



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

March 28, 2014

Mr. Thomas Caine, Site Manager
Vallecitos Nuclear Center
GE-Hitachi Nuclear Energy Americas LLC
6705 Vallecitos Road
Sunol, CA 94586

SUBJECT: NRC INSPECTION REPORT 070-00754/14-001

Dear Mr. Caine:

This refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on March 18-20, 2014, at the Vallecitos Nuclear Facility in Sunol, California. This inspection was an examination of activities conducted under the NRC Materials License SNM-960 as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

The inspection findings were presented to you at the conclusion of the onsite inspection. The enclosed report presents the results of this inspection. No violations were identified and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234 or the undersigned at 817-200-1191.

Sincerely,

/RA/

D. Blair Spitzberg, Ph.D., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Docket: 070-00754

License: SNM-960

Enclosure:

NRC Inspection Report 070-00754/14-001

cc w/encl:

D. Krause, Project Manager, GE-Hitachi Nuclear Energy

S. Murray, Manager, GE-Hitachi Nuclear Energy

R. Weisenmiller, Commissioner, California Energy Commission

G. Perez, Chief, California Dept. of Public Health

R. Rogus, Senior Health Physicist, California Dept. of Public Health

K. Prendergast, Senior Health Physicist, California Dept. of Public Health

M. Kelley, Executive Director, Tri-Valley CARES

Pleasanton Public Library

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 070-00754

License: SNM-960

Report: 070-00754/14-001

Licensee: GE-Hitachi Nuclear Energy Americas LLC

Facility: Vallecitos Nuclear Center

Location: Sunol, California

Dates: March 18-20, 2014

Inspector: Robert Evans, Ph.D., P.E., C.H.P., Senior Health Physicist
Repository and Spent Fuel Safety Branch

Approved by: D. Blair Spitzberg, Ph.D., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

GE-Hitachi Nuclear Energy Americas LLC
U.S. Nuclear Regulatory Commission (NRC) Inspection Report 070-00754/14-001

This inspection was a routine, announced inspection of licensed activities being conducted at the Vallecitos Nuclear Center. In summary, the licensee was conducting site activities in accordance with license and regulatory requirements.

Management Organization and Controls

- The licensee provided oversight and control of site activities in accordance with regulatory, license, and procedure requirements. Site staffing was adequate to fulfill the requirements of the license. The licensee implemented the onsite safety review committees as stipulated in the license. (Section 1.2)

Operational Safety

- The licensee consolidated the onsite special nuclear material (SNM) in accordance with its SNM consolidation plan. The SNM that remains outside of the storage bunker was being controlled by the licensee in secured locations. (Section 2.2.a)
- Using the licensee's inventory records, the inspector confirmed that the licensee did not possess more SNM than allowed by the license. (Section 2.2.b)
- The inspector conducted a walkdown of plant ventilation systems, and the systems were found to be in agreement with the descriptions provided in the licensee's license renewal application, with a few minor exceptions. The licensee stated that it would review these discrepancies and would take corrective actions as necessary to resolve the discrepancies. (Section 2.2.c)

Radiation Protection

- The licensee implemented its radiation protection program in accordance with license and regulatory requirements. No individual exceeded the regulatory exposure limits during 2013. The licensee maintained extensive records for various routine samples and surveys. Based on a random review of these records, the inspector confirmed that no unrestricted area was contaminated and no component was released for unrestricted use with contamination above background levels. (Section 3)

Effluent Control and Environmental Protection

- The licensee implemented its effluent and environmental monitoring programs in accordance with procedural, license, and regulatory requirements. All required samples were collected, and no sample result exceeded the respective procedural, license, and regulatory limits. Doses to members of the public were less than the regulatory limits. (Section 4)

Report Details

Summary of Plant Status

At the time of the inspection, the licensee continued to possess special nuclear material (SNM) at the Vallecitos Nuclear Center. Previously, licensed activities included fuel examinations within various hot cells. At the time of this inspection, no fuel examinations were in progress and most SNM remained in storage. Other work in progress included manufacturing of sealed sources under the licensee's State of California license.

On September 30, 2009, GE Hitachi Nuclear Energy submitted a renewal application for its SNM-960 license. The SNM license expired on June 30, 2010, but the license remains under timely renewal as provided in Title 10 of the *Code of Federal Regulations* (CFR) 2.109(a). After consultation with NRC and State of California staff, the licensee resubmitted its renewal application in November 2012, requesting that the license be converted to a possession and storage only license. The licensee also submitted updated Decommissioning Funding Plans (DFPs) to the NRC and State of California in November 2012, based on the licensee's revised license renewal application.

The NRC conducted a conditional acceptance review of the November 2012 license application submittal, and the NRC subsequently provided the licensee with a list of additional information that was needed before the NRC's review could be completed. In addition, by letter dated September 11, 2013, the NRC rejected the licensee's proposed DFPs. In response, the licensee submitted a revised license renewal application to the NRC by letter dated December 13, 2013. The licensee modified the application to request authorization to use a limited amount of SNM. The remainder of the SNM, including irradiated nuclear fuel, will be stored at an onsite storage facility.

The licensee submitted a revised DFP to the NRC by letter dated January 31, 2014. In addition, the licensee submitted an updated license renewal application to the NRC by letter dated February 27, 2014. At the close of the inspection period, the NRC staff was still reviewing the licensee's revised application and DFP.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

The inspector reviewed the licensee's oversight and control of licensed activities.

1.2 Observations and Findings

The personnel requirements are provided in Section 4 of Appendix A to the license. (Appendix A is referenced in License Condition S-1.) At the time of the inspection, all managerial and staff positions were filled with qualified individuals. The radiation safety staff included the radiation safety officer, radiation protection supervisor, and four technicians. Other site staff that provided support to the radiation protection department included the instrument technician who performed instrument calibrations and the radiochemistry leader who was responsible for onsite radiological sample analyses. In summary, site staffing was adequate to fulfill the requirements of the license.

Section 7.1 of Appendix A requires the licensee to establish and maintain a comprehensive set of standards for operational health and safety, including standards for the As Low As Reasonably Achievable (ALARA) program. These standards include instructions for maintaining exposures ALARA and for establishing and implementing an ALARA committee.

The inspector reviewed the status of the ALARA committee. The committee met quarterly during 2013-2014. The committee discussed the status of the licensee's SNM consolidation efforts during the January 2014 meeting. The committee did not identify any negative trends, and no recommendations were provided for the SNM consolidation efforts. In summary, the licensee implemented the ALARA committee as stipulated in site procedures.

The inspector reviewed the licensee's ALARA goals for 2013 and 2014. During 2013, the ALARA goal for combined occupational exposures was 13.867 rem (0.13867 Sievert), while the actual combined dose was 10.788 rem (0.10788 Sievert). Most occupational doses were assigned to nuclear test reactor workers, but some maintenance activities also contributed to doses. These high-dose maintenance activities included refurbishment of the hot cell windows and repair of hot cell manipulators. The SNM consolidated work resulted in a combined worker dose of 0.064 rem (0.00064 Sievert), a small fraction of the total doses for the year.

The licensee established an ALARA goal of 12.992 rem (0.12992 Sievert) for total occupational exposures in 2014. The work activities that were expected to result in the most dose included neutron radiography, cobalt-60 source manufacturing, and hot cell manipulator repairs. Because most SNM remains in storage, the license does not expect SNM-related work to contribute significantly to occupational exposures in 2014.

Section 4.4 of Appendix A to the license references the Vallecitos Technological Safety Council. This committee is responsible, in part, for review of the nuclear and radiation safety programs at the Vallecitos Nuclear Center. The inspector reviewed the minutes for 2013 and interviewed selected committee members. The committee discussed various emerging topics including the tracking of occupational exposures of workers who also work at different sites. In summary, the Vallecitos Technological Safety Council functioned in accordance with the requirements specified in the license.

The inspector inquired about the status of the licensee's annual radiation program audit to ensure compliance with 10 CFR 20.1101(c) requirements. At the time of the inspection, the licensee had not finalized the annual program review for 2013. The inspector will review the completed audit during a future inspection.

The inspector noted that the licensee conducted mini-audits of certain radiation protection program areas, to supplement the annual program review. For 2013, these audits included reviews of the internal dosimetry program. These supplemental audits provided licensee management with useful information about the effectiveness of these specific areas of the radiation protection program.

1.3 Conclusions

The licensee provided oversight and control of site activities in accordance with regulatory, license, and procedure requirements. Site staffing was adequate to fulfill the

requirements of the license. The licensee implemented the onsite safety review committees as stipulated in the license.

2 Operational Safety (88020)

2.1 Inspection Scope

The inspector reviewed the licensee's control of operational activities to ensure compliance with license and procedure requirements.

2.2 Observations and Findings

a. SNM Consolidation Effort

The licensee plans to convert its SNM license from a possession and use license into a limited use license. In support of this effort, the licensee developed an inventory consolidation plan. The purpose of the consolidation plan was to reduce the inventory of SNM within site laboratories and hot cells, and to consolidate and store this material at the onsite storage bunker. The inspector reviewed the status of the licensee's SNM consolidation efforts.

The consolidation of the SNM was conducted in phases. One of the first phases involved the transfer of some SNM to the licensee's out-of-state fuel fabrication facility for recycling and reuse. The inventory consolidation plan also provided instructions for shipment of some residual SNM and other non-SNM wastes to an out-of-state disposal facility. The majority of the SNM will be stored in the onsite storage bunker. The bunker was being used for storage of SNM as well as irradiated reactor hardware. At the end of calendar year 2013, the licensee had completed the transfer of most SNM to the storage bunker. The licensee submitted an updated SNM consolidation status report to the NRC by letter dated February 27, 2014.

At the time of the inspection, the SNM that remained outside of the storage bunker included residual SNM in evaporated sludge material, residual SNM in radioactive wastes, SNM contaminated with americium-241, and SNM in the form of fission chambers and sealed sources. The licensee recently conducted removable contamination swipe tests to determine how much residual SNM remained in the hot cells at the radioactive materials laboratory, but these sample results were not available during the inspection. The inspector will review the results of the licensee's contamination study during a future inspection.

b. Possession of SNM

The inspector reviewed the licensee's inventory records to ensure that the licensee did not possess more SNM than allowed by the license. The license provides possession limits for irradiated and unirradiated uranium-235, uranium-233, and plutonium. Based on the licensee's inventory records, the licensee possessed less than the licensed limits. As noted earlier, most of the SNM was in long-term storage at the storage bunker. The remaining SNM was being stored in secured areas of the site.

c. Walkdown of Site Ventilation Systems

In an effort to ensure that occupational exposures are ALARA, the licensee used process and engineering controls, to the extent practical, to control the concentrations of radioactive materials in the building air. In its license renewal application, submitted to the NRC by letter dated February 27, 2014, the licensee provided a description of the ventilation systems for each major plant structure. The inspector conducted a walkdown of the licensee's plant ventilation systems to ensure that the as-built plant conditions matched the commitments provided in the license application.

The inspector conducted a walkdown of the ventilation systems for the laboratory building, radioactive materials laboratory, and waste evaporation plant. In general, the actual design and construction of the ventilation systems matched the descriptions provided in the application, with a few exceptions. For example, the as-found stack sampling system in the exhaust of the radioactive materials laboratory differed slightly from the description provided in the application. In particular, the airflow pathway and airflow sample rates differed slightly from the description provided in the application. Despite these variations, the licensee continued to sample stack releases in accordance with current license requirements, and no sample exceeded the respective action levels. In response to the inspector's observations, the licensee stated it would review these differences, and revise the application or make physical changes in the plant as necessary, to ensure that the application provides an accurate description of plant systems. The inspector will review the results of the licensee's assessments during a future inspection.

2.3 Conclusions

The licensee consolidated the onsite SNM in accordance with its SNM consolidation plan. The SNM that remains outside of the storage bunker was being controlled by the licensee in secured locations. Using the licensee's inventory records, the inspector confirmed that the licensee did not possess more SNM than allowed by the license. The inspector conducted a walkdown of plant ventilation systems, and the systems were found to be in agreement with the descriptions provided in the licensee's license renewal application, with a few minor exceptions. The licensee stated that it would review these discrepancies and would take corrective actions as necessary to resolve the discrepancies.

3 Radiation Protection (88030)

3.1 Inspection Scope

The inspector reviewed the licensee's radiation protection program to verify compliance with 10 CFR Part 20 and license requirements.

3.2 Observations and Findings

The inspector reviewed the licensee's occupational exposure records for 2013 to ensure that no individual had exceeded the limits specified in 10 CFR 20.1201. Occupational doses for site workers were a combination of doses from exposure to radioactive materials licensed by the State of California and the NRC. The licensee monitored employees for both external and internal exposures. External doses were measured

with optically stimulated dosimeters, while internal doses were monitored through whole body counting. Neutron-detecting dosimeters were assigned to selected site workers based on work activity. Any neutron doses were assigned to individuals in addition to gamma radiation doses. During 2013, all assigned doses were attributed to external sources. The licensee did not assign any internal doses to workers based on the results of its air sampling and whole body counting programs.

The inspector reviewed the licensee's tabulated data for 2013. A total of 139 individuals were monitored. The highest annual total effective dose equivalent exposure was 0.907 rem (0.00907 Sievert) to a facility maintenance technician with a regulatory limit of 5 rem (0.05 Sievert). Eighty-one individuals did not receive a measurable dose. For comparison, during 2012, the licensee monitored 186 individuals, and the highest annual individual dose was approximately 1.0 rem (0.01 Sievert).

The highest extremity dose was 1.11 rem (0.0111 Sievert) for a facility maintenance worker and 4.530 rem (0.0453 Sievert) for a nuclear test reactor worker. The regulatory limit for extremity dose is 50 rem (0.5 Sievert).

During calendar year 2013, the licensee conducted approximately 480 whole body counts. In accordance with Section 8.11 of Appendix A to the license and site procedures, the licensee conducted initial, exit, and annual whole body counts for each worker. In addition, whole body counts were conducted based on work activity and at the request of the worker. During 2013, the results were negative, consequently, no internal doses were assigned to site workers or visitors.

The licensee placed dosimeters in buildings occupied by visitors and employees in order to assess the maximum dose that could be received by a member of the public while visiting the Vallecitos Nuclear Center. The highest building doses were measured in a building adjacent to the waste evaporator plant. Based on the results of these measurements, the licensee conservatively calculated a dose to an individual who may have occupied the building for 8 hours per day, 5 days per week, and 52 weeks per year. The licensee's calculated dose was 0.08 rem (0.0008 Sievert) per year, a dose that remained below the 0.1 rem (0.0001 Sievert) per year limit for individual members of the public as specified in 10 CFR 20.1301. For comparison, the licensee's 2012 calculations conservatively estimated that an onsite worker could receive up to 0.076 rem (0.00076 Sievert) of dose.

The inspector reviewed Radiation Work Permit 2013-21, issued by the licensee to control SNM transfers from onsite buildings to the storage bunker. This permit provided the radiation protection instructions for site workers who packaged and transferred the SNM. Eight individuals signed onto this work permit. Based on the licensee's electronic dosimetry records, these individuals received a collective dose of 0.064 rem (0.00064 Sievert), a small fraction of the site's total dose of 10.788 rem (0.10788 Sievert).

Section 8.3 of Appendix A to the license provides the contamination detection requirements. These requirements include routine radiological surveys for surface contamination levels and measurement of radiation exposure rates throughout the site. The licensee maintained extensive records of these routine surveys. The inspector randomly reviewed the licensee's survey results for 2014. The records indicate that the unrestricted areas, including lunchrooms and offices, were free of residual contamination.

One area that exceeded the contamination action level was the waste evaporation plant. The equipment in this radiologically restricted area was recently cleaned to remove the sludge material from the internal components. The licensee was storing the sludge in 55-gallon drums in an adjacent building during the inspection.

The inspector also randomly reviewed the licensee's equipment release records for 2014. Based on the licensee's records, no item was released from the site with contamination above background levels.

The inspector toured the licensee's onsite counting laboratory, the location where certain samples were analyzed for radiological content. The inspector concluded that the laboratory technician was knowledgeable of the various analytical techniques, and the technician was adequately controlling the samples being analyzed. The inspector discussed the various action levels with licensee representatives. The licensee assigned different action levels for the different types and locations of samples being analyzed. In response to the inspector's questions, the licensee confirmed that the action levels being used by the laboratory were in agreement with procedural requirements.

The inspector conducted ambient gamma radiation measurements during site tours using a Ludlum Model 2401-EC2 survey meter (NRC No. 21450G, calibration due date of 11/07/14). The inspector noted that observed postings and labels were in compliance with regulatory and procedure requirements. The inspector also noted that the radiation detection instruments selected for review were within calibration. To more effectively survey personnel exiting radiation controlled areas, the licensee replaced its hand-held survey meters with personnel contamination monitors at key exit points. The inspector noted that these exit monitors appeared to be functioning as designed.

3.3 Conclusions

The licensee implemented its radiation protection program in accordance with license and regulatory requirements. No individual exceeded the regulatory exposure limits during 2013. The licensee maintained extensive records for various routine samples and surveys. Based on a random review of these records, the inspector confirmed that no unrestricted area was contaminated and no component was released for unrestricted use with contamination above background levels.

4 **Effluent Control and Environmental Protection (88045)**

41 Inspection Scope

The inspector reviewed the licensee's effluent and environmental protection programs to ensure compliance with license and regulatory requirements.

4.2 Observations and Findings

The environmental monitoring program requirements are provided in Section 10 of Appendix A to the license and the licensee's Environmental Monitoring Manual. In accordance with Appendix A, the licensee is required to monitor the gaseous effluents, liquid effluents, groundwater, stream bottom sediment, and vegetation. The Environmental Monitoring Manual provides additional requirements for measuring

ambient gamma radiation levels and for collecting ambient air particulate and pond water samples.

License Condition S-6 requires the licensee to summarize the effluent and environmental monitoring programs in an annual report to the NRC. The inspector reviewed the 2013 annual report, submitted to the NRC by letter dated February 28, 2014. The inspector compared the various sample results to the licensee's action levels as well as license and regulatory release limits. The licensee established action levels at some fraction of the regulatory limits to ensure that some action is taken, if needed, to help prevent the regulatory limits from being exceeded. In summary, the licensee collected all required samples and no sample result exceeded a procedural, license, or regulatory limit.

The licensee measured gaseous effluents by sampling the discharges of various plant stacks. The licensee established action levels for each stack based on flow rate. The stacks were sampled for gross alpha, gross beta-gamma, iodine-131, and noble gas concentrations. The licensee's records indicate that no sample result exceeded an administrative action level in 2013.

The licensee collected air particulate samples at four sample stations. The air filters were exchanged weekly and analyzed for gross alpha and gross beta-gamma concentrations. A charcoal cartridge was installed at each sample station to measure iodine concentrations, but the licensee only analyzed these cartridges if a suspected release had occurred. The licensee's records indicate that no sample result exceeded the action levels.

Regulation 10 CFR 20.1101(d) places a constraint on air emissions of radioactive material to the environment. The licensee used the COMPLY computer code to analyze the doses for members of the public. For 2013, the licensee calculated an effective dose equivalent of 1 millirem (0.01 milliSievert) per year to the nearest resident. The licensee also calculated the projected dose at the industrial fence line. This calculated dose was 6.4 millirem per year (0.064 milliSievert). These calculated doses were less than the 10 CFR Part 20 constraint limit of 10 millirem per year (0.1 milliSievert).

The licensee measured ambient gamma radiation levels at 31 environmental samples stations. These sample results were documented in the annual report. The difference between the highest and lowest environmental sample station was about 13 millirem. Previously, the licensee did not designate which ambient gamma radiation sampling stations were considered as the background stations. Starting in 2014, the licensee plans to reduce the number of environmental sampling stations and designate certain locations as background stations. The inspector will review the licensee's program changes during a future inspection.

The licensee sampled four 50,000-gallon water storage basins. Three of the basins are used to store industrial waste water, while the fourth is used to store sanitary waste water. In previous years, the licensee disposed of industrial waste water by discharge to a local drainage ditch, while sanitary waste water was disposed via land application. Since July 2003, the licensee disposed of all waste water by land application. During 2013, the total amount of waste water disposed via land application was about 4.58 million gallons, down significantly from 2012 (6.78 million gallons).

The licensee sampled the basin water for gross alpha and gross beta-gamma concentrations just prior to release of the water for land application. In accordance with

site procedures, the licensee collected composite samples on a monthly basis for analysis. The licensee also collected and analyzed basin water samples for certain non-radiological constituents such as pH and total dissolved solids. No sample exceeded the action levels in 2013.

However, during 2012, two basin sample results slightly exceeded the gross alpha and gross beta-gamma action levels. The licensee issued a condition report to investigate the causes of these two exceedances. The licensee concluded that these elevated sample results were caused by cross-contamination of the samples; although, the licensee could not clearly identify how the samples became cross-contaminated. The licensee noted that the samples collected the following month were below the action levels. The licensee concluded that the sample results were not representative of actual conditions, in part, because no other sample result exceeded the action levels before or after these samples were collected.

The licensee conducted groundwater sampling on a quarterly basis. The licensee is required to sample up to 14 wells, although not all wells have enough water to be sampled. The wells include the three original site wells, four wells that were installed in the 1970s in response to a pool leak, and seven wells that were installed in 2009 to comply with State of California requirements. Appendix A to the license provides action levels for two of the wells. The results for 2013 indicate that the two wells did not exceed the action levels. No action levels have been established by the NRC for the remainder of the wells.

The license requires stream sediment and vegetation sampling to ensure that radioactive materials are not accumulating in the release pathways. These samples are collected once per year. The results of the 2013 samples were less than the respective action levels.

The licensee previously sampled storm water effluents, receiving (incoming) water, and water tank influent either as a best management practice or as required by the State of California. The inspector noted that the licensee collected and analyzed these samples in accordance with instructions provided in the Environmental Monitoring Manual.

In summary, the licensee collected all samples as required by the license. Public doses were less than the 100-millirem annual dose limit specified in 10 CFR 20.1301(a). Gaseous effluents were less than the 10 millirem per year dose constraint as specified in 10 CFR 20.1101(d) for exposure of the public due to air emissions.

4.3 Conclusions

The licensee implemented its effluent and environmental monitoring programs in accordance with procedural, license, and regulatory requirements. All required samples were collected, and no sample result exceeded the respective procedural, license, and regulatory limits. Doses to members of the public were less than the regulatory limits.

5 Exit Meeting

The inspector reviewed the inspection scope and findings with licensee management at the conclusion of the onsite inspection. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

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E. Hagberg, Technician, Environmental Health and Safety
D. Krause, Radiation Safety Officer/Program Manager, Environmental Health and Safety

INSPECTION PROCEDURES USED

IP 88005	Management Organization and Controls
IP 88020	Operational Safety
IP 88030	Radiation Protection
IP 88045	Effluent Control and Environmental Protection

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
CFR	<i>Code of Federal Regulations</i>
DFP	Decommissioning Funding Plan
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
SNM	special nuclear material