State Nuclear Safety Inspector Office

October 2008 Monthly Report to the Legislature

Introduction

As part of the Department of Health and Human Services' responsibility under Title 22, Maine Revised Statutes Annotated (MRSA) §666 (2), as enacted under Public Law, Chapter 539 in the second regular session of the 123rd Legislature, the foregoing is the fourth monthly report from the State Nuclear Safety Inspector under this new legislation.

The State Inspector's individual activities for the past month are highlighted under certain broad categories, as illustrated below. Since some activities are periodic and on-going, there may be some months when very little will be reported under that category. It is recommended for reviewers to examine previous reports to ensure connectivity with the information presented as it would be cumbersome to continuously repeat prior information in every report.

Since the footnotes are expanded definitions of some scientific terms, for simplicity they were placed in a glossary at the end of the report. In addition, to better understand some of the content of the topics, some effort was placed in providing some historical information. However, for the time being this historical context will be provided as an addendum to the report.

Independent Spent Fuel Storage Installation (ISFSI)

During October the general status of the ISFSI was normal. There were four spurious alarms due to environmental conditions. All alarms were investigated and no further actions were warranted. There were no fire or security related impairments and no security events were logged.

There were four condition reports[1] (CRs) in October. The first was a power supply problem with the Industrial Intellex. A new power supply was ordered and the old unit was replaced. However, it was identified that only one individual knew the internal password to reboot the system. To correct the situation Maine Yankee ensured that multiple individuals were made knowledgeable of the password. The second CR was over a trespass incident. On Saturday, October 4th, two individuals were observed taking pictures of the ISFSI at the site entrance near the gatehouse. A security officer was dispatched to ask them to leave, which they did. Communication protocols were followed and appropriate officials were notified. No further actions were necessary. The third CR was related to Radiation Safety and Control Services (RSCS), a radiation consultant firm that provides radiation protection services to Maine Yankee. As part of their biennial audit Maine Yankee contracted with an independent third party to evaluate RSCS. The audit identified some areas for improvement and Maine Yankee initiated a condition report to track the progress of RSCS's corrective actions. The final CR was related to their computer server. Apparently, the system was down for several hours.

The oversight committee held its second quarterly meeting on October 14th with various state agencies and Maine Yankee in attendance. The discussion centered on attendees submitting their activities summaries for inclusion into the annual activities and funding reports to the Legislature.

Footnote 1: Refer to the Glossary.

Environmental

Besides its on-going air sampling at the old Bailey Farm House, on October 1st the State performed its quarterly sampling regimen of freshwater, saltwater, and seaweed. The sampling findings will be published in a future report when results become available from the State's Health and Environmental Testing Laboratory.

On October 3rd the State also performed its quarterly field replacement of its thermoluminescent dosimeters (TLDs)[2] of the ISFSI and Bailey Cove. The results from the quarterly change out showed that, of the 13 TLD locations near the ISFSI, 10 did not demonstrate any appreciable values above normal background radiation levels, whereas three stations did exhibit slightly elevated levels due to their proximity to the storage casks. The control TLDs that are stored at the State's Radiation Control Program in Augusta averaged about 26 milliRoentgens[3] (mR). The three elevated stations had values ranging from 27 to 33 mR, as compared to the 10 other stations that averaged about 22 mR. In comparison the normal expected quarterly background radiation levels on the coast of Maine would range from 13 to 23 mR.

For informational purposes Figure 1 at the end of the report illustrates the locations of the State's 13 TLD locations in the vicinity of the ISFSI. The State's locations are identified by letters. The three highest locations were stations F, G and K.

Maine Yankee Decommissioning

As related in last month's report the Dirt Road sampling was necessary to ensure that all the State's findings would still pass Maine Yankee's License Termination Plan (LTP) Class I standards, since the original Class III designation was incorrect. In September's report the results of Maine Yankee's 18 Dirt Road soil samples identified one sample with man-made Cesium-137, with the remaining radioactivity from natural radioactive elements normally found in soil and bedrock, namely Uranium and Thorium and their respective decay series[4], and Potassium-40. On October 16th the State met with Maine Yankee to discuss their findings. The State's analyses reported that six of their 18 soil samples contained the radioactive element Cesium-137 with the remainder from the same natural decay series and Potassium-40 that was found in the Maine Yankee samples. In both cases the findings indicated that the concentration of the Cesium-137 was low and comparable to what is normally found in nature from past weapons testing during the 1950's and 1960's. On October31st issued a letter to Maine Yankee stating that, based on the recent systematic sampling and bounding efforts on the elevated areas, the results demonstrated that Maine Yankee had met its Class I LTP criteria. Therefore, the State concluded that there were no further outstanding issues relative to the Dirt Road and considered this matter closed. Even though some residual radioactivity remains, due to the localized nature of the contaminant and the restricted security access to the site, the contamination found does not present a public health hazard.

With the closure of the Dirt Road, the only remaining walk down survey left to be performed on-site is the portion of the East Access Road adjacent to the ISFSI bermed area. This area remains as the background radiation levels from the ISFSI were initially too high to survey, (greater than 30,000 counts per minute), and could mask potential elevated areas. Since then the State has been monitoring the levels every spring and has observed a steady decrease in the ambient radiation levels down to

Footnotes 2, 3, and 4: Refer to the Glossary.

25,000 counts per minute (cpm). When the levels reach about 20,000 cpm the area will be surveyed to close out all transportation routes at the Maine Yankee site. The focus of the efforts will then be to complete the four remaining confirmatory reports so that the State can publish its findings in a decommissioning summary that is expected to be completed in March of 2009.

Groundwater Monitoring Program

From September 16th through September 18th Maine Yankee's environmental consultant, Ransom Environmental, collected 16 groundwater samples from 12 well locations, three of which have multiple well heads, within the confines of the old power plant area of the Bailey Point peninsula. As part of its annual quality assurance oversight of the groundwater monitoring program, the State received seven well samples for analysis. The results of Maine Yankee's analyses were received the latter part of the month and will be presnted in November's report. Currently, the State's quality assurance testing results are expected to be available for the November monthly report. The September sampling started the fourth year of the five year groundwater monitoring program.

Other Newsworthy Items

1. As noted in September's monthly report, the Nuclear Regulatory Commission (NRC) announced on September 8th that it had docketed the Department of Energy's (DOE) 8,646 page license application for the construction of a high-level waste repository at Yucca Mountain in Nevada. Docketing means that the NRC considers the license application sufficiently complete to begin a thorough technical review. Besides docketing the license application, the NRC also accepted DOE's environmental impact studies for the repository, with one exception. The NRC requested that DOE augment their analyses of how the repository operations would affect groundwater. By law the NRC is required to complete its review within three years, with the possibility of a one year extension that may be granted by Congress. Funding uncertainties may compel the NRC to request an extension from Congress. At the end of the review NRC will decide whether or not to grant a construction authorization to DOE.

2. On October 8th the Maine Public Broadcasting Network reported that the Canadian government was considering New Brunswick as one of four potential provinces to host a long term nuclear waste storage facility. The Point Lepreau nuclear plant is located in New Brunswick and is 30 miles from Maine's border. Moreover, the Canadian government announced last year that granite would be a suitable repository medium for disposing of spent nuclear fuel and high level waste.

3. On October 9th the NRC published its proposed revisions to its waste confidence rule. The NRC press release stated that its "waste confidence findings were first issued in 1984, subsequently revised in 1990, and reaffirmed in 1999." The original "Commission's confidence stated that a geologic repository would be available sometime in the first quarter of the 21st century and that spent nuclear fuel can be safely stored without significant environmental impacts for at least 30 years beyond the licensed operation of a reactor, including the term of a renewed license." The NRC press release now states that "the proposed revisions would predict that repository capacity will be available within 50 to 60 years beyond the licensed operation of all reactors, and that spent fuel generated in any reactor can be safely

stored without significant environmental impact for at least 60 years beyond the licensed operation of the reactor."

4. On October 11th the Attorney General for Nevada filed a seven page federal lawsuit in the U. S. Court of Appeals for the District of Columbia Circuit challenging the EPA's Yucca Mountain dose standards. This action was in response to the Environmental Protection Agency's (EPA) September 30th issuance of its final radiation standards for Yucca Mountain repository. The EPA's dose limit for the first 10,000 years after disposal was set at 15 millirems[5] per year. For the time period 10,000 to 1,000,000 million years the dose standard was established at 100 millirems per year.

5. On October 22nd the NRC published in the Federal Register a notice of hearing and opportunity to intervene in the DOE licensing application to construct a high level waste repository at Yucca Mountain. The notice triggers a 60 day clock for parties to file challenges to the project.

6. Correction: In September's report, item 5 under the "Other Newsworthy Items", it was stated that the Maine Yankee site was being considered for a proposed underground hydropower plant. The statement should have read the power plant project would be built on land formerly owned by Maine Yankee.

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State Nuclear Safety Inspector

Footnote 5: Refer to the Glossary.

Glossary

Condition Report (CR): A report that promptly alerts management to potential conditions that may be adverse to quality or safety. The report is generally initiated by a worker at the ISFSI facility. The report prompts management to activate a process to identify causal factors and document corrective and preventative measures stemming from the initial report.

Decay Series: There are three naturally occurring decay series of heavy elements that transform into a series of various radioactive elements by releasing energy in the form of particles, (such as alpha or beta), and/or gamma rays to end in a stable form of non-radioactive Lead. All three decay series start with extremely long lived radioactive, heavy elements that can be measured in geologic time units. They are Uranium-238 with an approximate half-life of 4.5 billion years, Uranium -235 with a half-life of about 700 million years, and Thorium-232 with a half-life of 14 billion years. All three series contain some more well-known radioactive species, Radium and Radon.

Rem: An acronym for roentgen equivalent man and is a conventional unit of dose equivalent that is based on how much of the radiation energy is absorbed by the body multiplied by a quality factor, which is a measure of the relative hazard of energy transfer by different particles, (alpha, beta, neutrons, protons, etc.), gamma rays or x-rays. In comparison the average natural background radiation dose equivalent to the United States population is estimated to be 292 millirems per year, or 0.8 millirem per day, with 68 % of that dose coming from radon. A millirem is one thousandth, (1/1000), of a rem.

Roentgen: A special unit of exposure named after the discoverer of X-Rays, Wilhelm Roentgen. It is a measure of how much ionization is produced in the air when it is bombarded with X-Rays or Gamma Rays. Ionization is described as the removal of an orbital electron from an atom. A milliRoentgen is one thousandth, (1/1000), of a Roentgen.

Thermoluminescent Dosimeters (TLD): Very small plastic-like phosphors or crystals that are placed in a small plastic cage and mounted on trees, posts, etc. to absorb any radiation that impinges on the material. Special readers are then used to heat the plastic to release the energy that was stored when the radiation was absorbed by the plastic. The energy released is in the form of invisible light and that light is counted by the TLD reader. The intensity of the light emitted from the crystals0 is directly proportional to the amount of radiation that the TLD phosphor was exposed to.

Addendum

Historical Perspective

Independent Spent Fuel Storage Installation (ISFSI)

Since the licensing and construction of the high level waste repository at Yucca Mountain in Nevada has been delayed until at least the year 2018, further delays are expected unless funding of the program is returned to appropriate levels. However, even with proper funding, delays until 2020 to 2025 would still be expected.

The Department of Energy (DOE) has not taken title and possession of any of the nation's spent fuel as mandated by the Nuclear Waste Policy Act of 1982 and is not expected to do so in the near term. DOE's inaction prompted Maine Yankee to construct an ISFSI during decommissioning to store the more than 1400 spent fuel assemblies that were previously housed in the spent fuel pool in the plant into 60 storage casks on-site. Another four casks contain some of the more radioactive components of the reactor internals that were cut up during decommissioning, since their radioactive concentrations were too high to dispose at a low level radioactive waste facility. These are expected to be shipped along with the spent fuel to the Yucca site should the repository open. However, there was some movement in the last Congress as it required the DOE to report back by the end of this year on the logistics of removing the spent nuclear fuel from the nation's closed plants.

Environmental

Since 1970 the State has maintained an independent, radiological environmental monitoring program of the environs around Maine Yankee. Over the years there was an extensive quarterly sampling and analysis program that included such media as salt and fresh water, milk, crabs, lobsters, fish, fruits, vegetables, and air. Since the decommissioning the State's program has been reduced twice to accommodate decreased revenues for sample analyses at the State's Health and Environmental Testing Laboratory (HETL). Presently, the State monitors one freshwater location, one saltwater and seaweed location, and one air sample location. The State maintains a quarterly sampling regimen, except for the air sample, which is performed bi-weekly near the old Bailey Farm House. Besides the media sampling, over the years the State has maintained a robust thermoluminescent dosimeter (TLD) program to measure the radiation environment. The TLDs were placed within a 10 to 20 mile radius of the plant to measure the background radiation levels and later, when the plant was operating, any potential increases in background levels due to plant operations. Over time the number of TLDs nearly doubled to address public concerns over the clam flats in Bailey Cove and the construction of the ISFSI. After the plant's decommissioning the State reduced the number of TLDs around Bailey Cove, but maintained the same number for the environmental surveillance of the ISFSI.

Maine Yankee Decommissioning

Maine Yankee's decommissioning was completed in the fall of 2005. At that time the State Nuclear Safety Inspector's (SNSI) also commenced his final walk down survey of the site. Certain areas such as the transportation routes exiting the plant site were surveyed later after the plant industrial area was decommissioned. Due to the length of the egress routes, it took a considerable amount of time to complete both half-mile east and west access routes and the two thirds of a mile of the railroad track.

In addition, seven specific areas, including the dirt road, were also examined as part of the final site survey. The State's final survey of the dirt road leading to the old softball field was extended last fall when the State discovered three localized elevated areas on the road that were contaminated. At that time, extensive bounding samples were taken to determine the extent of the contamination.

The State will publish its decommissioning findings in a decommissioning summary that is expected in March of 2009. As part of that process the State will condense over 40 major survey areas into a dozen confirmatory reports that are being worked on by an outside consultant. The independent consultant has been collecting all the State's findings and summarizing them in confirmatory reports that the State Nuclear Safety Inspector will use to complete the State's decommissioning summary. Currently, there are eight confirmatory reports that are essentially complete, two are in draft form awaiting review and two are outstanding and have yet to be drafted. Since the consultant's contract expired in July, a renewal contract was written and approved in September to cover the remaining reports.

Groundwater Monitoring Program

In June of 2004, the State, through the Department of Environmental Protection's (DEP) authority under 38 MRSA §1455, signed an agreement with Maine Yankee for a five year, post decommissioning radiological groundwater monitoring program at the site. Presently, the program is starting its fourth year. The details of how the agreement would be carried out relative to the quality assurance facets of the monitoring, sampling and analyses would be captured in Maine Yankee's Radiological Groundwater Monitoring Work Plan.

The normal sampling regimen for the groundwater monitoring program is March, June and September of each year. However, since the first sampling took place in September of 2005, the annual sampling constitutes the September sampling of the current calendar year and finishes with the June sampling of the following year. Hence, the third annual report of the post decommissioning groundwater monitoring program, summarizing the past year's findings, will be available later this fall.