HITACHI

GE Hitachi Nuclear Energy

Scott P. Murray
Manager, Facility Licensing

3901 Castle Hayne Road
P.O. Box 780
Wilmington, NC 28402
USA

T (910) 819-5950
scott.murray@ge.com

Proprietary Information Notice
Enclosure 3 to this letter contains GEH Proprietary information which is to be withheld from public disclosure in accordance with 10 CFR 2.390. Upon removal of Enclosure 3, the balance of this letter may be made public.

M230141

October 6, 2023

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-001

10 CFR 50.90

Subject: GEH License Amendment Request – Permanent Cessation of the GE Nuclear Test Reactor (NTR) and Possession Only Authorization

References:
1) NRC License R-33, Docket 0500073, General Electric Hitachi (GEH) Nuclear Test Reactor (NTR)
2) GEH Vallecitos Nuclear Center (VNC) Site Physical Security Plan (PSP), Revision 1 issued 10/11/22
3) Letter, D. Hardesty (NRC) to C. Martinez (GEH), Issuance of Renewed Facility Operating License No. R-33 for the NTR, 6/29/23 (ML23128A348)
4) GEH/NRC Meeting to Discuss NTR Disablement and Possession Only, 8/15/23
5) GEH Application for Consent to Direct Transfers of Control of Licenses and Related Conforming License Amendments, 9/1/23 (ML23244A246)

GE Hitachi Nuclear Energy Americas LLC (GEH) does not intend to continue operating the VNC NTR under NRC facility license R-33 (Reference 1) after 2023. GEH hereby requests that license R-33 be amended to remove the authority to operate the NTR, authorize possession-only of the reactor and fuel and remove operational requirements not needed for the possession only status.

Accordingly, on or before December 31, 2023, GEH commits to cease operation of the NTR, and the reactor will be permanently disabled by:

1) Installing and securing manual poison sheets around the core containment assembly
2) Rendering inoperative the mechanisms that permit removal of the neutron-absorbing safety and control rods from the reactor core, a step necessary to restart the reactor, and
3) The control room console key will be placed in the off position, removed, and be locked in a secured location away from the facility.

These actions will assure that the facility will not be capable of operating. GEH will maintain the reactor in permanent shutdown configuration at the designated VNC location in accordance with requirements and limitations set forth in the amended license.

GEH will also maintain in effect and fully implement all provisions of the NRC-approved physical security plan (Reference 2). The plan will be revised shortly after the NTR facility is shutdown to incorporate the 10 CFR 73.67(d) fixed site security requirements as needed.

Accordingly, GEH hereby requests that the following license conditions of license R-33 be amended as follows:

1.C Regarding facility operation should be deleted.

2.B.1 Pursuant to Section 104(c) of the Atomic Energy Act of 1954, as amended...."to possess, use and *maintain* the reactor as a utilization facility...(change operate to maintain)

2.B.2 Regarding the production of special nuclear material by the operation of the reactor should be deleted.

2.C.1 Regarding the licensee operating the reactor at a maximum power level should be deleted.

2.C.2 Regarding the licensee operating the facility in accordance with the Technical Specifications should be deleted.

GEH also requests this amendment be reviewed and approved in a timely fashion to allow transfer of the R-33 license by March 1, 2024 as requested in Reference 5.

Enclosure 1 to this letter is proposed amendments to the R-33 license technical specifications based on conditions analyzed in the possession only safety analysis.

Enclosure 2 to this letter is part 1 of a possession only license amendment safety analysis of the NTR disablement methods consistent with NUREG-1537, Part 1 "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors", February 1996.

Enclosure 3 to this letter is part 2 of a possession only license amendment criticality safety analysis of the NTR baseline subcritical configuration.

Please contact me if you have any questions regarding this matter.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Scott Murray

Scott Murray, Manager
Facility Licensing

Attachment: GEH Affidavit

Enclosures: 1) R-33 License Proposed Technical Specifications
2) Possession Only License Amendment Safety Analysis (Part 1)
3) Possession Only License Amendment Safety Analysis (Part 2) (Non-Public)

cc: NRC Region IV Administrator
J. M. Borromeo, Branch Chief, USNRC/NRR/DANU/UNPL
G. A. Wertz, USNRC/NRR/DANU/UNPL
C. Allen, USNRC/NMSS/DUWP/RDB
SPM 23-034

Attachment
GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Scott P. Murray, state as follows:

(1) I am the Manager, Licensing & Liabilities of GE-Hitachi Nuclear Energy (GEH), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is provided in Enclosure 3 to GEH's letter, M230141, Scott Murray to NRC Document Control Desk, entitled "GEH License Amendment Request – Permanent Cessation of the GE Nuclear Test Reactor (NTR) and Possession Only Authorization dated October 6, 2023. GEH proprietary information contained in Enclosure 3 is identified by the statement "GEH Proprietary Information Withhold from Public Disclosure Pursuant to 10 CFR 2.390."

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the Freedom of Information Act (FOIA), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for trade secrets (Exemption 4). The material for which exemption from disclosure is here sought also qualifies under the narrower definition of trade secret, within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975 F2d 871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F2d 1280 (DC Cir. 1983).

(4) The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. Some examples of categories of information that fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH constitutes a competitive economic advantage over GEH and/or other companies.

b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

c. Information that reveals aspects of past, present, or future GEH customer-funded development plans and programs, that may include potential products of GEH.

d. Information that discloses trade secret and/or potentially patentable subject matter for which it may be desirable to obtain patent protection.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to the NRC in confidence. The information is of a sort customarily held in confidence by GEH, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, not been disclosed publicly, and not been made available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary and/or confidentiality agreements that provide for maintaining the information in confidence. The initial designation of this information as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure are as set forth in the following paragraphs (6) and (7).

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, who is the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or who is the person most likely to be subject to the terms under which it was licensed to GEH.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and

determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary and/or confidentiality agreements.

(8) The information identified in paragraph (2) above is classified as proprietary because it contains details of GEH's processes, methods, design, or manufacturing facilities.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH. The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial. GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 5th day of October 2023.

Scott P. Murray
GE-Hitachi Nuclear Energy Americas LLC

STATE OF NORTH CAROLINA)
)
COUNTY OF __NEW HANOVER)

Subscribed and sworn to me, a Notary Public, in and for the State of North Carolina, this 5th day of October 2023.

Notary Public in and for the
State of North Carolina

Krystle Wohrman
NOTARY PUBLIC
New Hanover County, NC
My Commission Expires June 13, 2028

Enclosure 1
R-33 License Proposed Technical Specifications

GE HITACHI NUCLEAR ENERGY

NEDO 32765
Revision 7
October 2023

TECHNICAL SPECIFICATIONS FOR THE NUCLEAR TEST REACTOR FACILITY LICENSE R-33

TABLE OF CONTENTS

1 INTRODUCTION

This document constitutes the Technical Specifications for the GEH Nuclear Test Reactor as required by 10 CFR 50.36 and supersedes all prior Technical Specifications. This document includes the "basis" to support the selection and significance of the specifications. The Technical Specifications are based on the guidance provided in American National Standards Institute/ American Nuclear Society (ANSI/ANS) 15.1-2007, "The Development of Technical Specifications for Research Reactors" as modified by NUREG-1537, Part 1, Appendix 14.1, "Format and Content of Technical Specifications for Non-Power Reactors."

These Technical Specifications provide limits that assure reactor-related activity will be controlled in a way that protects the health and safety of the public, the environment, and on-*SITE* personnel. Areas addressed are Definitions, Limiting Conditions for Possession (LCP), Surveillance Requirements, Design Features and Administrative Controls.

1.1 DEFINITIONS

ADMINISTRATIVE CHANGE(S):

An editorial, non-technical change, which does not affect nuclear safety, personnel safety, security, quality, or change the intent of the document being changed.

CHANNEL(S):

The combination of sensors, lines, amplifiers, and output devices which are connected for the purpose of measuring the value of a parameter.

CHANNEL CALIBRATION:

A comparison and/or an adjustment of the *CHANNEL* so that its output corresponds with acceptable accuracy to known values of the parameter which the *CHANNEL* measures. Calibration *SHALL* encompass the entire *CHANNEL*, including equipment actuation, alarm, or trip test and *SHALL* include the *CHANNEL TEST*.

CHANNEL CHECK:

A qualitative verification of acceptable performance by observation of *CHANNEL* behavior. This verification where possible *SHALL* include comparison of the *CHANNEL* with other independent *CHANNELS* or systems measuring the same parameter.

CHANNEL TEST:

The introduction of a signal into the *CHANNEL* to verify that it is *OPERABLE*.

CONFINEMENT:

The enclosure of the overall *FACILITY* that is designed to limit the release of effluents between the enclosure and its external environment through controlled or defined pathways.

CONTROL ROD(S):

A non-scrammable device having an electric motor drive and containing boron-carbide material. These rods have been disabled and remain in the core per the *POSSESSION ONLY LICENSE SHUTDOWN CONFIGURATION*.

CORE CONFIGURATION:

See *POSSESSION ONLY LICENSE SHUTDOWN CONFIGURATION*.

EXPERIMENTAL FACILITY or EXPERIMENTAL FACILITIES:

Any location for an experiment which is on or against the external surfaces of the reactor main graphite pack, thermal column, or within any penetration thereof.

FACILITY:

That portion of building 105 composed of the NTR reactor cell, control room, north room, setup room, and south cell.

MANUAL POISON SHEET(S) (MPS):

Manually positioned devices containing cadmium material used to compensate for fuel burnout and maintain adequate negative reactivity inventory in the reactor to prevent attainment of criticality.

OPERABLE / INOPERABLE:

A system or component is / is not capable of performing its intended function.

OPERATING:

A component or system is performing its intended function.

POSSESSION ONLY LICENSE SHUTDOWN CONFIGURATION (POLSC):

That plant configuration that ensures the reactor will remain subcritical in the credible limiting accident analysis by restraining control rods, safety rods, and MPS in the positions assumed in criticality safety analysis. Details of the NTR POLSC are included in Section 5.

REACTOR MONITORING SYSTEM(S):

Those systems, including their associated input *CHANNELS*, that are designed to monitor important reactor parameters.

REACTOR SHUTDOWN CONFIGURATION:

All *SAFETY RODS*, *CONTROL RODS*, and in-service *MANUAL POISON SHEETS SHALL* remain in their respective fully inserted positions. See *POLSC*.

SAFETY ROD(S):

Spring-actuated scrammable devices containing boron-carbide material that have been disabled and remain in the core per the *POLSC*.

SHALL, SHOULD, AND MAY:

The word "*SHALL*" is used to denote a requirement; the word "*SHOULD*" is used to denote a recommendation; and the word "*MAY*" is used to denote permission, neither a requirement nor a recommendation.

SITE:

The area within the confines of the Vallecitos Nuclear Center (VNC) controlled by the LICENSEE (Refer to Safety Analysis Report, Figure 2-3).

SURVEILLANCE INTERVALS:

- Biennial – interval not to exceed 30 months.
- Annual – interval not to exceed 15 months.
- Semi-annual – interval not to exceed 7.5 months.
- Quarterly – interval not to exceed 4 months.
- Daily - *Must* be done during the calendar day.

2 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

2.1 SAFETY LIMITS

Applicability

These specifications are not applicable due to the reactor being in a *POLSC*. Reactor operations are not authorized.

2.2 LIMITING SAFETY SYSTEM SETTINGS

Applicability

These specifications are not applicable due to the reactor being in a *POLSC.* Reactor operations are not authorized.

3 LIMITING CONDITIONS FOR POSSESSION (LCP)

3.1 REACTOR CORE PARAMETERS

Applicability

Limiting conditions for operation are not applicable due to the reactor being in a *POLSC.* Reactor operations are not authorized. Fuel handling in support of defueling is the only activity allowed.

3.2 REACTOR CONTROL AND SAFETY SYSTEM

Applicability

These specifications apply to the reactor *SAFETY RODS, CONTROL RODS,* and *MPS* in a *POLSC*.

Objective

The objective is to ensure that the *SAFETY RODS CONTROL RODS,* and *MPS* remain fully inserted and *INOPERABLE.*

Specification

3.2.1 RODS *INOPERABLE*

All *SAFETY RODS* and *CONTROL RODS SHALL* be maintained *INOPERABLE* per the applicable conditions defined by the *POLSC.*

3.2.2 *MANUAL POISON SHEETS* SECURED

MPS slots SHALL be maintained per the applicable conditions defined by the *POLSC.*

Basis

Operation in accordance with LCP 3.2.1 and 3.2.2 ensures that the reactor remains safely sub-critical with adequate negative reactivity present to ensure reactor criticality does not occur.

3.3 REACTOR COOLANT SYSTEM

Applicability

This specification applies to the reactor primary coolant system when in a *POLSC.*

Objective

The objective is to minimize the adverse corrosion effects on reactor components.

Specification

3.3.1 FORCED FLOW COOLING

Light water forced coolant flow is *OPERABLE*. If this condition is not met corrective action *SHALL* be taken to restore operability within 90 days.

3.3.2 FUEL LOADING TANK FULL

The fuel loading tank *SHALL* be filled with water.

3.3.3 FUEL LOADING TANK LEVEL ALARM

The fuel loading tank low level alarm *SHALL* be maintained at 3 feet below the overflow or higher. A visible and remote alarm *SHALL* be available. Corrective action *SHALL* be taken if this condition is not met.

3.3.4 PRIMARY COOLANT CONDUCTIVITY

The specific conductivity of the primary coolant water *SHALL* be maintained less than 5 µS/cm.

Basis

Operation in accordance with LCP 3.3.1, 3.3.2, and 3.3.2 ensures that the primary pump provides for chemical mixing, flow through the primary water cleanup system, and

proper operation of the primary conductivity probe. Neither flow through, nor cooling of the fuel is credited in maintaining the fuel subcritical. Fuel loading tank level ensures that the reactor core tank is full and meets the criticality safety assessment bounding initial conditions and that adequate positive pump head pressure exists for primary pump operation. The minimum corrosion rate for aluminum in water (< 50°C) occurs at a pH of 6.5. Maintaining water purity below 5 µS/cm based upon an average of quarterly conductivity readings, will maintain the pH between 5.5 and 7.5. Operation in accordance with LCP 3.3.4 ensures aluminum corrosion is within acceptable levels.

3.4 CONFINEMENT

This section left intentionally blank.

3.5 REACTOR CELL, VENTILATION, AND CONFINEMENT SYSTEM

Applicability

This specification applies to the reactor cell ventilation systems when in a *POLSC.*

Objective

The objective is to limit the release of airborne radioactive materials to the environment.

Specification

3.5.1 REACTOR CELL NEGATIVE PRESSURE

The reactor cell *SHALL* be maintained at a negative pressure of not less than 0.5 in. of water with respect to the control room during performance of activities that could result in an airborne concentration of one DAC or greater in the reactor cell.

3.5.2 REACTOR CELL ACTIVITY RELEASE

Reactor cell ventilation system *SHALL* be *OPERATING* during performance of activities that could result in an airborne concentration of one DAC or greater in the reactor cell.

Basis

Operation in accordance with LCPs 3.5.1 and 3.5.2 ensures that potentially contaminated reactor cell air is released through the ventilation system filters. Since securing the ventilation system would confine airborne radiation in the reactor cell, the purpose of running the ventilation system is to strike a balance between maintaining safe levels for personnel in the facility and minimizing releases to the environment. Therefore, activities that are anticipated to generate an airborne concentration greater than one DAC locally are considered concerning and are performed only when the ventilation system is in operation.

As demonstrated in Chapter 13 of the NTR Safety Analysis Report, *CONFINEMENT* is not required to ensure radiological doses will not exceed 10 CFR 20 allowable limits.

3.6 EMERGENCY POWER

This section left intentionally blank.

3.7 RADIATION AND ENVIRONMENTAL MONITORING SYSTEMS

Applicability

This specification applies to the reactor cell area radiation monitor, the stack particulate activity monitor, and *SITE* monitoring with dosimeters.

Objective

The objective is to specify the radiation monitoring capabilities that *SHALL* be available to limit occupational radiation exposure and to ensure dose to members of the public due to direct exposure or airborne releases from NTR are below applicable limits.

Specification

3.7.1 AREA RADIATION MONITOR

A functional area radiation monitor* is required in the reactor cell and will alarm at 10 mr/hr.

*A functional area radiation monitor *SHALL* include:

- Instrument readout that is visible in the control room.
- a gamma-sensitive instrument
- A local audible alarm
- Alarm indication at a remote monitoring location

3.7.2 ENVIRONMENTAL MONITORING

The VNC *SITE* utilizes environmental air sampling stations and Optically Stimulated Luminescence (OSL) dosimeters in locations specified by the VNC Environmental Monitoring Manual.

3.7.3 STACK MONITOR OPERABILITY

The stack particulate activity monitor *SHALL* be *OPERATING* when any activity is performed in the *FACILITY* that could generate an airborne concentration greater than one DAC in the reactor cell and will alarm at 5.0E-10 µCi/cc. If the monitor is not functional, all evolutions that could cause such airborne releases *SHALL* be discontinued within the *FACILITY* and corrective action taken to restore functionality.

Basis

The radiation monitoring system provides information to *FACILITY* personnel regarding impending or existing danger from excess radiation. The stack particulate activity monitor is placed in service and operated continuously when reactor cell activities are capable of generating an airborne concentration greater than one DAC in the reactor cell. The alarm setpoint is derived from the normal background activity level.

3.8 EXPERIMENTS

Applicability

These specifications are not applicable due to the reactor being in a *POLSC*. Experiments are not authorized, and explosives are no longer stored in the *FACILITY*.

4 SURVEILLANCE REQUIREMENTS

4.1 REACTOR CORE PARAMETERS

Applicability

These specifications are not applicable due to the reactor being in a *POLSC.* Reactor operations are not authorized. Fuel handling in support of defueling is the only activity allowed.

4.2 REACTOR CONTROL AND SAFETY SYSTEM

Applicability

This specification applies to the surveillance requirements for *SAFETY RODS*, *CONTROL RODS*, and *MANUAL POISON SHEETS*.

Objective

The objective is to verify that the associated conditions of the *POLSC* are maintained.

Specification

4.2.1 *RODS* INOPERABLE

SAFETY RODS and *CONTROL RODS SHALL* be verified semi-annually to meet the conditions of the *POLSC.*

4.2.2 MANUAL POISON SHEETS SECURED

MANUAL POISON SHEET covers *SHALL* be verified semi-annually to be locked in place and the keys removed from the *FACILITY*.

Basis

Surveillance Requirement 4.2.1 ensures that each *SAFETY ROD* and *CONTROL ROD* is maintained IN*OPERABLE as required by the POLSC*.

Surveillance Requirement 4.2.1 ensures that each installed *MANUAL POISON SHEET* remains fully inserted and locked in position as required by the *POLSC*.

4.3 REACTOR COOLANT SYSTEM

Applicability

This specification applies to surveillance requirements of the primary coolant system.

Objective

The objective is to verify proper operation of the primary coolant cleanup system and the ability to monitor primary water chemistry.

Specifications

4.3.1 FORCED FLOW COOLING

The primary coolant flow instrument *CHANNEL CHECK SHALL* be performed quarterly and a *CHANNEL CALIBRATION* annually.

4.3.2 FUEL LOADING TANK FULL

The fuel loading tank level *SHALL* be visually checked quarterly.

4.3.3 FUEL LOADING TANK LEVEL ALARM

The fuel loading tank low level alarm *CHANNEL TEST SHALL* be performed quarterly.

4.3.4 PRIMARY COOLANT CONDUCTIVITY

The primary coolant conductivity instrument *CHANNEL CHECK SHALL* be performed quarterly and a *CHANNEL CALIBRATION* biennially.

Basis

Surveillance Requirement 4.2.1 ensures that primary coolant flow can be initiated and monitored allowing the primary cleanup system to OPERATE efficiently.

Surveillance Requirement 4.2.1 ensures that primary coolant conductivity can be accurately monitored.

4.4 CONFINEMENT

This section left intentionally blank.

4.5 REACTOR CELL, VENTILATION, AND CONFINEMENT SYSTEM

Applicability

This specification applies to surveillance requirements of the reactor cell ventilation system.

Objective

The objective is to verify proper operation of the ventilation system to ensure potentially

contaminated air is controlled and exhausted out the NTR discharge stack.

Specifications

4.5.1 REACTOR CELL NEGATIVE PRESSURE

The reactor cell differential pressure instrument *CHANNEL CHECK SHALL* be performed daily when the ventilation system is operating and a *CHANNEL CALIBRATION* annually.

4.5.2 REACTOR CELL ACTIVITY RELEASE

A *CHANNEL CHECK SHALL* be performed *DAILY* when the ventilation system is operating during activities that could generate an airborne concentration greater than one DAC in the reactor cell. A *CHANNEL CALIBRATION SHALL* be performed annually.

Basis

Operation in accordance with Surveillance Requirement 4.5.1 ensures that contaminated reactor cell air is exhausted through the ventilation system. This minimizes the possibility of an airborne contamination release to surrounding areas.

Operation in accordance with Surveillance Requirement 4.5.2 ensures that the required *CHANNEL is OPERABLE*, and that proper notification and surveillance will occur.

4.6 EMERGENCY POWER

This section left intentionally blank.

4.7 RADIATION AND ENVIRONMENTAL MONITORING SYSTEMS

Applicability

This specification applies to the surveillance requirements of radiation and environmental monitoring systems.

Objective

The objective is to ensure that radiation and environmental monitoring systems are *OPERATING* properly and to verify appropriate alarm set points.

Specification

4.7.1 AREA RADIATION MONITOR

Area Radiation monitor *CHANNEL CHECK SHALL* be performed quarterly and a

CHANNEL CALIBRATION annually.

4.7.2 ENVIRONMENTAL MONITORING

a. Monitoring of dose on *SITE* using Optically Stimulated Luminescence (OSL) dosimeters or other equivalent devices *SHALL* be performed and documented annually.

b. Environmental monitoring (e.g., sampling of soil and vegetation) *SHALL* be performed and documented annually.

4.7.3 STACK MONITOR OPERABILITY

Stack particulate activity monitor *CHANNEL CHECK SHALL* be performed daily when ventilation is required to be operated, and a *CHANNEL CALIBRATION* annually.

Basis

Operation in accordance with Surveillance Requirements 4.7.1 and 4.7.3 ensures that the monitoring systems are periodically tested and checked to maintain the instruments OPERABLE.

Based on experience at this *SITE*, the monitoring frequency of Surveillance Requirement 4.7.2 is adequate to conform to specification 3.7.2.

4.8 EXPERIMENTS

These specifications are not applicable due to the reactor being in a *POLSC.* Experiments are not authorized.

5 DESIGN FEATURES

5.1 SITE AND FACILITY DESCRIPTION

5.1.1 *FACILITY* LOCATION

The Nuclear Test Reactor (NTR) *FACILITY is* located on the *SITE* of the Vallecitos Nuclear Center (VNC).

5.1.2 CONTROLLED AREA AND RESTRICTED AREA TERMINOLOGY

The controlled area, as defined in 10 CFR Part 20 of the Commission's regulations, is the area within the VNC *SITE* boundary. The restricted area, as defined in 10 CFR Part 20 of the Commission's Regulations, is the NTR *FACILITY*.

5.1.3 EFFLUENT DISCHARGE

The discharge of all gaseous radioactive effluents *SHALL* be from the effluent stack at a minimum height of 45 feet (14 meters) above the grade level of Building 105.

5.2 REACTOR PRIMARY COOLANT SYSTEM

5.2.1 PRIMARY SYSTEM PRESSURE

The reactor coolant system is maintained at atmospheric pressure by a vent line to the holdup tank and the top of the fuel tank being open to the reactor cell.

5.3 REACTOR CORE AND FUEL

5.3.1 POSSESSION ONLY LICENSE SHUTDOWN CONFIGURATION (POLSC)

Rods

- *SAFETY ROD* drive belts removed
- *SAFETY RODS* electrically isolated
- Course *CONTROL ROD* drive chains removed
- *CONTROL RODS* electrically isolated

MPS

- *MPS* containing ½, 0.9, and a full sheet are installed and latched in slots #1, 2, and 5.
- *MPS* covers installed, locked and the keys removed from the *FACILITY*

Primary coolant

- Primary coolant cleanup system is *OPERABLE*
- Fuel loading tank is filled with water

5.3.2 CORE REEL ASSEMBLY

The fuel assemblies *SHALL* be positioned in a reel assembly inside the core tank. The core reel assembly *SHALL* be rotated only during authorized fuel handling activities and by manual operation of a crank inside the NTR cell.

5.3.3 TEMPERATURE COEFFICIENT OF REACTIVITY

The core is designed to exhibit a negative temperature coefficient of reactivity above 124°F, which is approximately the reactor steady-state operating temperature.

5.4 FISSIONABLE MATERIAL STORAGE

5.4.1 FUEL STORAGE

Fuel is stored in the as-designed core (Refer to SAR, Chapter 4.2). Fuel handling prior to defueling the core is not authorized. No other fuel or fuel devices are authorized at the *FACILITY*.

6 ADMINISTRATIVE CONTROLS

6.1 ORGANIZATION

The NTR *SHALL* be owned and operated by the LICENSEE with management and operations organization as shown in Figure 6-1.

6.1.1 STRUCTURE

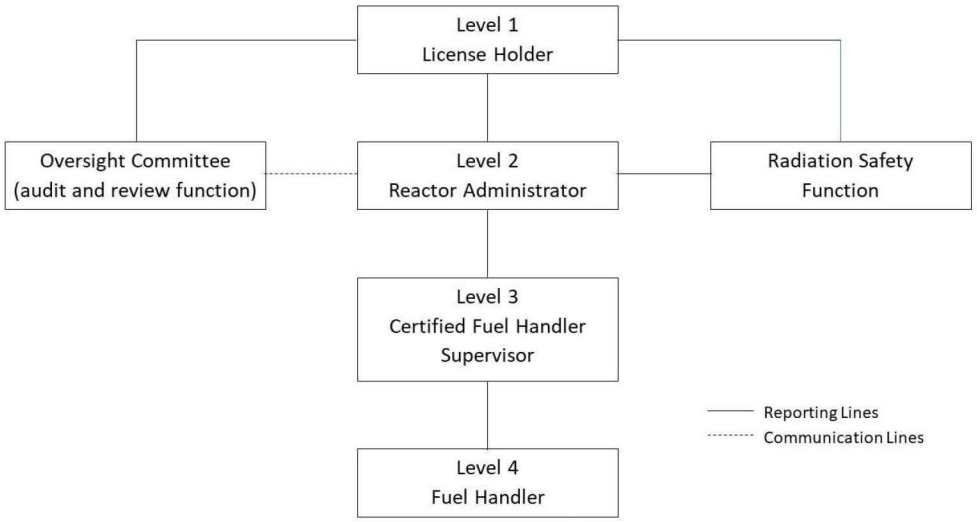

Figure 6-1 *FACILITY* Organization

6.1.2 RESPONSIBILITIES

(1) The Level 1 License Holder *SHALL* be responsible for the NTR *FACILITY* LICENSE.

(2) The Level 2 Reactor Administrator is responsible for ensuring security and safety of the *FACILITY*.

(3) Certified Fuel Handler Supervisor is responsible for daily fuel handling operations and ensures the fuel handling operations are done safely, that staffing is adequate, and that fuel handlers have current documented training and qualifications..

(4) Fuel Handler performs fuel handling operations under the direction of the Certified Fuel Handler Supervisor.

(5) Responsibilities of one level *MAY* be assumed by alternates when designated in writing.

6.1.3 STAFFING

The reactor cannot be operated and fuel movement prior to defueling is not permitted under the POL. A Certified Fuel Handler Supervisor *SHALL* be present at the NTR *FACILITY* during fuel relocations.

6.1.4 SELECTION AND TRAINING OF PERSONNEL

(1) The Level 2 Reactor Administrator will meet minimal standards for this position that include a cumulative 5 years of reactor operations, with 2 years in an occupational radiation exposure program, and 2 years of personnel supervisory experience. Variations in this standard shall be justified in writing by the Level 1 License Holder

(2) Certified fuel handlers will be trained in accordance with an NRC approved training program for NTR.

6.2 REVIEW AND AUDIT

6.2.1 COMPOSITION AND QUALIFICATIONS

(1) The Oversight Committee SHALL conduct routine audits and perform periodic reviews of the implementation of these Technical Specifications.

(2) The Oversight Committee SHALL be composed of the Level 2 Reactor Administrator and a member of radiation protection staff along with at least three individuals having expertise in reactor technology or radiation protection. Members SHALL be appointed by the Level 1 License Holder.

6.2.2 CHARTER AND RULES

The Oversight Committee *SHALL* be conducted under a written charter including provisions for:

(1) A meeting frequency of not less than once per calendar year.

(2) Allowing only one vote for each member or alternate for each issue reviewed.

(3) Quorum rules whereby a quorum is at least one-half of the voting members.

(4) The use of support organizations.

(5) Maintenance of records; including the dissemination, review, and approval of minutes.

6.2.3 REVIEW FUNCTION

Activities requiring review *SHALL* include the following:

(1) Determinations that proposed changes in equipment, systems, tests, or procedures are allowed without prior NRC approval as determined by 50.59 evaluation.

(2) All new procedures and major revisions of existing procedures having safety significance that are required by the administrative control specifications in Administrative Controls Section 6.4.

(3) Proposed changes to the Technical Specifications or the FACILITY operating LICENSE.

(4) Violations of Technical Specifications, and FACILITY LICENSE requirements.

(5) Audit Reports.

6.2.4 AUDIT FUNCTION

Audits SHALL include examination of records, logs, and documents as well as discussions with staff and observations as appropriate. Deficiencies *SHALL* be reported to the Level 1 reactor administrator as soon as identified and a written report of the findings of the audit submitted to the Oversight Committee within 3 months after the audit has been completed. The following *SHALL* be audited:

(1) FACILITY operation for conformance to these Technical Specifications and applicable LICENSE conditions: at least once per calendar year not to exceed 15 months between audits.

(2) Certified Fuel Handling training program: at least once every other calendar year not to exceed 30 months between audits.

(3) The results of condition reports initiated relative to the NTR: once per calendar year not to exceed 15 months between audits.

(4) NTR emergency response implementing procedures: once every other year not to exceed 30 months between audits.

6.3 RADIATION SAFETY

The Level 2 Reactor Administrator (or the Level 3 Certified Fuel Handler Supervisor in his absence), in coordination with the VNC Radiation Safety Officer (RSO), *SHALL* be responsible for implementing the NTR radiation safety function. The RSO *SHALL* report relevant findings to the Level 2 Reactor Administrator but *SHALL* report organizationally to the Level 1 License Holder, thereby maintaining independence from the production

organization. The radiation safety function is informed by the guidelines of the ANSI/ANS 15.11-2016, “Radiation Protection at Research Reactor Facilities."

6.4 PROCEDURES

Written procedures *SHALL* be prepared, reviewed, and authorized prior to initiating any of the activities listed in this section. Because the VNC is a multi-license *FACILITY*, procedures implementing elements of *SITE*-wide programs (i.e., radiation protection, emergency planning, security) are authorized by the Level 1 License Holder. NTR-specific implementing procedures as components of those larger programs and non-administrative changes to those procedures *SHALL* be authorized by the Level 2 Reactor Administrator. Procedures exclusive to the implementation of administrative and operational requirements of the NTR Licensing basis and their revisions *SHALL* be authorized by the Level 2 Reactor Administrator or his designated alternate(s) according to this section. Several of the activities in Administrative Control **Error! Reference source not found.** *MAY* be included in a single manual or set of procedures or divided among various manuals or procedures.

6.4.1 WRITTEN PROCEDURES

Written procedures *SHALL* be prepared for the following activities as required:

(1) Fuel Handling - Defueling. These may be maintained inactive as fuel handling will not be performed under the POL prior to defueling.

(2) Preventive or corrective maintenance which could have an effect on the safety of the fuel in storage, including the replacement of components.

(3) Surveillance checks, tests, calibrations, and inspections required by the Technical Specifications.

(4) NTR-specific radiation protection program implementing procedures for personnel safety consistent with applicable regulations or guidelines. Management commitment and programs to maintain exposures and releases as low as reasonably achievable *SHALL* be a component of the *SITE*-wide radiation protection program.

(5) NTR-specific implementing procedures for the *SITE*-wide emergency and security plans.

(6) NTR-specific radiation protection program implementing procedures for the use, receipt, and on-SITE transfer of by-product material for such activities

performed under the R-33 LICENSE.

6.4.2 ADMINISTRATIVE CHANGES TO PROCEDURES

(1) *ADMINISTRATIVE CHANGES* to procedures required by Administrative Control 6.4.1 MAY be made by the Level 3 certified fuel handler supervisor or Level 2 reactor administrator before implementation.

(2) *ADMINISTRATIVE CHANGES* made by authorization of the Level 3 Certified Fuel Handler Supervisor *SHALL* be subsequently approved by the Level 2 Reactor Administrator.

6.4.3 TEMPORARY DEVIATIONS

Temporary deviation from established procedures *MAY* be made by a Level 3 Certified Fuel Handler Supervisor in order to deal with special or unusual circumstances. These deviations *SHALL* be documented and reported to the Level 2 Reactor Administrator by the end of the next working day.

6.5 EXPERIMENTS REVIEW AND APPROVAL

Experiments are no longer performed at the NTR.

6.6 REPORTS

6.6.1 OPERATING REPORTS

A routine operating report providing the following information shall be submitted to the NRC Document Control Desk in accordance with the provisions of 10 CFR 50.59 not to exceed 24 months:

(1) Tabulation of major preventive and corrective maintenance operations having safety significance.

(2) A report in accordance with 10 CFR 50.59(d)(2) containing a brief description of any changes, tests, and experiments, including a summary of the evaluation of each.

(3) Summarized results of environmental surveys performed outside the *FACILITY*.

(4) A summary of exposures received by *FACILITY* personnel and visitors where such exposures are greater than 25% of that allowed or recommended.

6.6.2 SPECIAL REPORTS

Special reports are used to report unplanned events as well as planned major *FACILITY* and administrative changes. The following special reports *SHALL* be forwarded to the

NRC addressed in accordance with 10 CFR 50.4:

(1) There *SHALL* be a report not later than the following working day by telephone and confirmed in writing by telegraph or similar conveyance to the NRC, to be followed by a written report within 14 days, that describes the circumstances of any of the following events:

(a) Release of radioactivity from the SITE above allowed limits.

(b) Abnormal and significant degradation in reactor fuel, cladding, or coolant boundary, which could result in exceeding prescribed radiation limits for personnel or the environment.

(2) There *SHALL* be a written report within 30 days to the NRC for:

(a) Permanent changes to the *FACILITY* organization involving Level 1 or Level 2 management.

(b) Significant changes to the transient or accident analysis as described in the CSA 008N0128.

(c) There *SHALL* be a notification made to the NRC by telephone not later than 10 days following any combination of failures in equipment or administrative radiological work controls that result in a worker being assigned an unplanned dose equal to or greater than 100 mrem Total Effective Dose Equivalent (TEDE) or a spill of more than 1,000 gallons of contaminated liquid waste on uncovered (bare) soil.

6.7 RECORDS

Records *MAY* be in the form of logs, data sheets, or other suitable forms. The required information *MAY* be contained in single, or multiple records, or a combination thereof.

6.7.1 RECORDS TO BE RETAINED FOR A PERIOD OF AT LEAST FIVE YEARS OR FOR THE LIFE OF THE COMPONENT, WHICHEVER IS LESS:

(1) Normal reactor *FACILITY* operation (supporting documents such as checklists, log sheets, etc., *SHALL* be maintained for a period of at least one year).

(2) Principal maintenance operations.

(3) Reportable occurrences.

(4) Surveillance activities required by the Technical Specifications.

(5) Reactor *FACILITY* radiation and contamination surveys where required by

applicable regulations.

(6) Experiments performed with the reactor.

(7) Fuel inventories, receipts, and shipments.

(8) Approved changes in operating procedures.

(9) Records of meeting and audit reports of the review and audit groups.

6.7.2 RECORDS OF THE REQUALIFICATION PROGRAMS

Records of the requalification programs *SHALL* be maintained in accordance with 10 CFR 55.59(c)(5).

6.7.3 RECORDS TO BE RETAINED FOR THE LIFETIME OF THE REACTOR FACILITY

Note: Applicable annual reports, if they contain all the required information, *MAY* be used as records in this section.

(1) Gaseous and liquid radioactive effluents released to the environs.

(2) Off-*SITE* environmental-monitoring surveys required by the Technical Specifications.

(3) Radiation exposure for all personnel monitored.

(4) Drawings of the reactor *FACILITY*.

Enclosure 2
GEH Possession Only License Amendment Safety Analysis of the NTR (Part 1)

GE Nuclear Test Reactor
Possession-Only License Safety Analysis

Contents

A. Document Purpose

According to Section 17.2 of NUREG-1537, this safety analysis describes and analyses the GE Nuclear Test Reactor (NTR) and explains the provisions established to control reactor-related radioactivity to protect the health and safety of the public while the reactor is held in possession-only status. Included as a separate enclosure is a criticality safety analysis (CSA 008N0128) that provides detailed bounding for credible criticality accident scenarios while the NTR remains in its Possession-Only License Shutdown Configuration (POLSC).

B. Facility Description

GE designed and constructed the Nuclear Test Reactor (NTR) as part of the experimental facilities at its Vallecitos Nuclear Center (VNC) Site in Alameda County, California. The reactor was designed as an experimental physics tool to advance the company's nuclear energy programs. GE-Hitachi Nuclear Energy Americas LLC (GEH) currently operates the NTR facility for:

(1) neutron radiography (neutrography) of radioactive and nonradioactive objects,
(2) small sample irradiation and activation,
(3) sensitive reactivity measurements,
(4) training, and
(5) calibrations and other testing utilizing a neutron flux.

The NTR is a heterogeneous, highly enriched-uranium, graphite-moderated and reflected, light water-cooled, thermal reactor, licensed to operate at power levels not in excess of 100 kW (thermal). It has a confinement building to restrict the release of radioactivity to the environment, diversity and redundancy of instruments and controls and extremely low operating heat flux and temperatures.

The NTR is located at the Vallecitos Nuclear Center (VNC), which is largely undeveloped grasslands within the Livermore Upland physiographic area. VNC is situated on the north side of Vallecitos Valley in Southern Alameda County within five miles of Livermore and Pleasanton and approximately 35 air miles east-southeast of San Francisco and 20 air miles north of San Jose.

GE Nuclear Test Reactor
Possession-Only License Safety Analysis

Vallecitos Valley is approximately two miles long and 1 mile wide. The valley is at an elevation of 400 to 500 feet above sea level and is surrounded by barren mountains and rolling hills. There is very little commercial and residential development in the valley. The VNC Site slopes upward from about 400 feet at its relatively flat southern end to a 1,200-foot ridge on the north. The southern end of the property slopes slightly to the southwest where it drains through ditches to Vallecitos Creek which then discharges to Arroyo de la Laguna near the north end of Sunol Valley - two or three miles southwest of the property.

C. Hazards

All SNM and non-reactor-related byproduct material has been removed from the NTR facility except for the fuel in storage in the reactor.

Because GEH is requesting that this POL be issued with the reactor fuel remaining in the reactor, modifications will be made to the facility according to the POL Shutdown Configuration (POLSC) to maintain the reactor subcritical. These modifications are comprised of both administrative revisions to Technical Specifications (TSs) and physical alterations in facility configuration.

Modifications discussed in other "hazards" in this section ensure the remaining NTR source term does not escape from the facility and result in a release of radioactive materials to the environment exceeding the limits of 10 CFR 20.1201 for occupational workers or 10 CFR 20.1301 for members of the public.

Criticality Safety

Definitions pertaining to operating and/or operation of the reactor have been removed from the TSs. Definitions for "reactor shutdown" and "reactor secured" are replaced with the proposed definition for "reactor shutdown configuration", which is: "All SAFETY RODS, CONTROL RODS, and in-service MANUAL POISON SHEETS (MPS) shall remain in their respective fully inserted positions." This definition of "reactor shutdown configuration" is equivalent to the definition for "baseline subcritical configuration" given in the enclosed GEH Criticality Safety Assessment[1]. Both terms are concerned with holding the initial conditions for the bounding criticality analysis invariable by restraining movable poisons in the core with sufficient negative reactivity to keep the reactor subcritical.

A definition for POLSC has been added to the proposed TSs to describe the facility modifications that maintain the reactor shutdown configuration. The POLSC is described in the Enclosure, GEH Criticality Safety Assessment, and details are included as design features in section 5 of the proposed TSs. The POLSC includes modifications that are verifiable through surveillance, including verification that manual poison sheets (MPS) remain locked in place and inserted control and safety rod are restrained by removing their drive linkages and electrically isolating their motors.

[1] CSA 008N0128 is included as Enclosure 3 to this letter.

GE Nuclear Test Reactor
Possession-Only License Safety Analysis

Release of Radioactive Material to the Environment Consequential to Cladding Failure

Fuel cladding thickness is discussed in section 16.1 of the SAR[2] and is noted as being half of its original thickness after more than 60 years of operation. Chronic fuel cladding degradation is mitigated by ensuring primary coolant water conductivity remains below 10 µS/cm. Proposed TS 3.3.4 requires that conductivity in the primary coolant be maintained less than 5 µS/cm based on an average of quarterly conductivity readings. The potential release of radioactive material resulting from failure of the cladding is continuously monitored. Cladding integrity has been confirmed by periodic sampling for Sr-91 and Sr-92; however, this practice will be discontinued following cessation of operation as the short half-lives of these fission products will result in their rapid depletion from the primary system. Because the primary coolant system continuously vents directly into the reactor cell, increases in radioactivity are detectable by the stack monitoring system discussed in chapter 11 of the SAR when the ventilation system is operating, and at all times by the local reactor cell radiation monitor discussed in section 7.7 of the SAR. Setpoints for these alarms have been included in proposed TS 3.7.1 as 10 mrem/hr for the radiation monitor and TS 3.7.3 as 5.0E-10 µCi/cc for the particulate monitor. These alarms are set at slightly above normal background levels. Both alarms are announced in the control room and the radiation monitor alarms remotely. Details about fuel cladding thickness were previously provided to the NRC.[3]

Release of Radioactive Material to the Environment from Primary Cooling Leakage

Any potential leakage of primary coolant into the reactor cell would be collected in the cell sump and result in a sump high level alarm when water level reaches one foot in the sump. This water would then be pumped to the 500-gallon holding tank as described in section 5.2 of the SAR. A substantial loss of coolant would cause a low-level fuel loading tank alarm at 8 inches below the tank overflow. This is described in section 5.5 of the SAR. The reactor cell radiation monitor would then alarm at 10 mrem/hr. if water level were to drop low enough in the core tank to impact water attenuation. All these alarms occur in the control room and remotely. Details of level alarms were previously provided to the NRC.[4]

Because cooling of the fuel is not credited in maintaining the reactor shut down, the secondary cooling system has no design function relative to the POLSC and will be secured. To prevent heat exchanger cross-tube leakage from escaping to the retention basins through the pathway described in section 5.3 of the SAR, both the secondary inlet and outlet heat exchanger isolation valves will be closed and the drain valve for the tube side of the heat exchanger will remain open so that any cross-tube leakage will drain to the reactor cell sump. In addition, routine retention basin pre-discharge

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[2] Revision 5 of the NTR SAR, dated March 31, 2023 (Agencywide Documents Access and Management System [ADAMS] accession # ML23086C028)

[3] Enclosure to GEH Supplemental Information Supporting GE Nuclear Test Reactor License Renewal Audit – Audit Questions and Responses, Question 023, submitted on January 27, 2023 (ADAMS accession # ML23027A211)

[4] Enclosure to GEH Supplemental Information Supporting GE Nuclear Test Reactor License Renewal Audit – Audit Questions and Responses, Question 001, submitted on September 22, 2021 (ADAMS accession # ML21265A247 [cover letter]).

sampling described in Section 5.3 of the SAR will continue so that any leakage across the heat exchanger outlet isolation valve would be detected before it would be released offsite.

Release of Radioactive Material to the Environment by Way of the Experimental Facilities

The limiting experiment design basis accident for the NTR described in section 13.6 of the SAR is a fueled experiment accident involving the rupture of a U-235 capsule within the facility. Since all experiments have been discontinued at the NTR this bounding analysis is now superseded by the accident case in CSA 008N0128. The TS definition of "experiment" has been edited to clarify that experiments are no longer performed using the NTR. TS sections 3.8, 4.8, and 6.5, dealing with experiment implementation and review and approval have been likewise edited. Access to the experimental facilities is controlled by locked doors. Because the experimental facilities are non-operational, a release from these facilities is not a credible hazard.

Release of Radioactive Material to the Environment due to an Accidental Explosion

An accidental explosion is discussed in section 13.6.3 of the SAR and limits for storage are in TSs 3.8.3, 3.8.4, 3.8.7, 3.8.8, and 3.8.9. Under the POL, no explosive materials will be stored in the facility, so that an accidental explosion is not a credible hazard under the POLSC. These related TSs have been removed and proposed TS section 3.8 updated to indicate that explosives are not stored in the facility.

Release of Radioactive Material to the Environment due to Natural Phenomena

Natural Phenomena were considered in CSA 008N0128 which concluded that the most credible event, a seismic event, would not cause a criticality accident. The potential for damage to the facility from a seismic event is otherwise discussed in sections 3.4 and 13.4.6 of the SAR. As previously communicated to the NRC, none of the analyzed accidents in section 13.4 of the SAR (including a seismic event) produce unacceptable consequences that would result in exceeding the limits of 10 CFR 20.1301 for members of the public.[5]

Zirconium Fire

Zirconium fire is only mentioned here because of the heightened concern for fuel stored in water (spent fuel pools) during decommissioning and given that the NTR POLSC will store fuel under water in the reactor. Because NTR fuel, as described in section 4.2.1 of the SAR, is composed using aluminum cladding, a zirconium fire is not a credible hazard at the NTR.

D. POLSC System Operability

Reactor Safety and Safety-Related Systems

Because they are unnecessary in the POLSC, the following systems will be removed from operation.

- The instrument control system described in section 7.1 of the SAR.

[5] Enclosure to GEH Supplemental Information Supporting GE Nuclear Test Reactor License Renewal Audit – Audit Questions and Responses, Question 012, submitted on September 22, 2021 (ADAMS accession # ML21265A247 [cover letter])

- Scram systems listed in SAR Table 7-1 and TS Table 3-1 with the following note:
  - The primary coolant flow system will be retained to the extent necessary to provide flow and conductivity indication and chemical mixing for the primary coolant system.
  - Table 3-1 has been removed and specifications have been included within the proposed TSs.
- Reactor safety-related items in SAR Table 7-2 and TS Table 3-2 with the following notes:
  - The reactor cell pressure system will be retained to the extent necessary to provide pressure indication for the reactor cell. This provides confirmation of proper operation of the ventilation system when the system is operated to support proposed TS 3.5.2.
  - The fuel loading tank water level system will be retained to the extent necessary to provide level indication for the fuel loading tank, which provides confirmation that the reactor core can is full. The level alarms associated with the fuel loading tank will be maintained operational to provide early notification of coolant leakage.
  - The stack radioactivity monitoring system will be retained to the extent necessary to provide as-needed particulate monitoring of stack discharges (See Ventilation System below.).
  - Table 3-2 has been removed and specifications have been included within the proposed TSs.

Experimental Facilities

The experimental facilities described in section 10.3 of the SAR are not operable. TS sections 3.8, 4.8, and 6.5, dealing with experiment implementation and review and approval have been edited in the proposed TSs to reflect that experiments are not authorized in the NTR. Access to the experimental facilities is controlled by locked doors.

Secondary Cooling System

The secondary cooling system described in section 5.3 of the SAR will be secured by closing the coolant heat exchanger inlet and outlet valves and opening the tube-side heat exchanger drain valve and locking them in these positions. The rationale and justification for this lineup is discussed in detail in the Hazards section of this document.

Radiation Monitoring System

The radiation monitoring systems and area radiation monitors described in sections 16.4 and 7.7 of the SAR and 3.7 and 4.7 of the TSs will not be maintained operational except for the reactor cell radiation monitor. The reactor cell radiation monitor is a fixed gamma monitor that will alarm locally and remotely in the event it detects 10 mrem/hr in the reactor cell. This could result from a catastrophic loss of primary coolant or any condition that could increase radiation levels in the cell (for example, a criticality accident). The remaining four installed radiation monitors provide information to ensure operations personnel are not exposed to excess radiation during operation, irradiated experiment handling, and maintenance activities. Since the reactor has been permanently shut down and experiments are no longer performed, these monitors are no longer needed and will not be maintained operational. Maintenance performed in the reactor cell will be performed under the oversight of the radiation safety function according to section 6.0 of the proposed TSs.

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Primary Coolant System

The reactor fuel is contained within the reactor cell as described in sections 1.3 and 3.5 of the SAR. The POLSC includes the continued (though not continuous) operation of the primary cooling system to provide ongoing chemistry control for the fuel cladding. Flow through the system is necessary for the operation of the conductivity meter and to ensure mixing of chemistry throughout the system. Cooling of the fuel by the primary cooling system is not credited in the criticality safety analysis. Therefore, continuous operation of the primary cooling pump is not required; however, proposed TS 3.3.1 ensures that an inoperable pump will be restored to operability within 90 days or other means implemented to reasonably ensure conductivity remains below 5 µS/cm while pump operability is restored. Proposed TS surveillances 4.3.1, 4.3.2, and 4.3.4 ensure instruments in the primary coolant system continue to provide dependable confirmation of the fidelity of the POLSC.

Control & Safety Rods

The control and safety rods are fully inserted and restrained in the reactor by removing their drive motor linkages and isolating their motors electrically by removing inline fuses and relays (**See Figure 1**). Proposed TS surveillance 4.2.1 periodically verifies that rod configuration remains consistent with the POLSC.

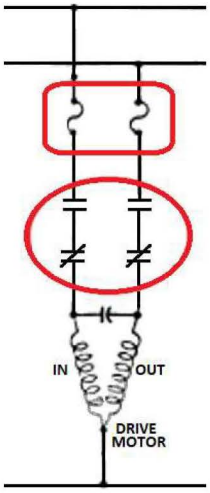

Figure 1 Typical Rod Drive Power (Simplified)

MPS

MPS are discussed in sections 3.1, 3.5, and 4.2.2 of the SAR. Contrary to the description given in section 3.1 of the SAR, additional MPS have been installed according to CSA 008N0128. Proposed TS 3.2.2 and surveillance 4.2.2 provide ongoing verification that the MPS configuration remains consistent with the POLSC and that the MPS covers are locked, and keys are controlled as a means to verify proper unaltered configuration. Details of the MPS latching and locking mechanisms and relative position of MPS in the reactor have been previously provided to the NRC.[6]

Ventilation System

The NTR ventilation system is described in sections 3.5 and 9.1 of the SAR. The ventilation system is required to be in service by TS 3.5.1 when the reactor is above 0.1 kW. Proposed TS 3.5.1 recognizes that the reactor is shut down and that negative pressure need only be verified when the ventilation system is operated during qualifying activities - those that could generate greater than one local Derived Air Constant (DAC) of airborne radioactivity (10 CFR 20, Appendix B, Table 1, Column 3).

TS 3.5.2 requires that the ventilation system be in service when activities are being performed that could release airborne radioactivity into the reactor cell. While the ventilation system does aid in confining releases of radioactive materials to the reactor cell, it is not credited for mitigating the limiting accident scenario described in section 13.6 of the SAR. Neither is it credited in CSA 008N0128 to mitigate the effects of an analyzed criticality accident. Because decommissioning work

[6] Enclosure to GEH Supplemental Information Supporting GE Nuclear Test Reactor License Renewal Audit – Audit Questions and Responses, Questions 002, 004, and 024, submitted on September 22, 2021, (ADAMS accession # ML21265A247 [cover letter]).

will not be permitted under the POL, it is inconceivable that any activities will be performed within the reactor cell that will meet the intended threshold of TS 3.5.2 until defueling of the reactor begins. Therefore, proposed TS 3.5.2 requires that the ventilation system be operating during qualifying activities. Maintenance of the ventilation system, including its filters, will continue to ensure the system remains viable and available when needed and the particulate channel will likewise be maintained to provide validation of local air sampling.

The function of the ventilation system and its monitoring system relative to environmental effluence is discussed in Chapter 11 of the SAR. Effluent from the NTR is dominated by activation and fission products produced during operation (Ar-41, I-131, Np-237). In the POLSC, no effluents will be generated, and so the stack monitor channels do not provide relevant input to the environmental monitoring program. This is further discussed in the Administrative Changes section of this document.

Balance of Plant

Other support systems discussed in Chapter 9 of the SAR will be maintained operable as necessary to support ongoing maintenance of the facility and eventual decommissioning activities.

E. Staffing Changes

TS section 6.0 has been modified to reflect changes in staffing and POL administrative structure. Facility management positions have been replaced with non-operational counterparts with similar responsibilities. Proposed TSs 5.4.1 and 6.4.1(1) clarify that, except for defueling of the reactor, fuel handling evolutions are not permitted under the POL.

The Level 1 License Holder is the license holder of name and is ultimately responsible for the safe operation of the facility relative to the health and safety of staff and the public and is the Manager of the Vallecitos Nuclear Center. To that end, the radiation safety function reports to the Level 1 License Holder and the Level 1 License Holder serves as chair of the site oversight committee. Selecting members of staff and ensuring the fidelity of staff training and qualifications programs are responsibilities of the Level 1 License Holder. The Level 1 License Holder also authorizes procedures and changes to non-NTR specific procedures that implement site-wide programs (i.e., Security, Emergency Planning, Radiation Protection).

The Level 2 Reactor Administrator reports to the Level 1 License Holder. The Level 2 Reactor Administrator will meet the minimum experience requirements of TS 6.1.4 and will coordinate with the radiation safety function to implement the radiation protection program in the NTR facility. The Level 2 Reactor Administrator is responsible for routine oversight of the NTR and authorizes all NTR-specific implementing procedures and procedure changes to those procedures governing fuel handling, maintenance, surveillances, NTR administration, and NTR-specific procedures that implement elements of site-wide programs (i.e., Security, Emergency Planning, Radiation Protection).

The Radiation Safety Function is under the authority of the RSO. The RSO implements the radiation protection program site-wide and reports to the Level 1 License Holder. The RSO reports relevant findings concerning radiation safety at the NTR to the Level 2 Reactor Administrator.

The Level 3 Certified Fuel Handler Supervisor reports to the Level 2 Reactor Administrator. License operators will be replaced with fuel handlers in preparation for final defueling. These fuel handlers will be certified as the result of receiving training through an NRC-approved training program. The Level 3 Certified Fuel Handler Supervisor is responsible for daily fuel handling operations and ensures the fuel handling operations are done safely, that staffing is adequate, and that fuel handlers have current documented training and qualifications. The Level 3 Certified Fuel Handler Supervisor has the authority to authorize a temporary deviation to a procedure involved with fuel handling but must document that deviation and report it to the Level 2 Reactor Administrator by the end of the next working day. Proposed TS 6.1.3 requires that a Level 3 Certified Fuel Handler Supervisor be at the NTR when fuel is moved within the core region.

The Level 4 Fuel Handler performs the hands-on manipulations involved in fuel handling under the direction of the Level 3 Certified Fuel Handler.

F. Administrative Changes

Review and Audit Functions:

The review and audit functions will be performed by a chartered site oversight committee that may or may not retain the name "Vallecitos Technological Safety Council" as discussed in section 11.1.2 of the SAR. The oversight committee will be chaired by the individual site manager responsible for the site health and safety function. The oversight committee will assume the audit function previously assigned to the Regulatory Compliance function in section 12.2.3 of the SAR. The oversight committee will be composed of at least five members, including the Level 2 Reactor Administrator, a member of the radiation protection staff, and at least three individuals having expertise in reactor technology or radiation protection. Appointment to the oversight committee will be by the Level 1 License Holder.

The oversight committee is responsible for reviewing:

- Safety reviews performed pursuant to 10 CFR 50.59 that conclude a change does not require prior NRC approval.
- New and major revisions to procedures required under TS Administrative Controls Section 6.4 having safety significance.
- Proposed changes to TSs or the facility POL.
- Violations of TSs and the POL.
- Audit reports.

The oversight committee is responsible for auditing:

- That the FACILITY is maintained according to TSs and the POL at least once per calendar year, not to exceed 15 months between audits.
- The Certified Fuel Handler training program at least once every other calendar year, not to exceed 30 months between audits.
- The results of condition reports initiated relative to the NTR at least once per calendar year, not to exceed 15 months between audits.
- NTR emergency implementing procedures once every other year, not to exceed 30 months between audits.

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Procedures:

The procedure process at the NTR remains to be a subset of the site procedure process with signature authority described above. Written procedures are prepared according to section 6.4.1 of the TSs for:

- Maintenance activities
- Surveillance checks, tests, calibrations, and inspections required by the TSs
- NTR-specific radiation protection procedures
- NTR-specific implementing procedures for the Site-wide emergency and security plans.
- NTR-specific radiation protection implementing procedures for the use, receipt, and on-site transfer of by-product material for such activities performed under the R-33 license.
- Fuel handling related to the eventual defueling of the facility. These procedures may be maintained in an inactive status until the time they are needed.

Administrative changes to these listed procedures may be authorized by the Level 2 Reactor Administrator or by the Level 3 Certified Fuel Handler Supervisor if the administrative change is subsequently authorized by the Level 2 Reactor Administrator.

Temporary deviations from procedures may be made by the Level 3 Certified Fuel Handler Supervisor if documented and reported to the Level 2 Reactor Administrator by the end of the next working day.

Emergency Planning:

The NTR is included within a VNC site-wide radiological emergency plan that was revised most recently on October 07, 2022 (ADAMS accession # ML22300A210). There are no plans to revise the VNC Radiological Emergency Plan currently.

Security:

The NTR is included within a VNC site-wide Physical Security Plan (PSP) that was approved by the NRC on May 26, 2022 (ADAMS accession # ML22144A196). The NRC was notified on October 12, 2022, of the most recent revision to the PSP pursuant to 10 CFR 50.54(p). A revision is planned to the PSP in support of this licensing action.

Radiation Safety:

The radiation protection program will remain largely unchanged from that described in section 11.1.2 of the SAR except for management structure changes noted above and in section 6.0 of the proposed TSs. The radiation safety function will no longer report to the Manager, Regulatory Compliance, but to the Level 1 License Holder.

Effluent / Environmental Monitoring:

Gaseous effluent from the VNC has been the primary dose component to the offsite environment and is almost exclusively due to Ar-41 formed by activation of air in the NTR. Because the NTR will no longer be operated, neither Ar-41 nor fission products will be created. Neither will activities be frequently performed that might result in the generation of significant airborne contaminants. As a result, continued effluent monitoring as an input to the site annual effluent report will be discontinued.

As stated above, the gaseous channel will not be maintained operational, and proposed TS 3.5.2 and TS 3.7.3 require that the ventilation system and the particulate channel of the stack monitoring system be operating when any activity is performed that could generate greater than one DAC of airborne radioactivity in the reactor cell. The ventilation system, its filters, and the particulate monitoring channel will be maintained operable, so they are available for these rare activities and for eventual defueling and dismantlement of the NTR. However, undermining confinement by operating the ventilation system for 30 hours each week only to simulate reactor operating run time for the sole reason of verifying that the reactor is not producing fission products is illogical. These changes are proposed to section 3.7 of the TSs.

TS 3.7, Radiation System Monitoring and Effluents, has been renamed, Radiation and Environmental Monitoring Systems to reflect that ongoing effluent monitoring of the stack has been discontinued.

TS 3.7.1, Monitoring Systems During Reactor Operations, has been deleted as the reactor is no longer operational.

TS 3.7.2, Monitoring Systems During Reactor Cell Maintenance, has been retained, but retitled, Area Radiation Monitor, renumbered as 3.7.1, and the specification has been changed to reflect the 10 mr/hr alarm setpoint previously discussed in this document.

TS 3.7.3, Effluents – Environmental Monitoring, has been renamed, Environmental Monitoring, and renumbered to 3.7.2. The reference to TLD badges has been updated to reflect the use of Optically Stimulated Luminescent (OSL) dosimeters. The VNC sitewide effluent monitoring program remains in effect and includes the NTR according to the VNC Environmental Monitoring Manual (EMM).[7]

Environmental Monitoring for the VNC site is further discussed in Section 7.0 of Enclosure 2 to letter, Vallecitos Nuclear Center Decommissioning Limited Post Shutdown Decommissioning Activities Report, submitted September 21, 2022 (ADAMS accession # ML22264A327).

TS 3.7.4, Effluents – Stack Release Activity, has been deleted as setpoints based on operational effluents (activation / fission products) are no longer applicable.

TS 3.7.5, Effluents – Stack Monitoring Operability, has been retitled to Stack Monitor Operability, renumbered to 3.7.3, and revised to require stack monitoring only for particulate activity in support of proposed TS 3.5.2. Proposed TS 3.5.2 also includes a particulate channel alarm setpoint of 5.0E-10 μCi/cc, as previously discussed in this document.

G. Reports

TS 6.6.1 Operating Reports

- TS 6.7.1(1) and (2) are deleted as they are not applicable to a permanently shut down reactor.
- TS 6.7.1(5) concerning details of effluence is deleted; however, TS 6.7 continues to require that the annual operating report include summarized results of environmental surveys

[7] A proprietary copy of Revision 6 of the VNC EMM was most recently provided to the NRC as Attachment 3 under cover letter, GEH Supplemental Information Supporting GE Nuclear Test Reactor License Renewal Audit – Audit Questions and Responses, dated September 22, 2021 (ADAMS accession # ML21265A247 [cover letter]).

performed outside the facility. The reactor is permanently shut down and decommissioning activities beyond defueling will not be performed under this POL amendment. Therefore, the ventilation system will be operated infrequently so that meaningful effluent data cannot be collected by the stack monitoring system. The sitewide effluent monitoring program remains in effect according to the VNC Environmental Monitoring Manual (EMM) and includes airborne monitoring.

TS 6.6.2 Special Reports

- TS 6.7.2(1)a and c are deleted as they are not applicable to a permanently shut down reactor.
- TS 6.7.2(2)b is edited to say:

  "*Significant changes to the assumptions or accident analysis as described in CSA 008N0128.*"

  As discussed in the Hazards section of this document, the CSA supersedes the limiting experiment design basis accident for the NTR described in section 13.6 of the SAR.

- TS 6.7.3 has been added as follows:

  "*There SHALL be a notification made to the NRC by telephone not later than 10 days following any combination of failures in equipment or administrative radiological work controls that result in a worker being assigned an unplanned dose equal to or greater than 100 mrem Total Effective Dose Equivalent (TEDE) or a spill of more than 1,000 gallons of contaminated liquid waste on uncovered (bare) soil.*"

  This notification has been added to align with criteria previously established at the VNC for existing shutdown reactors.[8] This notification involves an interpretation of unsafe condition previously justified to the NRC.[9]

[8] Enclosure 2 to the VNC Limited Post Shutdown Decommissioning Activities Report, Rev. XII, September 21, 2022 (ADAMS accession # ML22264A325) as amended on November 22, 2022 (ML22326A353)

[9] Enclosure 3 to Nuclear Test Reactor License Renewal (R-33), Roadmap, dated November 19, 2020 (ADAMS accession package # ML20325A193)