. Bruce Power shall supply samples of L&ILW resin when requested by OPG NWMD staff." CSA N292.0 Clause "5.9.2 Characterization should include assessing the physical, mechanical, chemical, biological, thermal, and/or radiological properties of the waste material as applicable. Note: Characterization methodologies include the following: a) review of process knowledge and historical information; b) visual inspection; c) radioactivity measurements (e.g., alpha, beta, gamma); d) chemical and radiochemical analysis; e) non-destructive assay (e.g., gamma spectroscopy, neutron	

Article No.	Clause Requirement	Assessment	Compliance Category
		activation analysis); f) modelling and use of scaling factors; g) burn-up data and age for fuels and fuel bearing material; and h) assessment of contaminant homogeneity in the material." 5.9.2 REQUIREMENTS ARE ADDRESSED BY: BP-PROC-00107, OPG Waste Acceptance Criteria for Radioactive Waste states: "1.0 PURPOSE This procedure, an implementing document of BP-PROC-00878, Radioactive Waste Management, outlines the acceptance criteria for Low and Intermediate Level Waste (L&ILW) at Ontario Power Generation's (OPG) Western Waste Management Facility (WWMF) as defined by OPG in W-PROC-WM-0025, Waste Acceptance Criteria for L&IL Radioactive Waste. 3. The requirements for handling and segregation of radioactive waste prior to transfer to OPG's WWMF. This is defined in BP-RPP-00010, Segregation and Handling of Radioactive Waste. 4. The process for transfer of radioactive waste to OPG's WWMF. This is defined in BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material. 5. The processes used by Civil Maintenance Waste Handlers to process radioactive waste. These are described in B-SMP-79100-00004	

Article No.	Clause Requirement	Assessment	Compliance Category
		4.1.5 Waste Characterization Requirements The eventual long-term permanent storage and/or disposal of L&ILW received at OPG's WWMF may be accomplished only if the characteristics (radiological, chemical and physical) are known (measured or estimated). Bruce Power shall identify typical L&ILW streams and then apply good waste management practices, reasonable assumptions, and available source term data to provide acceptable waste characterization estimates. Bruce Power shall supply samples of L&ILW resin when requested by OPG NWMD staff." Bruce Power complies with the requirements of the WWMF. The responsibility for ensuring compliance with CSA N292.0 Clause 5.9.2 Characterization details resides with WWMF and NWMO. Therefore, Bruce Power is compliant with their aspects of these requirements. CSA N292.0 Clause "5.9.3 Minimum waste characterization requirements should be defined by the waste receiver." 5.9.3 REQUIREMENT IS ADDRESSED BY: BP-PROC-00107, OPG Waste Acceptance Criteria for Radioactive Waste states:	

Article No.	Clause Requirement	Assessment	Compliance Category
		"1.0 PURPOSE This procedure, an implementing document of BP-PROC-00878, Radioactive Waste Management, outlines the acceptance criteria for Low and Intermediate Level Waste (L&ILW) at Ontario Power Generation's (OPG) Western Waste Management Facility (WWMF) as defined by OPG in W-PROC-WM-0025, Waste Acceptance Criteria for L&IL Radioactive Waste."	
7.2	The radiological, physical, chemical, and biological properties of the radioactive waste shall be ascertained, as applicable, in order to a) verify that the radioactive waste meets the waste acceptance criteria and can be safely managed at a given facility; b) assign the radioactive waste to the appropriate class; and c) determine the suitability of the radioactive waste for further handling, processing, storage, or placement in a repository.	BP-PROC-00878 - Radioactive Waste Management states: "4.4 Radioactive Waste Packaging, Transport and Storage Following segregation, radioactive wastes are processed and packaged by CvM staff in preparation for: 1. Shipment to Ontario Power Generation (OPG) for disposal at their on-site landfill located on the Bruce Power Site in accordance with BP-PROC-00196, Landfill Waste Acceptance Criteria; or 2. Shipment to OPG for disposal at their Western Waste Management Facility (WWMF) as Low or Intermediate Level Waste in accordance with BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste; or 3. Shipment to EnergySolutions Bear Creek Facility in Tennessee for processing in accordance with BP-PROC-00711, Waste Acceptance Guidelines for Energy Solutions. Radioactive waste is prepared for shipment in accordance with BP-PROC-00188, Radioactive Material Transportation, specifically: • BP-RPP-00013, Radioactive Shipments, for off-site shipments. • BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material, for transfer of radioactive waste to on-site licensed facilities, including OPG. Note: Waste that has been determined to be free releasable for disposal to a facility outside Bruce Power (e.g., a recycling or compost facility) is transported to the central waste staging yard at Bruce Power by Bruce Power staff in accordance with BP-PROC-	C

Article No.	Clause Requirement	Assessment	Compliance Category
		00196 and BP-PROC-00888. 7.2 Qualified Personnel Ensure radioactive waste is properly handled, segregated and labelled in accordance with BP-RPP-00010." BP-PROC-00133, Hazardous Waste Management Requirements" states: "4.1 Hazardous Waste Generation 4.1.1 Hazardous Waste Identification The fundamental principles of waste identification are to determine the physical state, chemical character and radiological status. Any waste must be identified and classified. This is to determine proper segregation, storage, and disposal options. See SEC-ENV-00005 and BP-PROC-00478. Analytical tests may have to be performed on a particular waste to determine if it meets primary characteristics defined in the Manual. Schedules of contaminants listed in Reg. 347 must be checked from time to time for amendments. Waste Criteria 1. If the waste form fails the slump test then the waste's physical state is declared to be a liquid. 2. If the waste fails the Toxicity Characteristic Leaching Procedure then the waste is declared "Leachate Toxic". 3. If the waste meets the regulatory definition of pathological waste	

Article No.	Clause Requirement	Assessment	Compliance Category
		then refer to Section 4.3.4 [R-27]. 4. If the waste characteristics meet the definitions of radioactive liquid and hazardous waste then the waste is declared to be Mixed Waste. 5. If the waste has a PCB concentration ≥50 ppm then the waste is declared PCB Waste. Check Appendix C for whether the waste is low level or high level. 6. Check the waste characteristics to determine if the waste meets the Reg. 347 [R-27], definitions of: a) Severely Toxic b) Acute Hazardous Waste Chemical c) Hazardous Waste Chemical d) Hazardous Industrial Waste e) Ignitable f) Corrosive g) Reactive h) Liquid Industrial Waste" BP-RPP-00010 -Segregation and Handling of Radioactive Waste states: "4.1.3 Radiological Considerations 4.1.3.1 Solid waste shall be considered contaminated when measurement with a 15 cm2 pancake detector contamination meter results in anything above 100 cpm net in a background less than 100 cpm for fixed contamination and no detectable for loose	

Article No.	Clause Requirement	Assessment	Compliance Category
		contamination. Liquid waste shall be considered contaminated when any of the following are true: Gross beta/gamma concentration greater than Minimum Detectable Limit. Tritium Concentration greater than 2 Ci/kg. Any measurable contact dose rate off the container. 4.3 Handling Radiological Waste For instructions on handling Potentially Radioactive waste see Appendices. APPENDIX A: SEGREGATION GUIDELINES APPENDIX B: LIKELY CLEAN SOLID WASTE FROM ZONE 2 APPENDIX C: DISPOSING OF NON-TRITIATED ACTIVE SOLID WASTE FROM ZONE 3 APPENDIX D: DISPOSING OF TRITIATED SOLID WASTE APPENDIX E: DISPOSING OF FLOOR SWEEPINGS AND MOP HEADS APPENDIX F: DISPOSING OF SCRAP METAL APPENDIX G: DISPOSING OF RADIOACTIVE CONTAMINATED LIQUID WASTE"	
7.3	The category name defining the radioactive waste form should specify its nature or origin. Note: Examples of category names may include, but are not limited	BP-PROC-00878 - Radioactive Waste Management states: "4.2 Radioactive Waste Handling and Segregation The handling and segregation of radioactive waste at source is	C

Article No.	Clause Requirement	Assessment	Compliance Category
	to, the following: a) solid dry waste; b) absorbed liquid; c) contaminated scrap; d) animal carcass; or e) industrial trash.	performed by qualified personnel of the work group generating the waste in accordance with BP-RPP-00010, Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials. Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the work group generating the waste. Through the segregation process, radioactive waste is clearly identified by waste type, radiological properties, and point of origin to ensure proper segregation into designated waste receptacles and assists in radioactive waste minimization. 4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable 2. Compactable 3. Non-processable 4. Metal melt" BP-PROC-00133, Hazardous Waste Management Requirements" states:	

Article No.	Clause Requirement	Assessment	Compliance Category
		"4.1 Hazardous Waste Generation 4.1.1 Hazardous Waste Identification The fundamental principles of waste identification are to determine the physical state, chemical character and radiological status. Any waste must be identified and classified. This is to determine proper segregation, storage, and disposal options. See SEC-ENV-00005 and BP-PROC-00478. Analytical tests may have to be performed on a particular waste to determine if it meets primary characteristics defined in the Manual. Schedules of contaminants listed in Reg. 347 must be checked from time to time for amendments. Waste Criteria 1. If the waste form fails the slump test then the waste's physical state is declared to be a liquid. 2. If the waste fails the Toxicity Characteristic Leaching Procedure then the waste is declared "Leachate Toxic". 3. If the waste meets the regulatory definition of pathological waste then refer to Section 4.3.4 [R-27]. 4. If the waste characteristics meet the definitions of radioactive liquid and hazardous waste then the waste is declared to be Mixed Waste. 5. If the waste has a PCB concentration ≥50 ppm then the waste is declared PCB Waste. Check Appendix C for whether the waste is low level or high level. 6. Check the waste characteristics to determine if the waste meets the Reg. 347 [R-27], definitions of: a) Severely Toxic b) Acute Hazardous Waste Chemical	

Article No.	Clause Requirement	Assessment	Compliance Category
		c) Hazardous Waste Chemical d) Hazardous Industrial Waste e) Ignitable f) Corrosive g) Reactive h) Liquid Industrial Waste" BP-RPP-00010 -Segregation and Handling of Radioactive Waste states: "4.1.2 Waste Processing 4.1.2.1 Excluded area waste shall be considered active at point of origin. Waste originating from areas designated as excluded areas shall be placed in active waste cans or radioactive waste bags. Exception to this treatment must be approved by the Responsible Health Physicist. 4.1.2.2 All waste shall be placed in the correct container, e.g., recycle container, likely clean container, metal container, active waste container. • FORM-11076, Radioactive Material Tag shall be filled out completely, name printed clearly, and attached to all active waste, on the outer-most waste bag (if double bagging is required). • Active bags must be sealed correctly. Twisting the upper portion of the bag and applying tape ensures a proper seal. • Compost bags shall be tied closed. DO NOT apply tape. • Metal and materials containing metal shall not be placed into regular waste containers. • Put it into the “metals” containers provided or contact Waste	

Article No.	Clause Requirement	Assessment	Compliance Category
		Management Section for guidance. • Contact Waste Management Section for proper handling and disposal of contaminated recyclable materials. • Used floor sweepings and mop heads shall be placed in separate floor sweepings and mop head waste bags - black and yellow stripe. Sealed bags shall be stored at the relevant Zone 3 active waste collection point. Zone 2/3 mop heads must be wrung out and have no visible liquid."	
7.4	The characterization of radioactive waste should include, as appropriate, information concerning the radioactive waste's a) origin; b) history; c) radionuclide inventory; d) radionuclide concentration; and e) physical, chemical, and biological properties.	a) is addressed by BP-RPP-00010 - Segregation and Handling of Radioactive Waste which states: "4.1.2.4 All solid active waste shall be identified as to its point of origin." b) is addressed by FORM-11076 "Radioactive Material" which has the following fields to be filled in "Item Description, Previous location(s), Gamma, Beta, and Details" c), d) and e) are addressed by: BP-RPP-00010 - Segregation and Handling of Radioactive Waste which states: "4.1.3 Radiological Considerations 4.1.3.1 Solid waste shall be considered contaminated when measurement with a 15 cm2 pancake detector contamination meter results in anything above 100 cpm net in a background less than 100 cpm for fixed contamination and no detectable for loose	C

Article No.	Clause Requirement	Assessment	Compliance Category
		contamination. Liquid waste shall be considered contaminated when any of the following are true: • Gross beta/gamma concentration greater than Minimum Detectable Limit. • Tritium Concentration greater than 2 Ci/kg. • Any measurable contact dose rate off the container. 4.1.3.2 The radiological hazards of radioactive waste shall be controlled at point of origin: • Active solid waste materials with gamma dose rates greater than 2.5 mrem/h at 30 cm, or greater than 25 mrem/h contact, shall be bagged separately from less active material. Such waste shall be bagged and tagged with a completed FORM-11076 and delivered to the Waste Management Section or deposited at a Zone 3 waste pick-up location. • When placing solid radioactive waste into a waste container, or depositing waste at a pick-up location, perform surveys and set up barriers and signs as required. These are required when the dose rate of the area, container or area around the container exceeds 2.5 mrem/h at 30 cm or when tritium concentrations in air exceed 1 MPC(a)." BP-PROC-00188 - Radioactive Material Transportation states: "4.2 Radioactive Material Classification Prior to shipment of radioactive material, all radioactive material must be classified in accordance with the CNSC PTNSR. The requirements and time required to classify radioactive material will vary depending on the form, history of use (e.g., storage/use location, impacted system, potential for contamination), frequency	

Article No.	Clause Requirement	Assessment	Compliance Category
		of shipment and activity of the radioactive material. In order to ensure radioactive material can be properly classified prior to shipment, information regarding the radioactive material to be shipped offsite to a licensed facility shall be submitted to the Transport Coordinator or qualified classifier, through e-mail or phone call, 3 -5 days in advance of the required shipment date. Upon receipt of information, the Transport Coordinator or qualified classifier shall classify the radioactive material ensure that regulatory requirements for transporting radioactive material are met for packaging. The classification of the material can be divided into different categories, including: • Excepted • LSA-I, LSA-II, LSA-III • SCO-I, SCO-II • Type A • Type B including Type B(U), Type B(M) • Type C • Special Arrangement These categories are further described in Appendix B. Classifications of routine shipments (e.g. tritiated heavy water shipments) are defined in Standing Radioactive Shipment Permits (SRSP) which are prepared by the Transport Coordinator and approved by a Facility Health Physicist. Class 7 shippers are permitted to classify material and prepare a FORM-11124, Radioactive Shipment Permit (RSP) without a Health Physicist's or the Transport Coordinator's approval signature if the radiological conditions meet the requirements included in the SRSP. For all other non-routine shipments, their classification may varies case by case due to various contributing factors. The processes of classifying these shipments are further described in BP-RPP-00013, Radioactive Shipments."	
7.5	The physical, chemical, and biological properties relevant to the management of the radioactive waste shall be listed.	BP-PROC-00133 - Hazardous Waste Management Requirements contains:	C

Article No.	Clause Requirement	Assessment	Compliance Category
	Note: For low- and intermediate-level radioactive waste forms, these properties may include a) state; b) waste matrix composition; c) chemical composition; d) specific gravity; e) solubility in water; f) dispersibility; g) particle size distribution; h) freezing/melting/boiling point; i) vapour pressure; j) flash point; k) combustibility and flammability; l) explosive limits; m) chemical toxicity; n) biohazards; o) physical hazards; p) unusual hazards; q) stability; r) hazardous polymerization; s) decomposition products; t) chelating agents; and u) incompatibility.	"APPENDIX C: HAZARDOUS WASTE IDENTIFICATION PARAMETERS" which identifies the following: -Polychlorinated Biphenyl Waste Parameters -Radioactive Liquid Waste Parameters (There are 3 categories of radioactive liquids and are defined as: Type 1, Type 2, Type 3. -Waste Derived Fuel Parameters (Arsenic (As), Cadmium (Cd), Chromium (Cr), Lead (Pb), PCBs, Total Halogens, Flash Point)" and includes additional levels and details. BP-PROC-00188 - Radioactivity Material Transportation "APPENDIX B: PACKAGE LIMITS Activity Limits for Excepted Packages Physical State of Contents - Solids - Special Form - Other forms - Liquids - Gases:Tritium, Special Form, Other Forms"	

Article No.	Clause Requirement	Assessment	Compliance Category
7.6	Radioactive waste characterization should include, as appropriate, the following radiological information: a) the radionuclides of interest, determined by analysis, inference (e.g., scaling factors, used fuel ratios), or knowledge of the process generating the radioactive waste; b) the total activity of each radionuclide of interest (Bq); c) the specific activity of each radionuclide of interest (Bq/m3, Bq/kg, etc.); d) surface contamination (alpha and beta/gamma) of the package (Bq/cm2); and e) the fissile radionuclides and their concentrations if greater than natural concentrations (absolute percent by weight).	BP-PROC-00188 - Radioactive Material Transportation states: "4.2 Radioactive Material Classification Prior to shipment of radioactive material, all radioactive material must be classified in accordance with the CNSC PTNSR. The requirements and time required to classify radioactive material will vary depending on the form, history of use (e.g., storage/use location, impacted system, potential for contamination), frequency of shipment and activity of the radioactive material. In order to ensure radioactive material can be properly classified prior to shipment, information regarding the radioactive material to be shipped offsite to a licensed facility shall be submitted to the Transport Coordinator or qualified classifier, through e-mail or phone call, 3 -5 days in advance of the required shipment date. Upon receipt of information, the Transport Coordinator or qualified classifier shall classify the radioactive material ensure that regulatory requirements for transporting radioactive material are met for packaging. The classification of the material can be divided into different categories, including: • Excepted • LSA-I, LSA-II, LSA-III • SCO-I, SCO-II • Type A • Type B including Type B(U), Type B(M) • Type C • Special Arrangement These categories are further described in Appendix B. Classifications of routine shipments (e.g. tritiated heavy water shipments) are defined in Standing Radioactive Shipment Permits (SRSP) which are prepared by the Transport Coordinator and approved by a Facility Health Physicist. Class 7 shippers are permitted to classify material and prepare a FORM-11124,	C

Article No.	Clause Requirement	Assessment	Compliance Category
		Radioactive Shipment Permit (RSP) without a Health Physicist's or the Transport Coordinator's approval signature if the radiological conditions meet the requirements included in the SRSP. For all other non-routine shipments, their classification may varies case by case due to various contributing factors. The processes of classifying these shipments are further described in BP-RPP-00013, Radioactive Shipments." BP-RPP-00013 - Radioactive Shipments states: "4.4 Surveying Radioactive Material Before Packing for Shipment -Is material solid and free from tritium or other volatile contamination? -If no: -Arrange for analysis of liquid or gas samples (if applicable) -Send samples to Chemistry Lab -Attach analysis results to the RSP (Radioactive Shipment Permit) -See Appendix A -APPENDIX A - Guide to Characterize Shipments is a table with the following columns: SHIPMENT, CHARACTERIZATION, and STEPS The clause requirements are met by the details contained in the Appendix A table." Additional detailed information is included in BP-PROC-00914 - Radiological Analysis.	
7.7	In the case of radioactive waste that is currently in storage, including	The concept of "storage for decay" is not implemented in Bruce	C

Article No.	Clause Requirement	Assessment	Compliance Category
	radioactive waste from past activities, that has not been characterized in accordance with current standards, the characterization should be determined through a) inspection and measurement; and b) review of available information. Note: The radiological characteristics of the radioactive waste can change with time due to decay and/or the ingrowth of progeny. In addition, the radionuclides and other properties of concern can change depending on the selected waste management option.	Power documentation: - BP-PROC-00878, "Radioactive Waste Management", - BP-PROC-00714, "Low Level Radioactive Waste Minimization", - FORM-11803, "Waste Minimization Plan" or - BP-PROC-00107, "OPG Waste Acceptance Criteria for Radioactive Waste" Bruce Power complies with the requirements of the WWMF. The responsibility for ensuring "radioactive waste that has been in storage, including radioactive waste from past activities that has not been characterized in accordance with current standards" resides with WWMF and NWMO. Therefore, Bruce Power is compliant with their aspects of these requirements.	
8.1	During packaging of the radioactive waste, the creation of voids that reduce the mechanical stability of the radioactive waste package shall be avoided to the extent practical.	BP-RPP-00013 - Radioactive Shipments states: "4.5 Packaging Radioactive Material for Shipment -Follow any special instructions required for packing. -Contact the Transport Coordinator for fissile material packaging and transportation requirements. -Special instructions required for some packages may be specified on the RSP, SRSP or package design approval certificate provided by Transportation Coordinator. -Ensure material inside package is secure to prevent shifting during transport. Consult with Transport Coordinator or Class 7 Shipper or acceptable methods to secure load." SEC-RPR-00010 R000 - Type A and Less Packages - Receiving,	C

Article No.	Clause Requirement	Assessment	Compliance Category
		Handling and Shipping states: "4.0 PROCEDURE DESCRIPTION 4.1 General Requirements 5. Solid material shall be uniformly distributed within the packaging. The load should not have protrusions, sharp edges, or other features that could result in damage to the package. Dunnage shall secure any solid material that has such protrusions or sharp edges such that these features are unable to damage the package."	
8.2.1	The radioactive waste form at the time of packaging and after any subsequent processing or alteration (e.g., as a result of material decomposition) shall a) be chemically compatible with the material of the container; b) not compromise the package integrity; and c) meet the requirements of the radioactive waste facility.	SEC-RPR-00010 - TYPE A AND LESS PACKAGES - RECEIVING, HANDLING AND SHIPPING states: "4.0 PROCEDURE DESCRIPTION 4.1 General Requirements 1. Shipping of packages described in this procedure shall be in accordance with BP-RPP-00013, Radioactive Shipments. 2. Handling of packaging described in this procedure shall be in accordance with the appropriate safety procedures. 3. Qualified personnel shall perform all radiation measurements required in this procedure as per BP-RPP-00018, Facility Access and Working Rights. 4. All activities described in this procedure shall be performed by or under the direct supervision of a TDG qualified Class 7 Shipper or Handler/Receiver. 5. Solid material shall be uniformly distributed within the packaging. The load should not have protrusions, sharp edges, or other features that could result in damage to the package. Dunnage shall secure any solid material that has such protrusions or sharp edges such that these features are unable to damage the package. 6. Lid lifting attachments shall be removed or temporarily rendered	C

Article No.	Clause Requirement	Assessment	Compliance Category
		incapable of being used before transport of any Type A package. 7. Package shall be sealed in such a manner that any opening of the package is evident. For Excepted, Type IP-1, and Type IP-2 packages, it may be acceptable to apply the seal to the conveyance. 8. Indications of damage to packaging shall be reported to the Facility Transportation Coordinator. 4.1.1 Contents 1. Contents of packages shall be physically and chemically compatible with the packaging's material(s) of construction. Materials of construction are noted in each package description section. 2. Ensure that the materials being shipped comply with the requirements and/or limitations of the receiving facility."	
8.2.2	Corrosive materials shall be identified to ensure that, if released, the integrity of adjacent packages or facility structures is not jeopardized.	BP-PROC-00107 - Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste identifies: "4.1.8 Documentation Requirements All L&ILW proposed to be received at OPG's WWMF shall be accompanied by the following documents below, as applicable. Note: All documents shall be completed by Bruce Power staff and verified by OPG NWMD Staff prior to transfer of waste to OPG's WWMF as required by the respective document. 1. For each transfer of LLW: a) W-FORM-10124, Low Level Radioactive Waste Load Statement and 2. For each transfer of ILW:	C

Article No.	Clause Requirement	Assessment	Compliance Category
		a) W-FORM-10125, Intermediate Level Waste Load Statement. 3. Additional forms as required by the type of radioactive waste being transferred and defined by the criteria in this procedure: a) W-FORM-10114, Radioactive Waste Notification b) W-FORM-10115, Inspection/Test c) W-FORM-10116, Solidified Liquid Waste Record 4. Bruce Power shall also supply any supplementary information such as loading checklists and logs, radiological surveys, chemical analyses as appropriate. This information shall be attached to the documentation listed above." SEC-RPR-00010 - TYPE A AND LESS PACKAGES - RECEIVING, HANDLING AND SHIPPING states: "4.1.1 Contents 1. Contents of packages shall be physically and chemically compatible with the packaging’s material(s) of construction. Materials of construction are noted in each package description section. 2. Ensure that the materials being shipped comply with the requirements and/or limitations of the receiving facility. 5. Unless otherwise specified in this procedure, radioactive liquids shall be packaged in an approved qualified packaging that includes an additional barrier that provides leak prevention. 8. Unless otherwise specified, none of the packaging described in this procedure may contain material with properties of any classification of dangerous goods other than Class 7 (i.e.,	

Article No.	Clause Requirement	Assessment	Compliance Category
		corrosive, flammable, etc.). A documented safety assessment stating that it is safe to transport such material may be required. 4.1.2 Labels and Markings 1. Many of the packaging in this procedure can serve as different packaging types (i.e., an ET-120 may serve as a Type A, Type IP-2, or as an Excepted package). When using any packaging, ensure that the markings on the outside and / or inside of the packaging correspond to the appropriate type of packaging for that shipment. Remove or obscure any markings for other packaging types. 2. Each package which conforms to a Type A package design shall be legibly and durably marked on the outside of the packaging with “Type A”. If a Type A package is being used to carry less than a Type A quantity, then the “Type A” label must be removed or covered. 3. Each package which conforms to a Type IP-2 package design shall be legibly and durably marked on the outside of the packaging with “Type IP-2”. If a Type IP-2 package is being used to carry less than an IP-2 quantity, then the “Type IP-2” label must be removed or covered. 4. Each package of gross mass exceeding fifty (50) kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging. 5. Appendix C lists the Safety Mark label requirements for all packaging discussed in this procedure." W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria states: "1.0 INTRODUCTION	

Article No.	Clause Requirement	Assessment	Compliance Category
		Radioactive liquid wastes are generated from a variety of processes throughout Ontario Power Generation (OPG). Much of the waste is generated at Pickering, Darlington and Bruce Power, where it is stored in 200L drums and set aside for eventual disposition." Bruce Power complies with the identification requirements of the WWMF. The responsibility for ensuring that "Corrosive materials shall be identified to ensure that, if released, the integrity of adjacent packages or facility structures is not jeopardized." resides with WWMF and NWMO. Therefore, Bruce Power is compliant with their aspects of these requirements.	
8.2.3	While using a binder/immobilization matrix for radioactive waste treatment, care shall be taken that a combination of the radioactive waste and matrix does not negatively affect the integrity of the package.	BP-PROC-00107 - Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste identifies: "4.1.8 Documentation Requirements All L&ILW proposed to be received at OPG's WWMF shall be accompanied by the following documents below, as applicable. 3. Additional forms as required by the type of radioactive waste being transferred and defined by the criteria in this procedure: c) W-FORM-10116, Solidified Liquid Waste Record" "4.8.3 Elemental Tritium Contaminated Waste 2. Elemental tritium contaminated oils shall be prepared by Bruce Power as follows: a) The oil shall be solidified in accordance with Section 4.8.5 (a W-FORM-10116 shall be submitted for this waste). b) The solidified oil must be placed in a carbon steel drum. c) Backfill the drum void space with moist vermiculite or another	C

Article No.	Clause Requirement	Assessment	Compliance Category
		equivalent absorbent. d) Seal the drum in a 1 cm thick high-density polyethylene salvage overpack." "4.8.5 Solidified Liquids A list of approved products for solidification is provided in OPG document W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria. A summary of OPG Solidification Options are provided in Appendix B. If solidification of liquids is required, contact the Bruce Power Waste Management Work Management Coordinator to ensure that solidification agents are approved by OPG." W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria states: "1.0 INTRODUCTION Radioactive liquid wastes are generated from a variety of processes throughout Ontario Power Generation (OPG). Much of the waste is generated at Pickering, Darlington and Bruce Power, where it is stored in 200L drums and set aside for eventual disposition. The testing and evaluation of these products was performed independently and on behalf of the U.S. Department of Energy (DOE). The results from bench-scale testing, thermal stability and ignitability testing of the final product, and observations from continued monitoring of samples were used to establish which of the vendor products might be most suitable for treatment of	

Article No.	Clause Requirement	Assessment	Compliance Category
		radioactive liquids, slurries, and sludges for storage at WWMF. 3.0 RECOMMENDED APPROACH Four vendors and their products are recommended for the purpose of immobilizing aqueous and miscellaneous radioactive liquid wastes generated at OPG. Sorbent capacity and rate, volumetric expansion, degree of mixing required, final wasteform physical appearance and behavior, and presence/absence of free liquid in the final wasteform, based on testing of similar liquid wastes types, and sorbent cost were all factors taken into consideration. Bench-scale testing would take place at the station or at the vendor location for determination of the type and quantity of the agent required. For mixed radioactive liquid wastes containing aqueous and organic phases, it is recommended that the phases be separated where possible prior to solidification with sorbent materials. A combination of various sorbents may be required if separation of the aqueous and organic components becomes difficult. Prior to solidification for intention to transfer to the WWMF, the solidification method must be approved by NWMD. The liquids must be verified by the waste generator to have been completely solidified, with no remaining freestanding liquid. The solid should also be stable (will not revert back to liquid over time). Once the drums are solidified, WWMF personnel will review the process for acceptance, and store the waste. Since the liquid waste characteristics vary widely, it is recommended that station staff work closely with the above vendors to develop solutions as required." Bruce Power complies with the requirements of the WWMF which	

Article No.	Clause Requirement	Assessment	Compliance Category
		are approved by NWMO. The responsibility for ensuring that "the combination of the radioactive waste and matrix does not negatively affect the integrity of the package" resides with WWMF and NWMO. Therefore, Bruce Power is compliant with their aspects of these requirements.	
8.3	To minimize the risk of dispersal of radioactive material as a result of package deterioration, preference should be given to an immobilized radioactive waste form.	BP-PROC-00107 - Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste identifies: "4.1.8 Documentation Requirements All L&ILW proposed to be received at OPG's WWMF shall be accompanied by the following documents below, as applicable. 3. Additional forms as required by the type of radioactive waste being transferred and defined by the criteria in this procedure: c) W-FORM-10116, Solidified Liquid Waste Record" "4.8.3 Elemental Tritium Contaminated Waste 2. Elemental tritium contaminated oils shall be prepared by Bruce Power as follows: a) The oil shall be solidified in accordance with Section 4.8.5 (a W-FORM-10116 shall be submitted for this waste). b) The solidified oil must be placed in a carbon steel drum. c) Backfill the drum void space with moist vermiculite or another equivalent absorbent. d) Seal the drum in a 1 cm thick high-density polyethylene salvage overpack." "4.8.5 Solidified Liquids A list of approved products for solidification is provided in OPG document	C

Article No.	Clause Requirement	Assessment	Compliance Category
		W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria. A summary of OPG Solidification Options are provided in Appendix B. If solidification of liquids is required, contact the Bruce Power Waste Management Work Management Coordinator to ensure that solidification agents are approved by OPG." W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria states: "1.0 INTRODUCTION Radioactive liquid wastes are generated from a variety of processes throughout Ontario Power Generation (OPG). Much of the waste is generated at Pickering, Darlington and Bruce Power, where it is stored in 200L drums and set aside for eventual disposition. The testing and evaluation of these products was performed independently and on behalf of the U.S. Department of Energy (DOE). The results from bench-scale testing, thermal stability and ignitability testing of the final product, and observations from continued monitoring of samples were used to establish which of the vendor products might be most suitable for treatment of radioactive liquids, slurries, and sludges for storage at WWMF. 3.0 RECOMMENDED APPROACH Four vendors and their products are recommended for the purpose of immobilizing aqueous and miscellaneous radioactive liquid wastes generated at OPG. Sorbent capacity and rate, volumetric expansion, degree of mixing required, final wasteform physical appearance and behavior, and presence/absence of free liquid in	

Article No.	Clause Requirement	Assessment	Compliance Category
		the final wasteform, based on testing of similar liquid wastes types, and sorbent cost were all factors taken into consideration. Bench-scale testing would take place at the station or at the vendor location for determination of the type and quantity of the agent required. For mixed radioactive liquid wastes containing aqueous and organic phases, it is recommended that the phases be separated where possible prior to solidification with sorbent materials. A combination of various sorbents may be required if separation of the aqueous and organic components becomes difficult. Prior to solidification for intention to transfer to the WWMF, the solidification method must be approved by NWMD. The liquids must be verified by the waste generator to have been completely solidified, with no remaining freestanding liquid. The solid should also be stable (will not revert back to liquid over time). Once the drums are solidified, WWMF personnel will review the process for acceptance, and store the waste. Since the liquid waste characteristics vary widely, it is recommended that station staff work closely with the above vendors to develop solutions as required." Bruce Power complies with the requirements of the WWMF which are approved by NWMO. The responsibility "To minimize the risk of dispersal of radioactive material as a result of package deterioration, preference should be given to an immobilization radioactive waste form" resides with WWMF and NWMO. Therefore, Bruce Power is compliant with their aspects of these requirements.	
8.4	Radioactive waste that contains liquids, or whose degeneration creates liquid, should be packaged with liquid absorbent material to	SEC-RPR-00010 R000 - Type A and Less Packages - Receiving, Handling and Shipping states:	C

Article No.	Clause Requirement	Assessment	Compliance Category
	minimize free liquid in the waste package to the extent practicable.	"4.0 PROCEDURE DESCRIPTION 4.1 General Requirements 4.1.1 Contents 5. Unless otherwise specified in this procedure, radioactive liquids shall be packaged in an approved qualified packaging that includes an additional barrier that provides leak prevention. 6. If Type A radioactive contents are in liquid form, package shall either: a) Contain absorbent material to absorb twice the volume of liquid contents. or b) Include an inner containment component within which contents are normally contained, and an outer containment component to ensure retention of liquid contents within package during transport. 7. Unless otherwise specified, water classified as LSA-II shall be limited to quantities not exceeding 225 Litres or 0.8 TBq Tritium per Litre. The specific activity of other liquids shall not exceed 10-4 A2/g."	
8.5.1	The inclusion of chelating or complexing agents in the radioactive waste form should be minimized to the extent practical.	BP-PROC-00107 - OPG Waste Acceptance Criteria for Radioactive Waste states: "4.5.2 Hazardous Waste Requirements 2. Solid L&ILW exhibiting the following hazardous waste characteristics shall be considered are acceptable at OPG's WWMF, but will require an approved W-FORM-10114. c) Waste processed using complexing (chelating) agents, such as	C

Article No.	Clause Requirement	Assessment	Compliance Category
		EDTA." "APPENDIX B: SOLIDIFICATION OPTIONS Bench-scale testing would take place at the station or at the vendor location for determination of the type and quantity of the agent required. For mixed radioactive liquid wastes containing aqueous and organic phases, it is recommended that the phases be separated where possible prior to solidification with sorbent materials. A combination of various sorbents may be required if separation of the aqueous and organic components becomes difficult. The brief product descriptions presented in the previous section are general guidelines for the use of various solidification media. Because of the nearly endless waste varieties, determination of a specific waste and solidification recipe is essential to achieve optimum balance of efficiency and economy. The amount of the various solidifiers required for a given waste will vary with the type and concentration of organics present and/or the ionic concentration and character of the aqueous phase, as well as the solids content."	
8.5.2	Any chelating or complexing agents that are contained in the radioactive waste form should be identified. Note: Chelating or complexing agents in the radioactive waste form can enhance the mobility of radionuclides.	BP-PROC-00107 - OPG Waste Acceptance Criteria for Radioactive Waste states: "4.5.2 Hazardous Waste Requirements 2. Solid L&ILW exhibiting the following hazardous waste characteristics shall be considered are acceptable at OPG's WWMF, but will require an approved W-FORM-10114. c) Waste processed using complexing (chelating) agents, such as EDTA. 4.8.5 Solidified Liquids	C

Article No.	Clause Requirement	Assessment	Compliance Category
		A list of approved products for solidification is provided in OPG document W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria. A summary of OPG Solidification Options are provided in Appendix B. If solidification of liquids is required, contact the Bruce Power Waste Management Work Management Coordinator to ensure that solidification agents are approved by OPG. 4.8.5.1 Prior to Solidification 1. Prior to solidification for the intention of transfer to OPG's WWMF as a solid, Bruce Power shall submit to OPG NWMD Staff the following: a) W-FORM-10114, Radioactive Waste Notification b) W-FORM-10116, Solidified Liquid Waste Record 2. W-FORM-10116 shall indicate the type of liquid to be solidified, the intent to solidify using a pre-approved product, and the proposed solidification method, providing NWMD an opportunity to review the solidification activities. The liquid waste shall only be solidified once the submitted W-FORM-10114 is accepted by OPG NWMD Staff."	
8.6	Radioactive waste in gaseous form shall a) not compromise the mechanical stability of the radioactive waste form or package; and b) be immobilized or depressurized to the extent practicable.	BP-PROC-00107 - OPG Waste Acceptance Criteria for Radioactive Waste states: "4.5 Waste Acceptance Criteria - Non-Radiological Requirements 4.5.1 Physical State Requirements Gaseous -L&ILW actively generating gases or containing compressed gasses is not acceptable."	

Article No.	Clause Requirement	Assessment	Compliance Category
		BP-PROC-00133 - Hazardous Waste Management Requirements states" "4.6.4 Foreign Waste Disposal Facilities Radioactive hazardous waste that does not meet BP-PROC-00107, Waste Acceptance Criteria for Low & Intermediate Level Radioactive Waste, is a candidate for sending waste to a foreign waste disposal facility."	
8.7	Prior to packaging, radioactive wastes shall be subject to treatments that mitigate explosivity, pyrophoricity, and chemical reactivity to the greatest extent possible.	*** Could not find much information on "treatments that mitigate explosivity, pyrophoricity, and chemical reactivity". There is no relevant information in "NK37-SMP-79500-00001 - Waste Chemical Transfer Facility" W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria states: "1.0 INTRODUCTION The testing and evaluation of these products was performed independently and on behalf of the U.S. Department of Energy (DOE). The results from bench-scale testing, thermal stability and ignitability testing of the final product, and observations from continued monitoring of samples were used to establish which of the vendor products might be most suitable for treatment of radioactive liquids, slurries, and sludges for storage at WWMF."	
8.8.1	Radioactive waste that is known or suspected to contain pathogenic organisms shall be treated to render the pathogens harmless to the extent practicable.	A pathogen is an infectious agent or biological agent that causes disease or illness to its host.	C

Article No.	Clause Requirement	Assessment	Compliance Category
		Pathogenetic organisms are not addressed in Bruce procedures: -BP-PROC-00878 -Radioactive Waste Management -BP-PROC-00080 -Effluent Monitoring Program "Pathogenic organisms" are addressed as part of conventional and hazardous waste management, which is performed in accordance with BP-PROC-00133, Hazardous Waste Management Requirements" which states: "4.1.1 Hazardous Waste Identification 3. If the waste meets the regulatory definition of pathological waste then refer to Section 4.3.4 [R-27]. 4. If the waste characteristics meet the definitions of radioactive liquid and hazardous waste then the waste is declared to be Mixed Waste. 4.3.3 Mixed Waste If the mixed waste meets the criteria for storage of radioactive oils at Ontario Power Generation Western Waste Management RWOS#2 then follow the instructions from BP-PROC-00107, Waste Acceptance Criteria for Low & Intermediate Level Radioactive Waste. If the mixed waste is aqueous-based and meets the criteria for Active Liquid Waste Treatment (Section 4.5.3) then proceed to process the waste on-site. If the mixed waste meets none of the criteria then a business proposal must be submitted to the Waste Specialist. The business	

Article No.	Clause Requirement	Assessment	Compliance Category
		proposal must outline the available options (i.e., do nothing; explore options with Ontario Power Generation or other external contractor as appropriate). 4.3.4 Pathological Waste If the waste meets the regulatory definition of pathological waste then contact Health Services Manager for consultation on disposal options. This waste type cannot be sent to the incinerator at Ontario Power Generation Western Waste Management. Empty containers and liners that come into contact with pathological waste are also considered hazardous waste. They must be incinerated, autoclaved or otherwise sterilized to make them non-infectious at an MOE approved facility. There is no small quantity exemption."	
8.8.2	Any potential hazard from pathogens that is present in the radioactive waste shall be identified in order that the radioactive waste can be adequately treated. Levels remaining in the waste should be documented and the effect of long-term pathogenicity assessed.	BP-PROC-00133, Hazardous Waste Management Requirements" states: "4.1.1 Hazardous Waste Identification 3. If the waste meets the regulatory definition of pathological waste then refer to Section 4.3.4 [R-27]. 4. If the waste characteristics meet the definitions of radioactive liquid and hazardous waste then the waste is declared to be Mixed Waste. 4.3.3 Mixed Waste If the mixed waste meets the criteria for storage of radioactive oils at Ontario Power Generation Western Waste Management	C

Article No.	Clause Requirement	Assessment	Compliance Category
		RWOS#2 then follow the instructions from BP-PROC-00107, Waste Acceptance Criteria for Low & Intermediate Level Radioactive Waste. If the mixed waste is aqueous-based and meets the criteria for Active Liquid Waste Treatment (Section 4.5.3) then proceed to process the waste on-site. If the mixed waste meets none of the criteria then a business proposal must be submitted to the Waste Specialist. The business proposal must outline the available options (i.e., do nothing; explore options with Ontario Power Generation or other external contractor as appropriate). 4.3.4 Pathological Waste If the waste meets the regulatory definition of pathological waste then contact Health Services Manager for consultation on disposal options. This waste type cannot be sent to the incinerator at Ontario Power Generation Western Waste Management. Empty containers and liners that come into contact with pathological waste are also considered hazardous waste. They must be incinerated, autoclaved or otherwise sterilized to make them non-infectious at an MOE approved facility. There is no small quantity exemption."	
8.9	Other biological hazards potentially contained in radioactive waste shall be assessed and identified in the waste documentation to the extent practicable.	BP-PROC-00133, Hazardous Waste Management Requirements" states: "4.1 Hazardous Waste Generation 4.1.1 Hazardous Waste Identification The fundamental principles of waste identification are to determine the physical state, chemical character and radiological status. Any	C

Article No.	Clause Requirement	Assessment	Compliance Category
		waste must be identified and classified. This is to determine proper segregation, storage, and disposal options. See SEC-ENV-00005 and BP-PROC-00478. Analytical tests may have to be performed on a particular waste to determine if it meets primary characteristics defined in the Manual. Schedules of contaminants listed in Reg. 347 must be checked from time to time for amendments. Waste Criteria 1. If the waste form fails the slump test then the waste's physical state is declared to be a liquid. 2. If the waste fails the Toxicity Characteristic Leaching Procedure then the waste is declared "Leachate Toxic". 3. If the waste meets the regulatory definition of pathological waste then refer to Section 4.3.4 [R-27]. 4. If the waste characteristics meet the definitions of radioactive liquid and hazardous waste then the waste is declared to be Mixed Waste. 5. If the waste has a PCB concentration ≥50 ppm then the waste is declared PCB Waste. Check Appendix C for whether the waste is low level or high level. 6. Check the waste characteristics to determine if the waste meets the Reg. 347 [R-27], definitions of: a) Severely Toxic b) Acute Hazardous Waste Chemical c) Hazardous Waste Chemical d) Hazardous Industrial Waste e) Ignitable	

Article No.	Clause Requirement	Assessment	Compliance Category
		f) Corrosive g) Reactive h) Liquid Industrial Waste 4.1.2 Hazardous Waste Generator Registration with Regulators (Normal Conditions) The MOE Waste Generator Number assigned to Bruce Power is ON2615100. [R-1] Any hazardous waste stream or hazardous waste that Bruce Power produces, collects, handles or stores or is likely to produce, collect, handle or store must be registered with the Director for Reg. 347. This includes hazardous wastes that potentially can be disposed via on-site processes. [R-2] See also BP-PROC-00478. Bruce Power shall submit a Generator Registration Report to the MOE by February 15th (any year) to register new or existing hazardous wastes. This is termed the “Initial Generator Registration Report”. The format and content is prescribed in the Manual. This task is performed online using the MOE HWIN database (generator section). [R-2] [R-3]"	
9.1	The selection of a radioactive waste processing method should include assessment of a) the characteristics of the radioactive wastes to be processed; b) the characteristics of the processed radioactive waste; c) the need for removal or neutralization of hazardous components; d) the waste acceptance criteria of waste management facilities which will receive the processed	a) is addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "4.2 Radioactive Waste Handling and Segregation Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials. Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the	Gap

Article No.	Clause Requirement	Assessment	Compliance Category
	wastes; e) a cost/benefit analysis of radioactive waste processing as it pertains to handling, packaging, transportation, storage, and long-term management; f) the maturity of technologies in relation to minimizing processing risks; g) the risk and/or effects of radiological and conventional emissions during processing; h) ALARA in relation to facility worker exposure during handling, worker and public radiation exposure, and environmental impact risk; i) the impact of the volume reduction achieved; j) the impact of mixing long- and short-lived radionuclides and/or radioactive wastes from different points of origin; k) the availability of qualified personnel; l) the availability of other on-site processing equipment; m) transportation requirements; n) licence restrictions and regulatory requirements; and o) the complexity of and time required for regulatory approvals.	work group generating the waste. Through the segregation process, radioactive waste is clearly identified by waste type, radiological properties, and point of origin to ensure proper segregation into designated waste receptacles and assists in radioactive waste minimization." b) is addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the correct disposal stream: - B-SMP-79100-00002, Operation of the Trakker/Scanner - B-SMP-79100-00003, Operation of the Waste Bag Monitor - B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E - B-SMP-79100-00011, Waste Shielding Flask Use - B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams:	

Article No.	Clause Requirement	Assessment	Compliance Category
		1. Incinerable 2. Compactable 3. Non-processable 4. Metal melt" c) "the need for removal or neutralization of hazardous components;" is detailed in BRUCE NUCLEAR GENERATING STATION A OPERATING MANUAL NK21-OM-79500 - Chemical Waste Management. See the table of contents. BP-PROC-00133, Hazardous Waste Management Requirements" states: "4.1 Hazardous Waste Generation 4.1.1 Hazardous Waste Identification The fundamental principles of waste identification are to determine the physical state, chemical character and radiological status. Any waste must be identified and classified. This is to determine proper segregation, storage, and disposal options. See SEC-ENV-00005 and BP-PROC-00478. Analytical tests may have to be performed on a particular waste to determine if it meets primary characteristics defined in the Manual." d) is addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "4.5 Radioactive Waste Receipt and Processing 4.5.1 Incinerator Ash from EnergySolutions Processing and return of incinerator ash to Bruce Power is performed by EnergySolutions at its Bear Creek facility. Once	

Article No.	Clause Requirement	Assessment	Compliance Category
		received at Bruce Power, incinerator ash is delivered to the OPG WWMF according to the specified waste acceptance criteria defined in BP-PROC-00107. 4.5.2 Active Liquid Waste BP-PROC-00029, Bruce Power Waste Acceptance Criteria – Active Liquid Effluent, defines the criteria for the acceptance of Active Liquid Effluent received at Bruce A Active Liquid Waste Treatment System. These criteria define the maximum allowable content of the Active Liquid Effluent that can be accepted at Bruce A Active Liquid Waste Treatment System, such that the Active Liquid Effluent can be processed by the Bruce A Active Liquid Waste Treatment System. These Waste Acceptance Criteria apply to all Active Liquid Effluent generated on the Bruce Site that is received at the Bruce A Active Liquid Waste Treatment System for processing." e) is addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 3) Ensure decisions on management of radioactive waste are based on minimizing risk to the environment, public and staff and minimizing total life cycle costs for radioactive waste storage and	

Article No.	Clause Requirement	Assessment	Compliance Category
		disposal." f) "the maturity of technologies in relation to minimizing processing risks;" is not explicitly identified in the Bruce Power procedures. **(Gap)** g) and h) are addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. 3. Ensure decisions on management of radioactive waste are based on minimizing risk to the environment, public and staff and minimizing total life cycle costs for radioactive waste storage and disposal."	

Article No.	Clause Requirement	Assessment	Compliance Category
		i) is addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "4.1 Radioactive Waste Minimization At all times, workers shall strive to minimize the production of solid radioactive waste. BP-PROC-00714, Low Level Radioactive Waste Minimization, defines the requirement for minimization of low level radioactive waste and defines the expectations for all workers." j) is addressed by BP-PROC-00878 - "Radioactive Waste Management" which states: "4.2 Radioactive Waste Handling and Segregation The handling and segregation of radioactive waste at source is performed by qualified personnel of the work group generating the waste in accordance with BP-RPP-00010, Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials. Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the work group generating the waste. Through the segregation process, radioactive waste is clearly identified by waste type, radiological properties, and point of origin to ensure proper segregation into designated waste receptacles and assists in radioactive waste minimization." k) is addressed by BP-PROG-12.05 - "Radiation Protection Program" which states: "7.13 Department Manager, RP Programs 7.13.9 Maintains a record of the NEW status for all designated	

Article No.	Clause Requirement	Assessment	Compliance Category
		NEWs through the SM, Dosimetry. 7.13.11 Defines and approve the training requirements for radiation protection training. 7.13.12 Ensures a training program is in place for radiation protection. 7.13.13 Removes radiation protection qualification(s) if workers are not performing to the radiation protection standards." l) is addressed by BP-PROG-12.05 - "Radiation Protection Program" which states: "2. Radiation Protection Equipment and Materials Radiation Equipment and Materials are used to maintain doses ALARA, alert individuals to hazards, and to prevent the spread of radioactive contamination. The DM, RP Programs establishes the requirements for management of new RP Equipment as outlined in BP-PROC-00908, Radiation Protection Equipment and Materials Management." m) is addressed by BP-PROG-12.05 - "Radiation Protection Program" which states: "4.5.3 Radioactive Material Transfers and Transportation All transport of radioactive material to licensed facilities outside of Bruce Power is conducted in compliance with the CNSC Packaging and Transport of Nuclear Substances Regulations and Transport Canada's Transport of Dangerous Goods Regulations. This process is described in BP-PROC-00188. The DM, RP Programs is responsible for defining the governance and oversight of Bruce Power's Radioactive Material Transportation Program as defined in BP-PROC-00188. The requirements of BP-PROC-00188 are implemented and supported through Line Managers, SFAMs, and	

Article No.	Clause Requirement	Assessment	Compliance Category
		the Transport Coordinator. The transport of radioactive material between Bruce Power site facilities is not governed by the CNSC Packaging and Transport of Nuclear Substances Regulations, nor by the Transport of Dangerous Goods Regulations. In order to control contamination spread and keep radiation exposures ALARA, specific procedures relating to on-site and facility transfers of radioactive material are implemented. This is further described in BP-RPP-00033, Unconditional Releases and Conditional Transfers of Material, an implementing document of BP-PROC-00188. n) is addressed by BP-PROG-12.05 - "Radiation Protection Program" which states: "5.1 Relevant Statutory, Regulatory and Licensing Requirements This program is intended to satisfy relevant statutory, regulatory and licensing requirements as specified in the following documents: 1. Acts, Regulations, Standards and Regulatory Documents • Class I Nuclear Facilities Regulations, SOR/2000-204 (current version in force since 14DEC2012) • Class II Nuclear Facilities and Prescribed Equipment Regulations, SOR/2000-205 (current version in force since 13MAY2010) • CNSC G-129, Revision 1, Keeping Radiation Exposures and Doses As Low as Reasonably Achievable (ALARA) • CNSC RD-204, Certification of Persons Working at Nuclear Power Plants • CNSC S-106 Rev 1, Technical and Quality Assurance Standards for Dosimetry Services • CNSCS-260, Making Changes to Dose Related Information Filed with the National Dose Registry • CSA N286-05, Management System Requirements for Nuclear Power Plants	

Article No.	Clause Requirement	Assessment	Compliance Category
		• General Nuclear Safety and Control Regulations, SOR/2000-202 (current version in force since 17APR2008) • IAEA Safety Standard Series No. TS-R-1 (ST-R, Revised), Regulations for the Safety Transport of Radioactive Material. 1996 Edition (Revised) (current version in force since 1996) • Nuclear Safety and Control Act, S.C. 1997, c. 9 (current version in force since 29JUN2012) • Nuclear Substances and Radiation Devices Regulations, SOR/2000-207 (current version in force since 13MAY2010) • Occupational Health and Safety Act, R.R.O 1990, Regulation 861, X-Ray Safety current version in force since 31DEC1990) • Packaging and Transport of Nuclear Substances Regulations, SOR/2000-208 (version in force since 02DEC2011) • Privacy Act, R.S.C, 1985, c.P-21 (version in force since 01APR2013) • Radiation Emitting Devices Act, R.S.C., 1985c. R-1 (current version in force since 13OCT2004) • Radiation Protection Regulations, SOR/2000-203 (current version in force since 18SEPT2007) • Transport of Dangerous Goods Regulations, SOR/2012-245 (current version in force since 23NOV2012) 2. Bruce Power Licences • Bruce A Power Reactor Operating Licence (PROL 15.00/2014) • Bruce A Licence Conditions Handbook (LCH-BNGSA-R6) • Bruce B Power Reactor Operating Licence (PROL 16.00/2014) • Bruce B Licence Conditions Handbook (LCH-BNGSB-R4) • Central Maintenance and Laundry Facility Waste Nuclear	

Article No.	Clause Requirement	Assessment	Compliance Category
		Substance Licence (WNSL-W2-323.02/2017) • Dosimetry Service Licence 13152-6-16 issued for in-house dosimetry services - consolidated. • Class II Nuclear Facilities and Prescribed Equipment Licence 13152-2-16 issued to operate a calibration irradiator facility and to possess the nuclear substances that are associated with or arise from the activity. • Class II Nuclear Facilities and Prescribed Equipment Licence 13152-5-17 issued for construction of a calibration irradiator facility and to possess, transfer and store nuclear substances that are associated with or arise from the activity. • Nuclear Substances and Radiation Devices Licence 13152-1-15 issued for consolidated uses of nuclear substances. • Nuclear Substances and Radiation Devices Licence 13152-3-15 issued for industrial radiography. o) "the complexity of and time required for regulatory approvals." is inferred given the following contents of BP-PROG-12.05 - "Radiation Protection Program" which identifies the following procedures: -BP-PROG-06.01, CNSC Licence Acquisition -BP-PROG-06.03, CNSC Interface Management and includes: APPENDIX A: CNSC LICENCES ISSUED TO BRUCE POWER which is a table including LICENCE, LOCATION, LICENCE DESCRIPTION and LICENSEE CONTACT.	
9.2.1	Segregation of radioactive wastes according to their radiological, physical, chemical, and biological characteristics should be carried out to support requirements for processing. Notes: 1) If possible, radioactive wastes should be segregated from	BP-PROC-00878 - Radioactive Waste Management states: "4.2 Radioactive Waste Handling and Segregation Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials.	C

Article No.	Clause Requirement	Assessment	Compliance Category
	the point of generation and onwards. 2) Various segregation schemes may be used. For example, solid radioactive wastes may be separated into combustible and non-combustible, with the latter further separated into compactible and non-compactible.	Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the work group generating the waste. Through the segregation process, radioactive waste is clearly identified by waste type, radiological properties, and point of origin to ensure proper segregation into designated waste receptacles and assists in radioactive waste minimization. 4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the correct disposal stream: • B-SMP-79100-00002, Operation of the Trakker/Scanner • B-SMP-79100-00003, Operation of the Waste Bag Monitor • B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E • B-SMP-79100-00011, Waste Shielding Flask Use • B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable 2. Compactable	

Article No.	Clause Requirement	Assessment	Compliance Category
		3. Non-processable 4. Metal melt Implementation details are included in BP-RPP-00010 - "Segregation and Handling of Radioactive Waste".	
9.2.2.1	Compaction should be considered for reducing volumes and increasing the mechanical stability of radioactive waste. Notes: 1) Compaction has a volume reduction factor of typically 2 to 5. Compaction and baling technologies are well established and widely used. Radioactive waste is usually compacted in standardized containers; it then can be repackaged for convenience of handling or to improve storage properties. 2) Low-force compaction is usually limited to readily compactable radioactive waste. 3) Super compactors may be used to also compact other materials such as concrete, metal pipes, and wood.	BP-PROC-00878 - Radioactive Waste Management states: 4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the correct disposal stream: • B-SMP-79100-00002, Operation of the Trakker/Scanner • B-SMP-79100-00003, Operation of the Waste Bag Monitor • B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E • B-SMP-79100-00011, Waste Shielding Flask Use • B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable 2. Compactable 3. Non-processable	C

Article No.	Clause Requirement	Assessment	Compliance Category
		4. Metal melt BP-RPP-00010 -"Segregation and Handling of Radioactive Waste" APPENDIX A: SEGREGATION GUIDELINES identifies in a table compactable items. B-SMP-79100-00004 - Waste Processing -APPENDIX E: SEGREGATION GUIDELINES identifies in a table compatible items.	
9.2.2.2	The impact of radioactive liquid and dust should be considered when evaluating compaction for a specific radioactive waste stream.	BP-RPP-00010 -"Segregation and Handling of Radioactive Waste" details the work flow processes in: "APPENDIX E: DISPOSING OF FLOOR SWEEPINGS AND MOP HEADS" and "APPENDIX G: DISPOSING OF RADIOACTIVE CONTAMINATED LIQUID WASTE"	C
9.2.3	Where available, incineration should be considered for significantly reducing radioactive waste volumes and for destruction of hazardous substances. Note: In most cases, combustible radioactive waste is incinerated at very high temperatures. Most of the non- volatile radionuclides are retained in the bottom ash. Combustion gases containing volatile radionuclides may be filtered and scrubbed to remove fly ash and acid gas, respectively, before release to the atmosphere. When necessary, consideration should be given to other hazards in the ash, such as heavy metals, and dioxins and furans. Incineration typically yields volume reduction factors greater than 50 and improves waste homogeneity.	BP-RPP-00010 -"Segregation and Handling of Radioactive Waste" APPENDIX A: SEGREGATION GUIDELINES identifies in a table incinerable items. BP-PROC-00878 -"Radioactive Waste Management" states: "4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the	C

Article No.	Clause Requirement	Assessment	Compliance Category
		correct disposal stream: - B-SMP-79100-00002, Operation of the Trakker/Scanner - B-SMP-79100-00003, Operation of the Waste Bag Monitor - B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E - B-SMP-79100-00011, Waste Shielding Flask Use - B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable 2. Compactable 3. Non-processable 4. Metal melt 4.5.1 Incinerator Ash from EnergySolutions Processing and return of incinerator ash to Bruce Power is performed by EnergySolutions at its Bear Creek facility. Once received at Bruce Power, incinerator ash is delivered to the OPG WWMF according to the specified waste acceptance criteria defined in BP-PROC-00107." BP-PROC-00107 - OPG Waste Acceptance Criteria for Radioactive Waste states: "4.8.1 Iron-55 Particulate Contaminated Waste 1. Incinerable Iron-55 (Fe-55) particulate LLW shall be double bagged and tightly sealed with brown and transferred in a Reusable	

Article No.	Clause Requirement	Assessment	Compliance Category
		Secondary Container which is clearly marked "Fe-55 incinerable waste". 4.8.4 Liquids 1. Absorbed liquids that are suitably packaged may be accepted for immediate incineration given that the other criteria for incinerable waste are met. The liquid shall satisfy the incinerator Certificate of Approval (current information is available from the NWMD Waste Acceptance Coordinator). Prior approval by OPG NWMD shall be obtained. 2. Radioactive waste oil is accepted for incineration or interim storage."	
9.2.4	Immobilization should be considered for liquid and dispersible solid radioactive waste and is often required as part of the waste acceptance criteria. Notes: 1) Immobilization reduces the potential for migration or dispersion of radionuclides and/or hazardous substances in liquid or dispersible solid radioactive waste by converting it into a solid matrix. The immobilization material used depends upon a number of factors, including its compatibility with the radioactive waste, and required radioactive waste form properties. 2) Cement is one of the most widely used matrices for immobilizing radioactive wastes. Other radioactive waste binders include thermoplastic and thermosetting materials, porcelain, ceramic, clays, and glass.	BP-PROC-00878 -"Radioactive Waste Management" identifies the following waste acceptance criteria that may identify immobilization: 4.4 Radioactive Waste Packaging, Transport and Storage 1. Shipment to Ontario Power Generation (OPG) for disposal at their on-site landfill located on the Bruce Power Site in accordance with BP-PROC-00196, Landfill Waste Acceptance Criteria; or 2. Shipment to OPG for disposal at their Western Waste Management Facility (WWMF) as Low or Intermediate Level Waste in accordance with BP-PROC-00107, Waste Acceptance Criteria for Low and Intermediate Level Radioactive Waste; or 3. Shipment to EnergySolutions Bear Creek Facility in Tennessee for processing in accordance with BP-PROC-00711, Waste Acceptance Guidelines for Energy Solutions. Radioactive waste is prepared for shipment in accordance with BP-PROC-00188, Radioactive Material Transportation, specifically: BP-PROC-00107 - Waste Acceptance Criteria for Low and	C

Article No.	Clause Requirement	Assessment	Compliance Category
		Intermediate Level Radioactive Waste identifies: "4.1.8 Documentation Requirements All L&ILW proposed to be received at OPG's WWMF shall be accompanied by the following documents below, as applicable. 3. Additional forms as required by the type of radioactive waste being transferred and defined by the criteria in this procedure: c) W-FORM-10116, Solidified Liquid Waste Record" "4.8.3 Elemental Tritium Contaminated Waste 2. Elemental tritium contaminated oils shall be prepared by Bruce Power as follows: a) The oil shall be solidified in accordance with Section 4.8.5 (a W-FORM-10116 shall be submitted for this waste). b) The solidified oil must be placed in a carbon steel drum. c) Backfill the drum void space with moist vermiculite or another equivalent absorbent. d) Seal the drum in a 1 cm thick high-density polyethylene salvage overpack." "4.8.5 Solidified Liquids A list of approved products for solidification is provided in OPG document W-REP-03469-00002, Process for Disposition of Radioactive Liquid Waste Not Meeting WWMF Waste Acceptance Criteria. A summary of OPG Solidification Options are provided in Appendix B. If solidification of liquids is required, contact the Bruce Power Waste Management Work Management Coordinator to ensure that solidification agents are approved by OPG."	

Article No.	Clause Requirement	Assessment	Compliance Category
9.2.5.1	Decontamination should be considered as a means of changing the classification of the radioactive waste material. Note: Decontamination removes both fixed and loose surface contamination by either physical, chemical, or electrochemical means. Its use can result in the reclassification and possible clearance of radioactive wastes and the minimization of radioactive waste volumes.	BP-PROC-00878 -"Radioactive Waste Management" states: "4.0 PROCEDURE DESCRIPTION In addition to generic requirements required by CSA Standard N286-05, Clause 6.28 requires the following: (e) decontamination"	C
9.2.5.2	Selection of the decontamination method shall consider a) safety; b) efficiency; c) waste minimization; d) feasibility; and e) cost-effectiveness. Notes: 1) Physical decontamination methods for the removal of loose contamination typically involve wiping the surface layer with absorbent material, washing with water sprays, and vacuuming. More aggressive physical methods required for the removal of fixed contamination include, but are not limited to, the use of grinding, polishing, brushing, abrasive blasting (glass beads, magnetite, sand, steel pellets, plastic pellets, silicon carbide, ceramics, dry ice, etc.), water jetting, scarifying, needle scaling, scabbling, shaving, milling, and ultrasonic cleaning. The grit used in blasting can be washed and recycled, although this results in the generation of a secondary liquid radioactive waste. 2) Chemical and electrochemical methods for the removal of fixed contamination involve the removal of a thin surface layer by controlled dissolution. Reagents used include mineral acids, organic	BP-PROC-00878 -"Radioactive Waste Management" states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. 3. Ensure decisions on management of radioactive waste are	C

Article No.	Clause Requirement	Assessment	Compliance Category
	acids, and complexing agents.	based on minimizing risk to the environment, public and staff and minimizing total life cycle costs for radioactive waste storage and disposal. 4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Standards and Canadian Standard Association (CSA) requirements pertaining to radioactive waste management, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.28. 5. The achievement of high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 (Rev-1). At all times, nuclear safety shall be a primary consideration of every radioactive waste management activity and operational decision with respect to these activities."	
9.2.6	Dismantling and segmentation of equipment and/or structures should be considered to reduce radioactive waste volumes and to yield an improved packaging efficiency. Note: A variety of techniques can be used depending on factors such as the material of construction, the size and shape of the equipment, and the degree of contamination. Tools used include hand tools, saws, shears, impact tools, and cutting tools. Highly contaminated portions of the equipment and/or structures may be removed to facilitate better management of the radioactive waste and to reduce volumes.	BP-PROC-00878 R000 - "Radioactive Waste Management" states: "4.1 Radioactive Waste Minimization At all times, workers shall strive to minimize the production of solid radioactive waste. BP-PROC-00714, Low Level Radioactive Waste Minimization, defines the requirement for minimization of low level radioactive waste and defines the expectations for all workers. To raise awareness about waste minimization, BP-PROC-00181, Waste Minimization Plan, has been developed and defines how work groups can work to reduce waste when completing work/tasks and introduces waste accountability, improves monitoring and tracking of waste, and assists in planning appropriate waste targets and costs. Work groups are expected to complete and include in work plans, FORM-11803, Waste Minimization Plan. Bruce Power staff and contractors shall adhere to BP-PROC-	Gap

Article No.	Clause Requirement	Assessment	Compliance Category
		00158, Removal of Packaging Material Prior to Entering Zone 2, Zone 3 and the Unzoned Areas, to eliminate unnecessary packaging and material from entering the site for the purpose of reducing the fireload and the potential for contaminated material. This procedure also defines the process for the elimination of unnecessary packaging material entering the protected area at Bruce Power Facilities." FORM-11803, "Waste Minimization Plan" only contains generic fields to identify the "Waste Minimization Strategy" for "Equipment", "Tools" or "Miscellaneous". There are no specific instructions to consider "Dismantling and segmentation" **(Gap)**. BP-PROC-00714, "Low Level Radioactive Waste Minimization", does not identify "dismantling and segmentation" as a technique to reduce radioactive waste volumes. BP-PROC-00181 -Waste Minimization Plan", does not identify "dismantling and segmentation" as a technique to reduce radioactive waste volumes.	
10.1	Handling methods shall be selected to minimize potential impacts to workers and the environment in accordance with the ALARA principle. Note: Handling risks associated with low-level radioactive waste are primarily related to packaging and container integrity, and non-radiological risks such as physical, chemical and biological hazards, and poor ergonomics. Low- level waste can also have radiological hazards. In addition, intermediate-level waste can include a significant external radiation hazard that requires shielding for safe handling and storage.	BP-PROC-00878 Ver000 - "Radioactive Waste Management" states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste.	C

Article No.	Clause Requirement	Assessment	Compliance Category
		This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. 3. Ensure decisions on management of radioactive waste are based on minimizing risk to the environment, public and staff and minimizing total life cycle costs for radioactive waste storage and disposal. 4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Standards and Canadian Standard Association (CSA) requirements pertaining to radioactive waste management, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.28. 5. The achievement of high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 (Rev-1). At all times, nuclear safety shall be a primary consideration of every radioactive waste management activity and operational decision with respect to these activities." "4.2 Radioactive Waste Handling and Segregation The handling and segregation of radioactive waste at source is performed by qualified personnel of the work group generating the	

Article No.	Clause Requirement	Assessment	Compliance Category
		waste in accordance with BP-RPP-00010, Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials. Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the work group generating the waste."	
10.2	Processes and procedures for handling low- and intermediate-level radioactive waste shall include, as applicable, requirements for a) conditioning, packaging, and containment; b) radioactive waste segregation; c) any non-routine equipment; d) shielding; e) contamination control; and f) ensuring radiological doses to workers are in accordance with the ALARA principle and at all times below regulatory dose limits.	a) and e) are addressed as follows in BP-RPP-00010 -Segregation and Handling of Radioactive Waste "4.1.2 Waste Processing 4.1.2.1 Excluded area waste shall be considered active at point of origin. Waste originating from areas designated as excluded areas shall be placed in active waste cans or radioactive waste bags. Exception to this treatment must be approved by the Responsible Health Physicist. 4.1.2.2 All waste shall be placed in the correct container, e.g., recycle container, likely clean container, metal container, active waste container. • FORM-11076, Radioactive Material Tag shall be filled out completely, name printed clearly, and attached to all active waste, on the outer-most waste bag (if double bagging is required). • Active bags must be sealed correctly. Twisting the upper portion of the bag and applying tape ensures a proper seal. • Compost bags shall be tied closed. DO NOT apply tape. • Metal and materials containing metal shall not be placed into regular waste containers. Put it into the “metals” containers provided or contact Waste Management Section for guidance. • Contact Waste Management Section for proper handling and disposal of contaminated recyclable materials. • Used floor sweepings and mop heads shall be placed in	C

Article No.	Clause Requirement	Assessment	Compliance Category
		separate floor sweepings and mop head waste bags - black and yellow stripe. Sealed bags shall be stored at the relevant Zone 3 active waste collection point. Zone 2/3 mop heads must be wrung out and have no visible liquid. b) c) and d) are addressed by BP-PROC-00878 R000 - "Radioactive Waste Management" which states: "4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the correct disposal stream: - B-SMP-79100-00002, Operation of the Trakker/Scanner - B-SMP-79100-00003, Operation of the Waste Bag Monitor - B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E - B-SMP-79100-00011, Waste Shielding Flask Use - B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable	

Article No.	Clause Requirement	Assessment	Compliance Category
		2. Compactable 3. Non-processable 4. Metal melt" f) is addressed as follows in BP-PROC-00878 R000 - "Radioactive Waste Management" which states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account. 3. Ensure decisions on management of radioactive waste are based on minimizing risk to the environment, public and staff and minimizing total life cycle costs for radioactive waste storage and disposal.	

Article No.	Clause Requirement	Assessment	Compliance Category
		4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Standards and Canadian Standard Association (CSA) requirements pertaining to radioactive waste management, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.28. 5. The achievement of high standards of radiation protection performance in accordance with industry best practices and the World Association of Nuclear Operators (WANO) Guidelines for Radiological Protection at Nuclear Power Plants, WANO GL 2004-01 (Rev-1)."	
11.1	Storage shall be in accordance with the requirements of CSA N292.0, Clause 13.	CSA N292.0-14, "General principles for the management of radioactive waste and irradiated fuel" extraction: "Authority having jurisdiction (AHJ) — the organization responsible for the approval of the safety and security of the systems associated with nuclear waste management, including its physical components, plans, and procedures. Note: For the purposes of this Standard, in Canada, the federal AHJ is the CNSC." "13 Storage" Clause "13.1 Waste storage areas shall be designed to permit safe handling, storage, and retrievability of wastes. Note: Waste storage areas can include cupboards, cabinets, fume-hoods, closets, rooms, buildings, and purpose built sites dedicated to the management of radioactive waste." COMPLIANT. An example to demonstrate compliance with clause 13.1 is in NK21-DM-34540 Rev.000, Design Manual: Spent Resin Storage	

Article No.	Clause Requirement	Assessment	Compliance Category
		System, which states: "Spent Resin-Tanks (3454 TK-1 and TK-2) Two spent resin tanks are installed in the Unit 2 Reactor Auxiliary Bay on floor elevation 5799-6'9. Tank TK-1 is located in Room R2-020 and tank TK-2 is located in room B2-022… Each tank has a bank of 4 resin inlet distributors near the 'top, a vent connected to the Active Ventilation System, a resin outlet connection near the bottom, a water return connection near the bottom and a screened drain connection near the bottom. Each tank also has a level monitoring and indicating system to maintain the resins in a flooded condition but not allow the water to flood the vent line. The rooms in which the tanks are situated are coated with a 'water proof coal tar epoxy lining to provide a second barrier to the environment if the tanks should fail. Each tank room also has a two inch leak detector valve which can be used to check the condition of the tanks, with respect to leakage from room R2-023 without entering the storage areas." Clause "13.2 Storage areas shall" Clause 13.2 "a) have signage in accordance with the requirements of the AHJ;" COMPLIANT. BP-PROG-12.05 - Radiation Protection Program states: "4.3.3 Hazard Posting	

Article No.	Clause Requirement	Assessment	Compliance Category
		The DM, RP Programs is responsible for defining a consistent system for radiation hazard posting, in accordance with the regulations, so that personnel are aware of the nature of the radiological hazards throughout their working environment. Areas that routinely have radiation fields are clearly identified with permanent warning signs, as described in BP-RPP-00023, Hazards Surveys, Posting, Response and Recording, an implementing procedure of BP-RPP-00041." BP-PROC-00878 Ver000 - "Radioactive Waste Management" states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 4. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Regulations, Licences and Standards and Canadian Standard Association (CSA) requirements pertaining to radioactive waste management, specifically CSA N286-05, Management System Requirements for Nuclear Power Plants, Section 6.28." BP RPP 00023 - Hazards Surveys, Posting, Response and	

Article No.	Clause Requirement	Assessment	Compliance Category
		Recording states: "2.1.2 A sign or tag indicating the presence of radioactive material(s) is required on any container or device that is used to store or otherwise hold radioactive materials, except under the following circumstances. 1. Where such a container forms part of the machinery attached to the manufacturing or processing equipment of a nuclear facility (i.e., the contaminated or activated process systems that comprise the reactor unit, such as the Heat Transport System, are not to be labeled as “containers” of radioactive material). 2. Where the quantity of radioactive material in a container is less than a scheduled quantity as set out in the Canadian Nuclear Safety Commission (CNSC) Regulations. 3. For containers used to temporarily store radioactive materials while under the supervision and in the presence of a yellow or green qualified Nuclear Energy Worker (NEW). 4. Where the radioactive material is contained in a transportation package that is labeled according to BP RPP 00013, Radioactive Shipments. 2.1.3 A sign indicating the presence of radioactive material(s) is required on an area, room or enclosure that is used to store or otherwise hold radioactive materials, except where the location has already been posted with a sign for radiation, surface contamination, or airborne contamination hazards. 2.1.4 There are specific jobs/duties when, because of plant conditions and Nuclear Safety concerns, personnel must remain in the vault if a Fixed Area Gamma Monitor (FAGM) alarms, providing their personal safety is not compromised. These exceptions are based on nuclear safety risks and are documented via an Authorized Health Physicist (AHP) exception letter. The exception letter for these circumstances shall be included in the REP. 2.1.5 Requirements for posting of radiological signs for nuclear substances or radiation devices related to non Power Reactor Operating Licenses can be found in BP RPP 00016, Purchase,	

Article No.	Clause Requirement	Assessment	Compliance Category
		Use, Storage and Disposal of Licensed Sources. 2.1.6 This procedure does not address the performance of hazard surveys using continuous workplace monitoring instruments (e.g., continuous tritium monitoring in general accessible areas). Refer to specific RP Procedures for guidance. 2.1.7 Radiological Hazard Information System (RHIS) entries are not required for hazard surveys recorded on radiological tags as per Section 4.4. 2.1.8 The routine survey program may define areas where a Radiation Danger sign remains even though hazards are below posting limits in accordance with DIV SHARE 00009, Routine Surveys." Clause 13.2 "b) have secondary containment sufficient to control spills or leaks in areas where liquids are stored;" COMPLIANT. An example to demonstrate compliance with clause 13.1 is in NK21-DM 34540 Rev.000, Design Manual: Spent Resin Storage System, which states: "Spent Resin-Tanks (3454 TK-1 and TK-2) Two spent resin tanks are installed in the Unit 2 Reactor Auxiliary Bay on floor elevation 5799-6'9. Tank TK-1 is located in Room R2-020 and tank TK-2 is located in room B2-022… Each tank has a bank of 4 resin inlet distributors near the 'top, a vent connected to the Active Ventilation System, a resin outlet connection near the bottom, a water return connection near the bottom and a screened drain connection near the bottom. Each tank also has a level monitoring and indicating system to maintain the resins in a flooded condition but not allow the water to flood the	

Article No.	Clause Requirement	Assessment	Compliance Category
		vent line. The rooms in which the tanks are situated are coated with a 'water proof coal tar epoxy lining to provide a second barrier to the environment if the tanks should fail. Each tank room also has a two inch leak detector valve which can be used to check the condition of the tanks, with respect to leakage from room R2-023 without entering the storage areas." Clause 13.2 "c) be designed to minimize radiation exposure in accordance with the ALARA principle;" COMPLIANT. NK21-DM-34540 Spent Resin Storage System states: "2.8 Shielding shall be provided for the permanent equipment and piping to reduce the radiation fields to an average of 0.6 millirem per hour in any normally accessible areas in accordance with the Health Physics and Radiation Safety recommendations. 2.9 Removable shielding or access control shall be provided to protect operators where equipment is accessible for maintenance." BP-PROC-00878 Ver000 - "Radioactive Waste Management" states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-	

Article No.	Clause Requirement	Assessment	Compliance Category
		MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account." Clause 13.2 "d) have restricted access and security provisions to deter and detect unauthorized access in accordance with the requirements of the AHJ;" COMPLIANT. To demonstrate compliance with clause 13.2 d BP-PROG-08.02 - Nuclear Security states: "1.0 PURPOSE This program document defines the overall business need, functional requirements, constituent elements and key responsibilities associated with providing a World Class Nuclear Utility Protection Service in accordance with the Nuclear Safety and Control Act (NSCA), applicable regulations and other Canadian Nuclear Safety Commission (CNSC) requirements and expectations. The core business is the protection of nuclear materials, company	

Article No.	Clause Requirement	Assessment	Compliance Category
		assets, employees and the public from malicious and malevolent acts. This will be timely and effective and supported through: access control, loss control, alarm assessment and response, immediate and effective intervention, security clearance, investigative/intelligence services, traffic safety and executive/venue protection. This element of the Bruce Power management system establishes processes that are necessary to ensure business and operating objectives are achieved within a framework where safety of the reactors is the paramount objective. This framework is built on Bruce Power's fundamental safety culture principles: • Reactor safety. • Industrial safety. • Environmental safety. • Radiological safety. This program establishes proactive "best-in-business" security processes and supports the nuclear safety principles while it conforms to the goals, objectives and legislative requirements. The Nuclear Security Program supports Bruce Power's fundamental nuclear safety objective to protect the public, site personnel and the environment from harm, by establishing and maintaining effective security defenses against radiological hazards caused by malicious and malevolent acts. 1.1 Scope The scope of this program includes processes performed by security personnel in the delivery of security services and protection measures, including program support functions and security-related processes that impact all personnel who perform work at Bruce Power." Clause 13.2 "e) have systems designed to detect and suppress	

Article No.	Clause Requirement	Assessment	Compliance Category
		fires in areas where combustible materials are stored; and" COMPLIANT. As per BP-PROG-10.01 - Plant Design Basis Management APPENDIX A: STATUTORY, REGULATORY AND LICENSING REQUIREMENTS see: "Bruce A PROL 15.00/2014 and Bruce B PROL 16.00/2014 Clause 5.6 The licensee shall carry out work related to the design of the nuclear facility with potential to impact protection from fire in accordance with CSA standard N293: Fire protection for CANDU nuclear power plants. BP-PROC-00473, Extended Storage/Work Area Approval DPT-PDE-00027, Fire Hazard Assessment Preparation and Maintenance DPT-PDE-00028, Fire Safe Shutdown Analysis Maintenance DPT-PDE-00029, Fire Protection Code Compliance Review Maintenance DPT-PDE-00030, Fire Protection Technical Evaluations Preparation, Review and Acceptance DPT-PDE-00031, Third Party Review - Fire Protection" "f) be designed with a means for detecting upset conditions." COMPLIANT. As per BP-PROG-10.01 - Plant Design Basis Management APPENDIX A: STATUTORY, REGULATORY AND LICENSING REQUIREMENTS see:	

Article No.	Clause Requirement	Assessment	Compliance Category
		"N286-05, Annex A.7, Detailed Design, BP-PROC-00657, Guideline for Conducting a Failure Modes and Effects Analysis" An example to demonstrate compliance with clause 13.2 clause f NK21-DM-34540 Spent Resin Storage System states: "2.11.8 Annunciation shall be provided on the local panel and in the main control room for low dewater pump flow and high differential pressure across strainer STRS." Clause "13.3 A storage area radiological monitoring program should provide routine monitoring and a record of compliance with the limits set by the AHJ." COMPLIANT BP-PROG-12.05 - Radiation Protection Program states: "2. Routine Radiological Surveys BP-RPP-00005, Routine Radiological Surveys, outlines the requirements for routine radiological surveys performed to verify: the implementation of this Program, the integrity of operating systems, to support the early discovery of unexpected hazards; and to identify longer term trends in hazard conditions. The location, type and frequency of routine surveys are scaled to the probability and the consequences of exposures. SFAMs develop and maintain their respective facility's survey program in accordance with BP-RPP-00005. The results of surveys are communicated through posting and labelling. These activities are conducted in accordance with the CNSC Radiation Protection Regulations, as described in BP-RPP-00023. Survey results are retained and accessible to workers in the	

Article No.	Clause Requirement	Assessment	Compliance Category
		RHIS for identification of trends and for work planning. In order to verify the technical basis of this Program, routine and periodic source term characterization data is undertaken in accordance with SEC-RPR-00073, Source Term Characterization of Radioactive Systems and Areas, an implementing document of BP-RPP-00049, Source Term Management (an implementing document of BP-RPP-00044). 4.3.3 Hazard Posting The DM, RP Programs is responsible for defining a consistent system for radiation hazard posting, in accordance with the regulations, so that personnel are aware of the nature of the radiological hazards throughout their working environment. Areas that routinely have radiation fields are clearly identified with permanent warning signs, as described in BP-RPP-00023, Hazards Surveys, Posting, Response and Recording, an implementing procedure of BP-RPP-00041." Clause "13.4 Storage areas should a) ensure a high degree of structural integrity, in accordance with the risk posed by its contents; b) ensure that waste packages are stored safely for the designated storage period; c) be equipped with monitoring and ventilation equipment where required to control ambient conditions; d) be designed to prevent unauthorized or inadvertent access, and provide separation from adjacent areas having different uses;	

Article No.	Clause Requirement	Assessment	Compliance Category
		e) be constructed so as to discourage intrusion by animals, which can lead to spread of contamination; f) be designed and equipped to provide for the safe handling of radioactive material; g) have interior surfaces constructed of materials that can be easily decontaminated; and h) as required, include equipment for radiological monitoring in their design. Clause "13.5 Waste packages shall be stored in such a manner that the radiation exposure to workers is minimized in accordance with the ALARA principle during waste retrieval." COMPLIANT BP-PROC-00878 Ver000 - "Radioactive Waste Management" states: "1.0 PURPOSE This procedure, an implementing document of BP-PROG-12.05, Radiation Protection Program, defines the fundamental business needs, constituent elements, functional requirements, implementing approaches and key responsibilities associated with implementing the Bruce Power Radiation Protection Waste Management Policy, as defined in the Bruce Power Management System Manual (BP-MSM-1, Appendix A) for radioactive waste. This is achieved by establishing and implementing standards and processes for the conduct of radioactive waste activities to ensure the following objectives, created to meet the intent of the Policy, are	

Article No.	Clause Requirement	Assessment	Compliance Category
		met: 1. Radioactive waste activities are controlled in a safe and environmental, financially and socially responsible way to ensure full compliance with regulatory requirements. 2. Public and occupational exposures to ionizing radiation during radioactive waste activities are controlled such that individual and collective doses are maintained at levels As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account." BP-PROC-00188 - Radioactive Material Transport states: "4.3 Selection, Use, and Maintenance of Radioactive Material Containers The requirements for the quality assurance and maintenance processes are further described in BP-PROC-00941, Radioactive Material Container Life Cycle Management." BP-PROC-00941 -Radioactive Material Container Life Cycle Management states: "1.0 PURPOSE This procedure, an implementing document of BP-PROC-00188, Radioactive Material Transportation, defines the standards and overall processes established for all the activities that are related to purchase, use, and maintenance of radioactive material packages and containers in Bruce Power to ensure the following objectives are met: 1. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Packaging and Transport of Nuclear Substances Regulations (PTNSR) and International Atomic Energy Agency (IAEA) TS-R-1. 2. Provide a recommended quality assurance program for all the class 7 containers owned by Bruce Power.	

Article No.	Clause Requirement	Assessment	Compliance Category
		3. Provide a guideline on the evaluation of class 7 containers. At all times, nuclear safety shall be a primary consideration of every radioactive material packaging activity and operational decision with respect to these activities. This procedure is applicable to all workers who are utilize radioactive material packages and containers at Bruce Power, whether they are full-time or part time-staff, or contractors. 1.1 Scope - The description herein applies to the purchase, use, maintenance, and repair of radioactive material shipping packages or storage containers. 4.4.1 Inspection and Testing The general condition of the package is vital to ensure radiation safety, whether for transport, or for temporary storage. Given proper attention to the package at the start will lessen the chances of potential radiation leakage and unplanned exposure to personnel." Clause 13.6 Fissile wastes shall be stored in such a manner that they will remain subcritical during normal operations and credible abnormal events. ****NEED BP-PROC-00301 - Reactivity Management***	

Article No.	Clause Requirement	Assessment	Compliance Category
		Clause "13.7 Administrative controls shall be used to manage waste packages so that they can be retrieved for transportation, processing, and repackaging. Note: Administrative controls can include isolation, radiation monitoring, and environmental monitoring." COMPLIANT BP-PROC-00188 - Radioactive Material Transport states: "4.3 Selection, Use, and Maintenance of Radioactive Material Containers The requirements for the quality assurance and maintenance processes are further described in BP-PROC-00941, Radioactive Material Container Life Cycle Management." BP-PROC-00941 -Radioactive Material Container Life Cycle Management states: "1.0 PURPOSE This procedure, an implementing document of BP-PROC-00188, Radioactive Material Transportation, defines the standards and overall processes established for all the activities that are related to purchase, use, and maintenance of radioactive material packages and containers in Bruce Power to ensure the following objectives are met: 1. Ensure compliance with Canadian Nuclear Safety Commission (CNSC) Packaging and Transport of Nuclear Substances Regulations (PTNSR) and International Atomic Energy Agency (IAEA) TS-R-1. 2. Provide a recommended quality assurance program for all the class 7 containers owned by Bruce Power.	

Article No.	Clause Requirement	Assessment	Compliance Category
		3. Provide a guideline on the evaluation of class 7 containers. At all times, nuclear safety shall be a primary consideration of every radioactive material packaging activity and operational decision with respect to these activities. This procedure is applicable to all workers who are utilize radioactive material packages and containers at Bruce Power, whether they are full-time or part time-staff, or contractors. 1.1 Scope - The description herein applies to the purchase, use, maintenance, and repair of radioactive material shipping packages or storage containers." Clause "13.8 Storage areas for liquids shall include provision for controlled ventilation during spills or leaks sufficient to ensure the requirements of the AHJ are satisfied." COMPLIANT BP-PROG-12.05 - Radiation Protection Program states: "SVPs of Bruce A and B and the VP Site Services are responsible for ensuring that the following systems are maintained and operated to support the effectiveness of this Program and to keep radiation exposures ALARA: 1. Ventilation, Dryers and Breathing Air Systems Ventilation systems minimize the probability and extent of airborne contamination transfer and also minimize the accumulation of airborne radioactive contamination in areas that are routinely occupied by personnel. Dryers reduce airborne tritium hazards in accessed areas. Breathing air systems allow a supply of clean breathing air to protective equipment; this ensures that personnel	

Article No.	Clause Requirement	Assessment	Compliance Category
		are protected from internal hazards. These systems must be available and operating to the specifications required to ensure effective radiation protection as outlined in BP-PROG-12.01." BP-PROG-12.05 -Radiation Protection Program states: "4.3.1 Facility Design Good engineering practices were followed during the initial design of the facilities such that the layout and operation of facility structures, systems, components, and processes were consistent with the established guidelines and contributed to maintaining occupational radiation exposures ALARA. The design of the facilities, in support of radiation protection, is governed by BP-PROG-10.01, Plant Design Basis Management."	
11.2.1	Storage for decay should be considered to allow short-lived radionuclides to decay. Notes: 1) Decay can lower intermediate-level waste to low-level waste and permit clearance of radioactive wastes. 2) A decay storage period of 10 half-lives reduces the initial radioactivity to less than one-thousandth of its original radioactivity. 3) Storage for decay is particularly suitable for radioactive wastes containing only short-lived radionuclides. It is most suitable for wastes containing radionuclides with an approximate half-life of less than 100 d [i.e., very short-lived low-level radioactive waste (VSLLW); see Clause A.5.2 of CSA N292.0]. However, radionuclides with longer half-lives may also be considered. 4) While storage for decay can be used for bio-hazardous radioactive waste and for other perishable radioactive waste such as animal carcasses, these types of radioactive waste pose special	**(Gap)** The concept of storage for decay is not identified in: - BP-PROC-00878, "Radioactive Waste Management", - BP-PROC-00714, "Low Level Radioactive Waste Minimization", - FORM-11803, "Waste Minimization Plan" or - BP-PROC-00107, "OPG Waste Acceptance Criteria for Radioactive Waste"	Gap

Article No.	Clause Requirement	Assessment	Compliance Category
	hazards and should be segregated and stored in dedicated and monitored freezer/refrigerator cabinets during decay storage.		
11.2.2	The radioactive waste should a) be kept segregated from the time of generation to the end of the decay storage period; and b) have representative measurements taken, or samples taken and analyzed, prior to the removal of each batch from control (see CSA N292.5). Note: Storage for decay and clearance from further regulatory control requires strict administrative control measures.	Radioactive waste is segregated at the time of generation through to disposal as per the following: BP-PROC-00878 - Radioactive Waste Management states: "4.2 Radioactive Waste Handling and Segregation Segregation and Handling of Radioactive Waste. Segregation reduces radioactive waste costs and prevents the unnecessary contamination of non-radioactive and non-tritiated materials. Effective solid waste segregation requires knowledge of the radiological history of the material and is best carried out at the point of origin of the waste and, therefore, is a responsibility of the work group generating the waste. Through the segregation process, radioactive waste is clearly identified by waste type, radiological properties, and point of origin to ensure proper segregation into designated waste receptacles and assists in radioactive waste minimization. 4.3 Radioactive Waste Collection and Processing Radioactive waste is collected, monitored, identified, and further segregated by Civil Maintenance (CvM) staff in accordance with BP-RPP-00010 and B-SMP-79100-00004, Waste Processing. B-SMP-79100-0004 provides details for CvM staff on pick-up points, pick-up routines, equipment and tools necessary to perform pick-ups, as well as the steps to be followed to monitor and identify radioactive waste. The following procedures provide instruction to	Gap

Article No.	Clause Requirement	Assessment	Compliance Category
		CvM staff on how to operate equipment and instrumentation used to collect and monitor the waste to properly process it for the correct disposal stream: • B-SMP-79100-00002, Operation of the Trakker/Scanner • B-SMP-79100-00003, Operation of the Waste Bag Monitor • B-SMP-79100-00010, Operation of TSA Barrel Monitor Models BM-286A, BM-286C, BM-286D, and BM-286E • B-SMP-79100-00011, Waste Shielding Flask Use • B-SMP-79100-00012, High Activity Waste Cart Use Through these processes, radioactive waste is segregated into the following waste disposal streams: 1. Incinerable 2. Compactable 3. Non-processable 4. Metal melt Implementation details are included in BP-RPP-00010 - "Segregation and Handling of Radioactive Waste". **(Gap)** However, the concept of "storage for decay" is not implemented in Bruce Power documentation. Therefore, there is a gap in these implementation requirements.	
11.2.3	Radioactive wastes containing very short-lived radionuclides (less than 100 d) should be segregated and accumulated in a separate storage area.	The concept of "storage for decay" is not implemented in Bruce Power documentation: - BP-PROC-00878, "Radioactive Waste Management", - BP-PROC-00714, "Low Level Radioactive Waste Minimization", - FORM-11803, "Waste Minimization Plan" or - BP-PROC-00107, "OPG Waste Acceptance Criteria for	Gap

Article No.	Clause Requirement	Assessment	Compliance Category
		Radioactive Waste" **(Gap)** Therefore, there is a gap in this implementation requirement.	