



HITACHI

GE Hitachi Nuclear Energy

NEDO-34188

Revision A

January 2025

*US Protective Marking: Non-Proprietary Information
UK Protective Marking: Not Protectively Marked*

BWRX-300 UK Generic Design Assessment (GDA) Chapter 16 – Operational Limits & Conditions

*Copyright 2025 GE Hitachi Nuclear Energy Americas, LLC
All Rights Reserved*

US Protective Marking: Non-Proprietary Information
UK Protective Marking: Not Protectively Marked

NEDO-34188 Revision A

INFORMATION NOTICE

This document does not contain proprietary information and carries the notations “US Protective Marking: Non-Proprietary Information” and “UK Protective Marking: Not Protectively Marked.”

IMPORTANT NOTICE REGARDING CONTENTS OF THIS REPORT

Please Read Carefully

The design, engineering, and other information contained in this document is furnished for the purpose of obtaining the applicable Nuclear Regulatory Authority review and determination of acceptability for use for the BWRX-300 design and licensing basis information contained herein. The only undertakings of GEH with respect to information in this document are contained in the contracts between GEH and its customers or participating utilities, and nothing contained in this document shall be construed as changing those contracts. The use of this information by anyone for any purpose other than that for which it is intended is not authorized; and with respect to any unauthorized use, no representation or warranty is provided, nor any assumption of liability is to be inferred as to the completeness, accuracy, or usefulness of the information contained in this document. Furnishing this document does not convey any license, express or implied, to use any patented invention or any proprietary information of GEH, its customers or other third parties disclosed herein or any right to publish the document without prior written permission of GEH, its customers or other third parties.

UK SENSITIVE NUCLEAR INFORMATION AND US EXPORT CONTROL INFORMATION

This document does not contain any UK Sensitive Nuclear Information (SNI) subject to protection from public disclosure as described in the Nuclear Industries Security Regulations (NISR) 2003, does not contain UK Export Controlled Information (ECI), and does not contain US Export Controlled Information (ECI) subject to the export control laws and regulations of the United States, including 10 CFR Part 810.

NEDO-34188 Revision A

EXECUTIVE SUMMARY

The BWRX-300 Generic Design Assessment (GDA) Preliminary Safety Report Chapter 16 presents at a high-level how the BWRX-300 design and operational documentation can enable a future duty holder/licensee to implement Operational Limits and Conditions (OLCs) for safe operation.

The OLC are those upon which reactor operation is licensed, monitored and controlled by the operator. Conditions of operation and safety limits are needed to ensure that the facility is in compliance with the regulatory requirements of the Office for Nuclear Regulation.

The approach to developing OLCs are described, and safety limits are identified, however the content of individual Technical Specifications is outside the scope.

Accurate limits for the OLC are dependent on the development of the design and modifications of the BWRX-300.

Claims and arguments relevant to GDA step 2 objectives and scope are summarized in Appendix A, along with an As Low As Reasonably Practicable (ALARP) position. Appendix B provides a Forward Action Plan (FAP).

NEDO-34188 Revision A

ACRONYMS AND ABBREVIATIONS

Acronym	Explanation
ALARP	As Low As Reasonably Practicable
CAE	Claims, Arguments and Evidence
FAP	Forward Action Plan
FW	Feedwater
GDA	Generic Design Assessment
GEH	GE Hitachi Nuclear Energy
HFE	Human Factors Engineering
IAEA	International Atomic Energy Agency
LCO	Limiting Condition for Operation
MCR	Main Control Room
NBS	Nuclear Boiler System
OLC	Operational Limits and Condition
ONR	Office for Nuclear Regulation
OPEX	Operational Experience
PSA	Probabilistic Safety Assessment
PSR	Preliminary Safety Report
RGP	Relevant Good Practice
RPV	Reactor Pressure Vessel
RTP	Rated Thermal Power
SAP	Safety Assessment Principles
SCDS	Safety Case Development Strategy
SDC	Shutdown Coolant System
SMR	Small Modular Reactor
SSCs	Structures, Systems, and Components
U.S.	United States
UK	United Kingdom
WERN	Western European Nuclear Regulators Association

NEDO-34188 Revision A

TABLE OF CONTENTS

EXECUTIVE SUMMARY iii

ACRONYMS AND ABBREVIATIONS iv

16. OPERATIONAL LIMITS & CONDITIONS 1

 16.1 Applicable Codes & Standards 3

 16.2 Bases for Development 4

 16.3 Safety Limits 6

 16.4 Requirements For Limits and Conditions for Normal Operation, Surveillance
 and Testing 7

 16.5 Administrative Requirements..... 8

 16.6 Operating Modes..... 9

 16.7 References..... 12

APPENDIX A CLAIMS, ARGUMENTS AND EVIDENCE..... 13

 A.1 Claims, Arguments and Evidence..... 13

 A.2 Risk Reduction As Low As Reasonably Practicable 14

APPENDIX B FORWARD ACTIONS 17

NEDO-34188 Revision A

LIST OF TABLES

Table 16-1: BWRX-300 Operational Modes	11
Table A-1: Operational Limits & Conditions Claims and Arguments	15
Table B-1: Conduct of Operations Forward Actions	17

LIST OF FIGURES

None.

NEDO-34188 Revision A

REVISION SUMMARY

Revision #	Section Modified	Revision Summary
A	All	Initial Issuance

NEDO-34188 Revision A

16. OPERATIONAL LIMITS & CONDITIONS

The BWRX-300 GDA Preliminary Safety Report (PSR) Chapter 16 presents at a high-level how the BWRX-300 design and operational documentation can enable a future duty holder/licensee to implement Operational Limits and Conditions (OLCs) for safe operation.

The OLC are those upon which reactor operation is licensed, monitored and controlled by the operator. Conditions of operation and safety limits are needed to ensure that the facility is in compliance with the regulatory requirements.

The approach to developing OLCs are described, and safety limits are identified, however the content of individual Technical Specifications is outside the scope. Accurate limits for the OLC are dependent on the development of the design and modifications of the BWRX-300.

The following chapters support PSR Ch. 16 – Operational Limits & Conditions:

- PSR Ch. 3 – NEDC-34165P, “Safety Objectives and Design Rules for Structures, Systems and Components (SSCs),” (Reference 16-1) – describes the approach to delivering the safety objectives and design rules. The safety objectives and design rules provide important input to the design provisions which the conduct of operations are required to compliment.
- PSR Ch. 11 – NEDC-34174P, “PSR Ch. 11 – Management of Radioactive Waste,” (Reference 16-2) – this chapter describes the main sources of liquid, gaseous and radioactive waste including the radiological source term used in calculating liquid and airborne effluent. Also described are the radioactive waste processing systems as well as temporary waste storage located on site.
- PSR Ch. 12 – NEDC-34175P, “PSR Ch. 12 – Radiation Protection,” (Reference 16-3) – This section describes administrative programs and procedures, in conjunction with facility design, ensure that the occupational radiation exposure to personnel is kept ALARP. The systematic application of the ALARP principle during the design phase of the BWRX-300 establishes the basic design criteria observed to reducing occupational exposure during plant operation and maintenance, decommissioning and post-accident ALARP.
- PSR Ch. 13 – NEDC-34176P, “PSR Ch. 13 – Conduct of Operation,” (Reference 16-4) – presents at a high-level how the BWRX-300 design and operational documentation produced for the Preliminary Safety Report (PSR) can enable a future duty holder/licensee to implement the safety case in organizational structure/arrangements, training, implementation of the operational safety program, plant procedures and guidelines and nuclear safety and nuclear security interfaces.
- PSR Ch. 14 – NEDC-34177P, “PSR Ch. 14 – Construction and Commissioning,” (Reference 16-5) – provides an assessment and specification of the BWRX-300 plant construction and commissioning, including, but not limited to civil works, mechanical systems, electrical systems, I&C, ancillary and auxiliary systems and environmental and habitability systems. The configuration control and management of Operational Experience (OPEX) in the design is discussed and provides detail of the conduct of operations.
- PSR Ch. 18 – NEDC-34190P, “PSR Ch. 18 – Human Factor Engineering,” (HFE) (Reference 16-6) – describes the concept of operation for the BWRX-300 including the level of automation and role of humans in the various operating modes, the Main Control Room (MCR) staffing concept and the procedure concept. Integration of these human factors into the Conduct of Operation is described in this Chapter.

NEDO-34188 Revision A

- PSR Ch. 19 – NEDC-34191P, “PSR Ch. 19 - Emergency Preparedness and Response,” (Reference 16-7) – this section describes Emergency Preparedness and Response, is to provide sufficient information on emergency arrangements, demonstrating in a reasonable manner during a nuclear or radiological emergency, all actions necessary for the protection of workers, the public, and the environment could be taken; and the decision-making process for the implementation of these actions would be timely, disciplined, coordinated, and effective.

NEDO-34188 Revision A

16.1 Applicable Codes & Standards

The OLCs should meet the specific requirements of the International Atomic Energy Agency (IAEA) relevant guidance and requirements are:

- IAEA SSG-70, "Operating Limits and conditions and Operating Procedures for Nuclear Power Plants," (Reference 16-8)
- IAEA, SSR-2/2, "Safety of Nuclear Power Plants: Commissioning and Operation, (Reference 16-9)

A reference point for Relevant Good Practice (RGP) for the development of OLCs is highlighted in the Western European Nuclear Regulators Association (WERNRA) "Safety Reference Levels for Existing Reactors," (Reference 16-10).

NEDO-34188 Revision A

16.2 Bases for Development

The bases for the OLCs are provided in various parts of the specifications. The Bases provides information necessary for understanding and implementation of the technical specification requirements. As such, the Bases are not part of the technical specifications.

As the Specifications vary in applicability and requirement, the information provided in the Bases differs accordingly providing the following:

- Discussion of the safety limits and their relationship to the protection of fuel clad integrity, pressure boundary integrity or containment integrity.
- A background discussion of each specification that describes the system, limit, or function as it relates to the specification including any limits that are protected by the specification and consequences of exceeding the limit.
- An applicable safety analyses discussion that discusses the analysis and evaluation from which the specification has been derived including, as applicable, design basis accident and transient analyses, major input assumptions, relationship of the Specification to the analysis acceptance criteria, and the appropriate Specification selection criteria.
- Discussion of the Limiting Condition for Operation (LCO) or Safety Limit) with explanation of why the requirement is appropriate, why it was determined to be the lowest functional capability or performance level necessary for safe operation of the facility, the relationship to the protection of fuel clad integrity, pressure boundary or containment integrity and any other facets of the specification required such as:
 - Operating Parameters
 - Environmental Parameters
 - Chemistry & Material Parameters
 - Required flow paths
 - Conditions required
 - Number of components required
 - Minimum Staffing levels
 - What actions taken and time taken for required action to be conducted if any derivation from the OLC occurs
 - If the plant behaves any different to the required state due to OLC requirements not being met, what actions are taken to bring the plant back to a safer state and time taken for required actions to be conducted.
- Discussion of the Applicability associated with the LCO with explanation of why compliance is required for the given conditions (e.g., Modes 1, 2, or 3) and why not required during other conditions (e.g., Modes 4, 5, and 6).
- Discussion of Actions:
 - For required actions to substantiate acceptability of deviation on the condition protection is provided. Probability of an event during the period covered or required action compensates for the specification deviation.
 - Substantiation of acceptability of completion teams and mode changes and corresponding acceptability.
 - Source of all of actions required.

NEDO-34188 Revision A

- Discussion of the specification requirements in regard to the surveillance, if the surveillance complies with the specification requirements including the basis of the specified acceptance criteria.
- A list of references that provide more detailed information pertinent to the Specification.

NEDO-34188 Revision A

16.3 Safety Limits

Safety Limits are limits upon important process variables that are necessary to reasonably protect the integrity of certain physical barriers that guard against the uncontrolled release of radioactivity. The conditions for which the Safety Limit is applicable is provided if required. A violation of any Safety Limit requires restoration of the Safety Limit and insertion of all control rods within a specified time period.

Safety Limits are established for fuel cladding integrity, fuel cooling, and reactor coolant system pressure boundary integrity.

The fuel cladding safety limit is based on establishing a margin to the conditions that produce onset to transition boiling. Because fuel damage is not directly observable, a step back approach is used to establish the safety limit for critical power ratio. A thermal power limit is applicable when less than approximately 4.72 MPaG and a minimum critical power ratio limit when greater than approximately 4.72 MPaG.

The fuel cooling safety limit is based on establishing water level above the top of active irradiated fuel to provide core cooling with margin.

The reactor coolant system pressure boundary integrity safety limit is based on protecting the reactor coolant pressure boundary against overpressurization. In the event of fuel cladding failure and release of fission products into the reactor coolant, the reactor coolant system serves as the primary barrier in preventing fission product release into the atmosphere. Establishing an upper limit on reactor vessel steam dome pressure ensures the reactor coolant pressure boundary integrity.

NEDO-34188 Revision A

16.4 Requirements For Limits and Conditions for Normal Operation, Surveillance and Testing

16.4.1 Limiting Condition for Operation

The LCO describes as simply as possible the lowest functional capability or performance level of equipment required for safe operation of the facility. Process parameters required to preserve the assumptions of the safety analysis are also the subject of LCOs. Uncertainties are considered and incorporated, such that the condition(s) specified are sufficient to provide a high degree of assurance that corresponding safety analysis limits are not exceeded.

16.4.2 Applicability

An Applicability statement is included for each LCO that consists of a simple listing of the Modes or Conditions during which the LCO is applicable. The Modes are defined in Section 16.6.

16.4.3 Actions

Conditions use the term inoperable, where appropriate to describe the failure to meet an LCO. Conditions are broken down into separate statements to describe a single condition unless multiple Conditions have identical Required Actions. Conditions are ordered from the least to most degraded condition. Required Actions are established to restore the parameter to within limits, restore SSCs to operable status, or place the plant in a safe condition within specified Completion Time. The Completion Times for the Required Actions are determined based on reliability and Probabilistic Safety Assessment (PSA). The Completion Times are established to ensure that any increase to risk is kept to an acceptable level.

16.4.4 Surveillance Requirements

Surveillance Requirements include brief descriptions of each Surveillance and its Frequency of execution, arranged in a table from the shortest to the longest interval. These Requirements clearly outline the necessary measures to guarantee adherence to the LCO. The surveillance frequency is determined through a reliability analysis, PSA, and past OPEX data. In cases where PSA information is lacking for specific equipment, the reliability evaluation is guided by supplier suggestions.

NEDO-34188 Revision A

16.5 Administrative Requirements

Administrative controls address provisions related to responsibility, organization, unit staff qualifications, procedures, programs and manuals, and reporting requirements, as necessary to assure operation of the facility in a safe manner.

NEDO-34188 Revision A

16.6 Operating Modes

The normal BWRX-300 operating modes are defined corresponding to any one inclusive combination of Reactor Mode Switch position, average reactor coolant temperature, and reactor vessel head closure stud tensioning specified in Table 16-1 with fuel in the reactor vessel.

16.6.1 Mode 1: Power Operation

Mode 1, Power Operation, is defined with the Reactor Mode Switch in the "RUN" position at any average reactor coolant temperature. The Reactor Mode Switch is not placed in "RUN" position unless the Nuclear Boiler System (NBS) is pressurized and able to turn the main turbine generator. The transition to Mode 1 normally occurs at 10%-12% Rated Thermal Power (RTP). A plant scram occurs at approximately 15% RTP when the Reactor Mode Switch is in the Startup position.

During Power Operation, the reactor water level is controlled by the Reactor Level Control function by adjusting the speed of the operating Reactor Feedwater (FW) Pump to maintain a normal reactor water level. The reactor pressure is controlled by the Reactor Pressure Control function using reactor steam dome pressure as the input. Reactor power is controlled by the Rod Control and Information System and the Plant Automation System. Normal power maneuvering occurs by moving control rods to achieve the desired power level.

16.6.2 Mode 2: Startup

Mode 2, Startup, is defined with the Reactor Mode Switch in the "STARTUP" position at any average reactor coolant temperature. Startup Operation is also defined with the Reactor Mode Switch in the "REFUEL" position when all the reactor head closure studs are fully tensioned. With the Reactor Mode Switch in the "STARTUP" position additional protection is in place for low power operation however but this mode allows the reactor to start heating up and pressurizing by withdrawing control rods via the Rod Control and Information System. In the "REFUEL" position, a control rod block prevents the withdrawal of more than two control rods at a time.

16.6.3 Mode 3: Hot Shutdown

Mode 3, Hot Shutdown, is defined with the Reactor Mode Switch in the "SHUTDOWN" position at an average reactor coolant $>215.6^{\circ}\text{C}$ and all Reactor Pressure Vessel (RPV) head closure studs fully tensioned. When the Reactor Mode Switch is placed into the SHUTDOWN position, a reactor scram signal is sent to the control rods. The scram signal is released after all operable control rods have been fully inserted by the hydraulic scram. Once released, the operator can reset the scram signal (if no other scram signals are present) so that the control rod drive system can recharge the scram accumulators and return flow to the reactor to the normal flow rate. A control rod withdrawal block is maintained any time the Reactor Mode Switch is in the "SHUTDOWN" position. The saturation steam temperature associated with the reactor steam dome pressure is used to determine average reactor coolant temperature if the Shutdown Cooling System (SDC) is not in service. If the SDC is in service, the higher of saturation temperature and SDC supply line temperature is used.

All reactor head closure studs are fully tensioned in this mode. This mode is entered after a reactor scram from any power level once the Reactor Mode Switch position is changed from RUN to SHUTDOWN. This mode is not typically entered during a normal transition from Refueling or Cold Shutdown to Power Operation.

16.6.4 Mode 4: Stable Shutdown

Mode 4, Stable Shutdown, is defined with the Reactor Mode Switch in the "SHUTDOWN" position at an average reactor coolant temperature between 215.6°C and 93.3°C and all RPV head closure studs fully tensioned. Stable Shutdown Operation can be achieved using passive

NEDO-34188 Revision A

cooling systems through natural circulation. The saturation steam temperature associated with the reactor steam dome pressure is used to determine average reactor coolant temperature if the SDC is not in service. If the SDC is in service, the higher of saturation temperature and SDC supply line temperature is used. This mode is entered during a normal shutdown to Cold Shutdown. The transitions to Cold Shutdown will require active cooling systems through forced circulation. The reactor head closure studs are fully tensioned in this mode. This mode can also be entered when transitioning from Cold Shutdown to Power Operation during heat up before the hand switch has been repositioned from “SHUTDOWN” to the “STARTUP” position.

16.6.5 Mode 5: Cold Shutdown

Mode 5, Cold Shutdown, is defined with the Reactor Mode Switch in the “SHUTDOWN” position at an average reactor coolant temperature < 93.3°C and all RPV head closure studs fully tensioned. In this mode, the temperature of the reactor coolant system is low, and the isolation condensers are not functional. Decay heat removal is accomplished through the SDC.

16.6.6 Mode 6: Refuelling

Mode 6, Refueling, is defined with the Reactor Mode Switch in “SHUTDOWN” or “REFUEL” position, and one or more RPV head closure studs are less than fully tensioned. The reactor is in a subcritical state. In this mode the RPV cannot be pressurized, and the isolation condensers are not able to remove heat. Decay heat can be effectively transferred from the fuel and absorbed by the volume of water present in the RPV and Fuel Pool. Temperature control to allow for effective maintenance is accomplished by use of the SDC and the Fuel Pool Cooling and Cleanup System. The containment is not required to be operable during Refueling.

NEDO-34188 Revision A

Table 16-1: BWRX-300 Operational Modes

Mode	Title	Reactor Mode Switch Position	Average Reactor Coolant Temperature (°C)
1	Power Operation	Run	N/A
2	Startup	Refuel (1) or Startup	N/A
3	Hot Shutdown (1)	Shutdown	>215.6
4	Stable Shutdown (1)	Shutdown	≤ 215.6 and > 93.3
5	Cold Shutdown (1)	Shutdown	≤ 93.3
6	Refuelling (2)	Shutdown or Refuel	N/A

Notes:

- (1) All RPV head closure studs fully tensioned
- (2) One or more head closure studs less than fully tensioned

NEDO-34188 Revision A

16.7 References

- 16-1 NEDC-34165P, "PSR Ch. 3 – Safety Objectives and Design Rules for SSCs," GE-Hitachi Nuclear Energy, Americas, LLC.
- 16-2 NEDC-34174P, "PSR Ch. 11 – Management of Radioactive Waste," GE-Hitachi Nuclear Energy, Americas, LLC.
- 16-3 NEDC-34175P, "PSR Ch. 12 – Radiation Protection," GE-Hitachi Nuclear Energy, Americas, LLC.
- 16-4 NEDC-34176P, "PSR Ch. 13 – Conduct of Operation," GE-Hitachi Nuclear Energy, Americas, LLC.
- 16-5 NEDC-34177P, "PSR Ch. 14 – Construction and Commissioning," GE-Hitachi Nuclear Energy, Americas, LLC.
- 16-6 NEDC-34190P, "PSR Ch. 18 – Human Factors Engineering," GE-Hitachi Nuclear Energy, Americas, LLC, 2024.
- 16-7 NEDC-34191P, "PSR Ch. 19 - Emergency Preparedness and Response," GE-Hitachi Nuclear Energy, Americas, LLC.
- 16-8 IAEA SSG-70, "Operating Limits and conditions and Operating Procedures for Nuclear Power Plants," September 2022.
- 16-9 IAEA, SSR-2/2, "Safety of Nuclear Power Plants: Commissioning and Operation," Rev 1, February 2016.
- 16-10 WENRA, "WENRA Safety Reference Levels for Existing Reactors," 2020.
- 16-11 ONR, "Safety Assessment Principles for Nuclear Facilities," Rev 1, 2020.
- 16-12 NEDC-34140P, "BWRX-300 UK GDA Safety Case Development Strategy," GE-Hitachi Nuclear Energy, Americas, LLC.

NEDO-34188 Revision A

APPENDIX A CLAIMS, ARGUMENTS AND EVIDENCE

A.1 Claims, Arguments and Evidence

The Office for Nuclear Regulation (ONR) Safety Assessment Principles (SAPs) 2014, “Safety Assessment Principles for Nuclear Facilities,” (Reference 16-11), identify ONR’s expectation that a safety case should clearly set out the trail from safety claims, through arguments to evidence. The Claims, Arguments and Evidence (CAE) approach can be explained as follows:

1. Claims (assertions) are statements that indicate why a facility is safe
2. Arguments (reasoning) explain the approaches to satisfying the claims
3. Evidence (facts) supports and forms the basis (justification) of the arguments

The GDA CAE structure is defined within the Safety Case Development Strategy (SCDS) NEDC-34140P, “BWRX-300 UK GDA Safety Case Development Strategy,” (Reference 16-12) and is a logical breakdown of an overall claim that:

“The BWRX-300 is capable of being constructed, operated and decommissioned in accordance with the standards of environmental, safety, security and safeguard protection required in the UK”.

This overall claim is broken down into Level 1 claims relating to environment, safety, security, and safeguards, which are then broken down again into Level 2 area related sub-claims and then finally into Level 3 (chapter level) sub-claims.

The Level 3 sub-claims that this chapter demonstrates compliance against are identified within the SCDS (Reference 16-12) and are as follows:

2.1.2 The design of the system/structure has been substantiated to achieve the safety functions in all relevant operating modes.

2.1.3 The system/structure design has been undertaken in accordance with relevant design codes and standards (RGP) and design safety principles, and taking account of Operating Experience to support reducing risks ALARP.

2.1.4 System/structure performance will be validated by suitable testing throughout manufacturing, construction and commissioning.

2.1.5 Ageing and degradation mechanisms will be identified and assessed in the design. Suitable examination, inspection, maintenance and testing will be specified to maintain systems/structures fit-for-purpose through-life.

2.1.6 The BWRX will be designed so that it can be decommissioned safely, using current available technologies, and with minimal impact on the environment and people.

2.2.3 Appropriate governance and assurance arrangements are in place to manage the design and substantiation of the BWRX-300.

2.2.4 Future arrangements can be developed to support an operational facility including normal and emergency arrangements.

In order to facilitate compliance, demonstration against the above Level 3 sub-claims, this PSR chapter has derived a suite of arguments that comprehensively explain how their applicable Level 3 sub-claims are met (see Table A-1 below).

It is not the intention to generate a comprehensive suite of evidence to support the derived arguments, as this is beyond the scope of GDA Step 2. However, where evidence sources are available, examples are provided.

NEDO-34188 Revision A

A.2 Risk Reduction As Low As Reasonably Practicable

It is important to note that nuclear safety risks cannot be demonstrated to have been reduced ALARP within the scope of a 2-Step GDA. It is considered that the most that can be realistically achieved is to provide a reasoned justification that the BWRX-300 Small Modular Reactor (SMR) design aspects will effectively contribute to the development of a future ALARP statement. In this respect, this chapter contributes to the overall future ALARP case by demonstrating that:

- The chapter-specific arguments derived may be supported by existing and future planned evidence sources covering the following topics:
 - Relevant Good Practice (RGP) has demonstrably been followed
 - Operational Experience (OPEX) has been taken into account within the design process
 - All reasonably practicable options to reduce risk have been incorporated within the design
- It supports its applicable level 3 sub-claims, defined within the SCDS (Reference 16-11)
- Probabilistic safety aspects of the ALARP argument are addressed within PSR PSR Ch. 15.

NEDO-34188 Revision A

Table A-1: Operational Limits & Conditions Claims and Arguments

Level 16 Chapter Claim	Chapter 16 Argument	Sub-Sections and/or Reports that Evidence the Arguments
2.1 The functions of systems and structures have been derived and substantiated taking into account RGP and OPEX, and processes are in place to maintain these through-life. (Engineering Analysis)		
2.1. The design of the system/structure has been substantiated to achieve the safety functions in all relevant operating modes.	At this stage of the GDA, key topics of discussion are highlighted for the design development which aims to prevent derivation from the OLC which will be later developed.	16.2 Bases for Development 16.6 Operating Modes
2.1.3 The system/structure design has been undertaken in accordance with relevant design codes and standards (RGP) and design safety principles, and taking account of Operating Experience to support reducing risks ALARP	RGP is used for the development of the design and OLCs to ensure safe practice and development for technical specifications.	16.1 Applicable Codes and Standards
2.1.4 System/structure performance will be validated by suitable testing throughout manufacturing, construction and commissioning.	Minimum requirements will be established for the safe operation of the facility, with implementation of SSCs. Surveillance testing will be carried out. The frequency of surveillance will be determined with the aid of the PSA and OPEX data	16.3 Safety Limits 16.4.1 Limiting Condition for Operation 16.4.3 Surveillance Requirements
2.1.5 Ageing and degradation mechanisms will be identified and assessed in the design. Suitable examination, inspection, maintenance and testing will be specified to maintain systems/structures fit for-purpose through-life	Testing is to be carried out to mitigate and meet safety standards throughout operation.	16.4.3 Surveillance Requirements

NEDO-34188 Revision A

Level 16 Chapter Claim	Chapter 16 Argument	Sub-Sections and/or Reports that Evidence the Arguments
2.2 The BWRX-300 has been developed in accordance with approved procedures, with appropriate governance and assurance arrangements by a competent and clearly defined organization		
2.2.4 Future arrangements can be developed to support an operational facility including normal and emergency arrangements	<p>With further development of the design, OLC's can be identified that can support an overall safe operating envelope.</p> <p>Safe and Effective OLC's can be tested through implementation of SSCs and testing</p>	<p>16.2 Bases for Development</p> <p>16.4 Requirements for Limits and Conditions for normal operation, surveillance, and testing.</p> <p>16.3 Safety Limits</p>

NEDO-34188 Revision A

APPENDIX B FORWARD ACTIONS

Table B-1: Conduct of Operations Forward Actions

FAP No.	Finding	Forward Actions	Delivery Phase
PSR16-329	Specific technical specifications as well as details of the duty holder/licensee arrangements are not known. At this stage of the BWRX-300 design, the overall scope of the operational limits and conditions is limited. For example, the approach to developing Operating Limits and Conditions will be described, safety limits will be identified, however the content of individual Technical Specifications is outside the scope of this GDA.	Further detail to be added for Operating Limits and Conditions once future technical specifications and duty/holder licensee arrangements are known	Before Site License Application