# MAINE STATE LEGISLATURE



Department of Health and Human Services
Maine People Living Safe, Healthy and Productive Lives
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April 15, 2016

**MEMORANDUM**

**TO:** Senator Michael Thibodeau, President of the Senate, and Representative Mark Eves, Speaker of the House

**FROM:** Mary C. Mayhew, Commissioner
Department of Health and Human Services

**SUBJECT:** State Nuclear Safety Inspector's January through February 2016 Monthly Reports to the Legislature on the Interim Spent Fuel Storage Facility in Wiscasset, Maine

Legislation enacted in the spring of 2008 requires the State Nuclear Safety Inspector to provide monthly reports to the President of the Senate, Speaker of the House, the U.S. Nuclear Regulatory Commission, and Maine Yankee. The reports focus on activities at the site and include highlights of the national debate on storing and disposing of the used nuclear fuel. For your convenience, highlights of local and national events are captured in the executive summary of the reports.

The enclosed reports provide the information required under Title 22 of the Maine Revised Statutes Annotated §666, as enacted under Public Law, Chapter 539, in the second regular session of the 123rd Legislature.

Should you have questions about its content, please feel free to contact Mr. Patrick J. Dostie, State Nuclear Safety Inspector, at 287-6721.

MCM/klv

Enclosure

cc: Mark Lombard, U.S. Nuclear Regulatory Commission
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J. Stanley Brown, Independent Spent Fuel Storage Installation Manager, Maine Yankee
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Kenneth Albert, Director, Maine Center for Disease Control and Prevention
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Timothy Schneider, Maine Public Advocate
Lieutenant Scott Ireland, Special Services Unit, Maine State Police
Nancy Beardsley, Director, Division of Environmental Health
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# State Nuclear Safety Inspector Office
# Maine CDC – DHHS

# February 2016 Monthly Report to the Legislature

## Executive Summary

The report covers activities at the Maine Yankee Independent Spent Fuel Storage Installation (ISFSI) facility, including the State's ongoing environmental radiation surveillance and provides updates on the national effort to license and construct a consolidated interim storage facility and/or a permanent geologic repository for the disposal of spent nuclear fuel. Maine's goal is to move the ISFSI waste stored at Maine Yankee to one of these facilities. The report's highlights assist readers to focus on the significant activities that took place both locally and nationally during the month.

## Local

- Maine Yankee and state officials met to discuss Maine Yankee's emergency notification process. Most of Maine Yankee's notification procedure delineated internal state communications, which the State agreed should be governed by the state and not dictated by Maine Yankee. The State seized the opportunity to simplify its own internal notification process.

- The Nuclear Regulatory Commission (NRC) issued an exemption to Maine Yankee's Technical Specifications on its cask inspection requirements for the inlet and outlet vents following off-normal, accident, or natural phenomena events, but limiting the scope to only snow and icing events.

## National:

- The Nuclear Waste Strategy Coalition, the National Association of Regulatory Utility Commissioners, and the Nuclear Energy Institute co-signed a letter to the Energy Secretary highlighting the billions of dollars that ratepayers have borne through mandated fees and the billions that taxpayers have paid for damages due to the federal government's failure to meet its contractual responsibilities. The three organizations advocated for "an annual plain-English accounting of how the money was collected and spent and how much remains."
- The Department of Energy (DOE) announced that it will be hosting eight public meetings seeking input in formulating a national consent-based siting process for communities wishing to host an interim spent fuel storage or geologic disposal facility. The first meeting is scheduled for March 29 in Chicago followed by Atlanta on April 11. The remaining six locations will be Boise, Idaho; Boston, Massachusetts; Denver, Colorado; Minneapolis, Minnesota; Sacramento, California; and Tempe, Arizona.
- DOE informed the public that it had published its final environmental impact statement (EIS) for the disposal of Greater Than Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste and recommended the GTCC waste be disposed at the Waste Isolation Pilot Project facility near Carlsbad, New Mexico. Maine Yankee has four concrete casks at the Wiscasset facility that contain GTCC waste.

## Introduction

As part of the Department of Health and Human Services' long standing oversight of Maine Yankee's nuclear activities under Title 22, Maine Revised Statutes (MRS) §666 (2), legislation was enacted in the second regular session of the 123rd and signed by Governor John Baldacci requiring that the State Nuclear Safety Inspector prepare a monthly report on the oversight activities performed at the ISFSI facility located in Wiscasset, Maine.

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 ongoing, 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. Past reports are available from the Radiation Control Program's web site at the following link: www.maineradiationcontrol.org and by clicking on the nuclear safety link in the left hand margin.

## Independent Spent Fuel Storage Installation (ISFSI)

During February, the general status of the ISFSI was normal, with no instances of spurious alarms due to environmental conditions.

There were no fire or security related impairments for the month. However, there were five security incident reports logged for the month. Three of the incident reports were written to provide compensatory measures to support snow removal, while a fourth was to support system maintenance activities. The fifth report was to document compensatory measures for a security system degradation while attempting to log into the computer system. The system was restarted clearing the error message.

There were eleven condition reports[1] (CR) for the month and they are described below.

1st CR: Documented that a drain-hole cover was missing. The area was marked as a tripping hazard.
2nd CR: Documented that various cords and wires in the Dayroom presented a tripping hazard. The cords were re-routed and bundled to eliminate the hazard.
3rd CR: Documented that a camera lens was fogging up. The internal heaters were checked and replaced as necessary. The fogging issue has not recurred. However, further testing was planned prior to closing the issue.
4th CR: Documented that the administrative limit of 25% blockage of one inlet vent was reached during a snowstorm. The affected concrete casks were inspected by management. Since the snow accumulation was well within limits, no further actions were taken.
5th CR: Documented that several concrete casks inlet screens were degraded due to snow removal activities. The screens had become detached from the frames in localized spots. New screens were ordered and will be installed.
6th CR: Documented that trouble alarms were noted on a cellphone backup system. The alarms cleared in a short time. The vendor was contacted for troubleshooting and parts were ordered.
7th CR: Documented that the heating system for a ventilation unit was not working properly. The thermostat was reset and the heating worked properly.
8th CR: Documented that there was excessive engine noise from a utility vehicle. The vehicle was taken out of service and will be replaced.
9th CR: Documented that an error message was received while attempting to log into a computer system. The system was restarted clearing the error message. The Condition Report will remain open pending further evaluation.
10th CR: Documented a discrepancy with the cask manufacturer's Technical Specification that required a one-time radiation survey, which was completed once each cask was loaded. The current Tech Spec's applicability was for "During Storage Operations." The previous wording when the casks were loaded was "During Loading Operations." An exemption request will be submitted to NRC to change the requirement to the previous wording. Otherwise, the current Tech Specs could force Maine Yankee to unload all the spent fuel assemblies from a cask within 30 days.

[1] A condition report is a report that promptly alerts management to potential conditions that may be adverse to quality or safety. For more information, refer to the glossary on the Radiation Control Program's website.

11th CR: Documented that a piece of telephone equipment was making abnormal noise. A Fairpoint technician performed the troubleshooting and it appeared to be a cooling fan. A replacement part was ordered.

*Other ISFSI Related Activities*

1. On February 1, Maine Yankee submitted to the NRC its annual notification on its foreign ownership, control, or influence status. Maine Yankee described the three separate occasions that member changes were made to the Board of Directors since the last annual notification. One of the changes did not contain a foreign certification since the sponsor company was a domestic corporation. The other two changes involved Emera, a Canadian firm that bought out Bangor Hydro Electric.

2. On February 4, Maine Yankee and state officials met to discuss the Maine Yankee emergency notification tree. Most of Maine Yankee's notification procedure delineated internal state communications. The State agreed that internal communications during a declared emergency should be governed by the state and not dictated by Maine Yankee. The State seized the opportunity to simplify its own internal notification process.

3. On February 18, NRC issued an exemption to Maine Yankee's Technical Specifications on its cask inspection requirements for the inlet and outlet vents following off-normal, accident, or natural phenomena events. However, the NRC limited the scope of the events covered to specifically snow and icing events. Since the exemption met the categorical exclusion requirements of NRC's regulations, no environmental assessment and finding of no significant impact were issued.

## Environmental:

The State received the fourth quarter results in late October from the field replacement of its thermoluminescent dosimeters (TLDs)[2] around the ISFSI and the Maine Yankee industrial site. The results from the quarterly TLD change out continued to illustrate three exposure groups: elevated, slightly elevated, and normal. The two usual high stations were stations G and K with two extra stations this quarter, F and Q, all with an average of 28.5 milliRoentgens[3] (mR). Typically, stations F and Q are in the slightly elevated grouping.

There were five stations in the slightly elevated group (E, J, L, M, and O) with an average of 26.3 mR. Generally, stations M and O are in the normal group. Fluctuations in the background are not unusual and are expected. These appear to be within the statistical boundaries of seasonal variations. There were eight stations (A, B, C, D, H, I, N, and P) in the normal group with an average of 23.8 mR for this quarter. It should be noted that station D had one element with an abnormally high value of 42.7 when compared to the other five element readings of 23, 24, 25, 25, and 26. The vendor performed an outlier test and rejected the data. The State conducted its own statistical outlier test and was able to reject the data point with 99% assurance.

The Maine Yankee industrial site TLDs averaged 24.1 mR, which is comparable to the routinely expected background radiation levels of 15 to 30 mR for the coast of Maine. The industrial site TLD results exhibited the expected seasonal variations with the third quarter results being slightly higher than the previous quarter. Some of the stations have background levels that are highly dependent upon tidal effects, and local geology. However, virtually all the stations display some seasonal fluctuations that are affected by the out gassing of the naturally occurring radioactive gas, Radon. However, the fourth quarter experienced unusually mild weather with much higher temperatures than normal, which may explain why the exposure values were higher than

[2] Thermoluminescent dosimeters (TLDs) are very small plastic like phosphors or crystals that are placed in a small plastic cage and mounted on trees, electric utility poles, etc. to absorb any radiation that impinges on the material. For a further explanation, refer to the glossary on the Radiation Program's website.

[3] A milliRoentgen (mR) is a measurement of radiation exposure in air. For a further explanation, refer to the glossary on the Radiation Program's website.

normal. Frozen ground and snow cover were not prevalent this quarter, which would have normally impeded the outgassing of Radon and yielding correspondingly lower values.

The four control TLDs that were stored at the State's Health and Environmental Testing Laboratory (HETL) in Augusta averaged about 13.1 mR. Although the storage of the control TLDs at HETL's pre-World War II steel vault lowers the natural background values, the 13.1 mR value for this quarter was slightly higher than the second quarter's control results of 11.7 mR. There appears to be no obvious reason for the increase. The controls were initially part of a program to better quantify the individual impacts of storage and transit exposures on the TLDs. However, as indicated above, they also have been instrumental in pointing out changes that normally would have not been captured if it were not for the assessment program.

As a further application of this TLD control assessment, every quarter three of the seven control TLDs received for the upcoming quarter are typically returned to the State's TLD vendor, Global Dosimetry in California, for an analysis of the transportation exposures. The initial set of results from the control TLD badges returned indicated an average of 7.1 mR for the total exposure picked up between leaving the vendor, arriving at the State and then immediately being shipped back and received by the vendor. The 7.1 mR was slightly higher than the previous quarter's reported 7.0 mR for the transit badges. Besides seasonal and daily fluctuations in the background, modest increases or decreases could be attributed to an extra few days or a few days less transit time. After four years, the State has acquired enough data on the transit badges to estimate an average of 6.5 mR for the expected transit exposure. The calculated statistics indicated that virtually all the transit data for the last four years fell within the range of the 95% confidence level. Now that the State has some assurance of what the transit exposure is, it will shift its attention to the final unknown, the storage exposure within the steel vault unit. The exposure determination will take about two years to complete with exposure assessments performed semi-annually.

The field control TLDs at Ferry Landing on Westport Island, the Edgecomb Fire Station and the roof of the State's Laboratory read 25.5, 26.3, and 22.7 mR, respectively. Historically, the Edgecomb Fire Station value is higher than the Westport Island location.

As noted in earlier reports, the State maintains an environmental air sampler on the roof of HETL for local or national events. The air sampler was extremely instrumental during the Fukushima event in Japan over three years ago in quantifying the levels of radioactivity that was coming from the crippled reactors. This year's third quarter results did not identify any unusual radioactive elements and were within historical ranges for both gross beta[4] and Beryllium-7, a naturally radioactive cosmogenic element that is produced from cosmic rays interacting with the nitrogen and oxygen atoms in the atmosphere. The gross beta results ranged from 21.9 to 29.4 femto-curies per cubic meter ($fCi/m^3$)[5]. A composite of the six bi-weekly air filter samples was used to measure the Beryllium-7's concentration of 50.3 $fCi/m^3$.

For informational purposes Figure 1 on page 5 illustrates the locations of the State's 17 TLD locations in the vicinity of the ISFSI. The State's locations are identified by letters with the highest locations for this quarter as F, G, K, and Q.

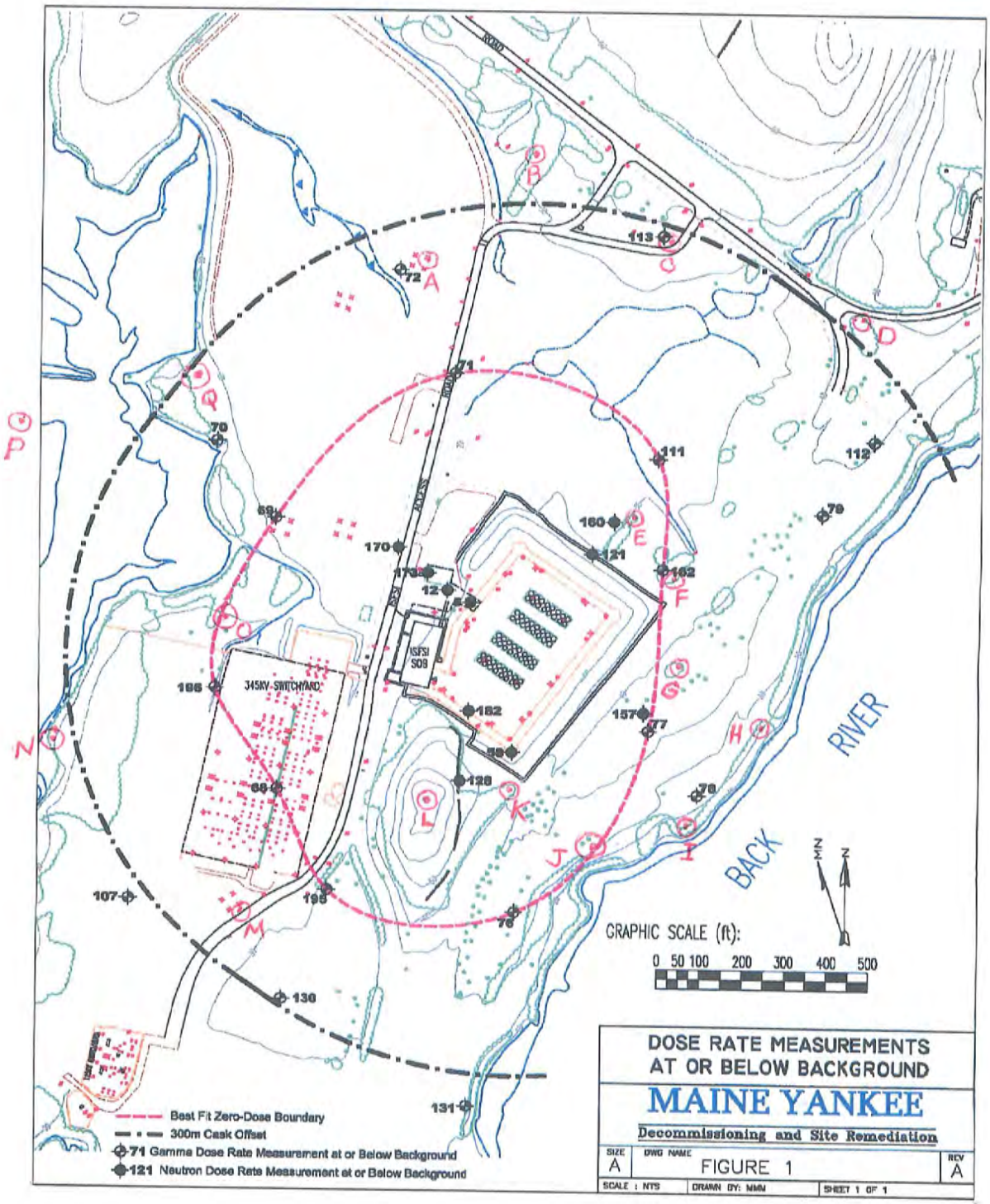
## Other Newsworthy Items:

1. On February 9, DOE's National Transportation Stakeholders Forum (NTSF) held the first of three webinars on rail inspection disciplines with the NTSF's Spent Nuclear Fuel Rail/Routing Ad Hoc Working Group. The Illinois Commerce Commission presented the Transportation Bureau's Rail Safety

[4] Gross Beta is a simple screening technique that measures the total number of beta particles emanating from a potentially radioactive sample. Refer to the glossary on the website for further information.

[5] A fCi/m3 is an acronym for a femto-curie per cubic meter, which is a concentration unit that defines how much radioactivity is present in a particular air volume, such as a cubic meter. A "femto" is a scientific prefix for an exponential term that is equivalent to one quadrillionth (1/1,000,000,000,000,000).

Figure 1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300m Cask Offset
71 Gamma Dose Rate Measurement at or Below Background
121 Neutron Dose Rate Measurement at or Below Background
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Program. The presentation illustrated what track safety standards inspectors focused on, such as the rail, ballast and drainage, the crossties, rail alignment, the distance or gauge between the rails, vegetation infringement, switches and rail fasteners. Next, the Oregon Rail Safety Program discussed and showed what defects they encountered in the field when it came to wheels, roller bearings, trucks, couplers, draft gear, car bodies, handholds and ladder treads, end platforms, hand and power brakes, uncoupling levers, sill steps, barriers, and locomotive defects. The last presentation by the Arizona Corporation Commission elaborated on signal and train control and its evolution from the earlier years to today's electronic systems. The web links for the individual presentations can be accessed by positioning the cursor over the underlined texts and following the directions.

2. On February 12, the Nuclear Waste Strategy Coalition, the National Association of Regulatory Utility Commissioners, and the Nuclear Energy Institute co-signed a letter to the Energy Secretary expressing their concern for transparency in DOE's reporting of the Nuclear Waste Fund's status. The letter highlighted the billions of dollars that ratepayers have borne through mandated fees and taxpayers have paid for damages due to the federal government's failure to meet its contractual responsibilities. The three organizations advocated for "an annual plain-English accounting of how the money was collected and spent and how much remains" for Fiscal Year 2015. The web link for the letter can be accessed by positioning the cursor over the underlined text and following the directions.

3. On February 14, a team of British scientists announced that they discovered new cement material that was 50% better at reducing the impact of radiation than current disposal solutions. The two year experiment identified mineral phases known to absorb highly radioactive elements.

4. On February 16, DOE's Environmental Management Office issued a fact sheet on the status of the recovery efforts at the Waste Isolation Pilot Project (WIPP) after the two underground incidents involving the salt haul truck fire and radiological release in February 2014. Since the incidents, considerable progress has been made in recovering the underground work areas through key processes such as mine stability and habitability measures, initial waste panel closure, radiological risk remediation, fire suppression systems, the addition of an interim ventilation system, significant changes to all safety programs, and reinforcing emergency response capabilities. The progress has the world's only geologic repository ready to resume waste disposal operations in December of this year. The web link for the fact sheet can be accessed by positioning the cursor over the underlined text and following the directions.

5. On February 16, DOE published a report, entitled, "Nuclear Fuels Storage and Transportation Requirements Document." The report's objective was to develop a set of options and a series of supporting analyses that will inform DOE with choices on how best to manage spent nuclear fuel and high-level waste. The document established a baseline of functions and requirements for the storage and transportation portions of the nuclear waste management system, provided foundations for planning future activities, and identified intersecting points between storage and transportation systems. The web link for the report can be accessed by positioning the cursor over the underlined text and following the directions.

6. On February 17, the Nuclear Waste Technical Review Board held a meeting to discuss the DOE's research and development on the performance of high burnup spent nuclear fuel during storage and transportation. The Board heard from several experts on high burnup fuel data gaps, NRC regulations on high burnup fuel in storage and transportation, hydride reorientation occurrence and effects, testing on radial hydrides, vibrational and shaker testing on high burnup fuel simulating road conditions, bending and fatigue tests, cask demonstration program, and modeling of spent fuel drying by vacuum and gas circulation for dry cask storage. The web link for the individual presentations can be accessed by positioning the cursor over the underlined text and following the directions.

7. On February 18, DOE announced the eight locations where it will be hosting public meetings seeking public input in formulating a national consent-based siting process for communities wishing to host an interim spent fuel storage or geologic disposal facility. The first meeting is scheduled for March 29 in Chicago followed by Atlanta on April 11. The remaining six meetings will be held in Boise, Idaho; Boston, Massachusetts; Denver, Colorado; Minneapolis, Minnesota; Sacramento, California; and Tempe, Arizona. DOE was expected to complete all the public meetings by the end of July. The web link for the news release can be accessed by positioning the cursor over the underlined text and following the directions.

8. On February 18, a news article was published on a new spring model that was developed by the University of Eastern Finland. The new model can predict with good accuracy the swelling in bentonite clay at atomic-level interactions in a clay–water system. Bentonite clay is a key barrier in the deep geologic disposal of high-level nuclear waste as its main purpose is to protect waste canisters from contacting underground water and other corrosive agents such as bacteria. In addition, the plasticity of the bentonite clay helps the waste canister to stay intact against rock movements or earthquakes, making the clay's swelling behavior vital as a buffer for disposal safety.

9. On February 19, DOE announced that they had cited two contractors, one the operator of the Waste Isolation Pilot Project (WIPP) and the other the operator of the Los Alamos National Laboratory (LANL), for violations of worker safety and health, and nuclear safety. The preliminary notices of violations were in regards to the salt haul truck fire and the radioactive release caused by inappropriate packaging material back in February, 2014. WIPP's operator was cited for four Severity Level I and seven severity Level II violations resulting in a loss of $7.6 million whereas the LANL operator was cited for two severity Level I and two severity Level II violations that resulted in the operator losing two years on its contract and $57 million on its contract fees. The violation citations marked the completion of DOE's investigation and enforcement process. The web link for the announcement can be accessed by positioning the cursor over the underlined text and following the directions.

10. On February 24, the NRC Chair forwarded his monthly status report to the House Chair on Energy and Commerce on the staff's activities associated with the resumption of DOE's Yucca Mountain License Application. The report summarized NRC's accomplishments since the Appeals Court Order in August of 2013. The report also noted that the NRC staff had commenced loading the licensing support documents into the NRC's publicly accessible library, the Agencywide Documents Access and Management System (ADAMS). In January, $626,000 of the $736,000 was spent on loading the support documents into ADAMS while nearly $110,000 was spent on continuing the review of public comments to complete the final environmental impact statement supplement for Yucca Mountain. About $2.4 million remains to complete the licensing support documents, the supplemental EIS, and the lessons learned report. The web links for the cover letter and the status report can be accessed by positioning the cursor over the underlined texts and following the directions.

11. On February 24, DOE informed the public that it had published its final environmental impact statement (EIS) for the disposal of Greater Than Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste. The report identified the different types of GTCC, both in volume and radioactivity, evaluated six federal locations, and described five disposal alternatives. The alternatives included no action, disposal at the WIPP facility in New Mexico, disposal in boreholes, disposal in a new trench system, and disposal in a new vault system. DOE's preferred approach was disposal in the WIPP facility near Carlsbad, New Mexico. Maine Yankee has four concrete casks at the Wiscasset facility that contain GTCC waste. The web link for the EIS summary and the five volume set can be accessed by positioning the cursor over the underlined text and following the directions.

12. On February 29, the Chair of the House Committee on Energy and Commerce and the Chair of the Subcommittee on Environment and Economy forwarded a letter to the Comptroller General of the

Government Accountability Office (GAO) exhorting urgency for reconstituting the nation's nuclear waste disposal program. The Chairs asked the nonpartisan watchdog to evaluate DOE's ability to complete the Yucca Mountain licensing application. The members posed a series of six questions for GAO to address that would help the Committee gain a better understanding of DOE's nuclear waste disposal program and their ability to acquire the much needed contractor support to defend its licensing application before the NRC. The web link for the letter can be accessed by positioning the cursor over the underlined text and following the directions.

13. In February, the U.S. Nuclear Waste Technical Review Board issued to Congress and the Secretary of Energy a report titled, "Survey of National Programs for Managing High-Level Radioactive Waste and Spent nuclear Fuel: Update." The report was an update of an earlier 2009 report that described 30 technical and recognized elements of nuclear waste programs in 13 countries. The report focused on the laws and regulations governing each nation's nuclear waste programs, the availability of local host communities to exercise veto power, and technical approaches to managing and disposing spent nuclear fuel and high-level waste. The web link for the report can be accessed by positioning the cursor over the underlined text and following the directions.

## Newsworthy Items Not Previously Reported

On January 6, the Social and Environmental Research Institute published a report, entitled, "Understanding Consent: Principles and Challenges for a Consent-based Process to Site Facilities for Interim and Long-term Storage of Spent Nuclear Fuel and High-Level Wastes in the United States." The report identified six key themes and fourteen challenges for consideration in the consent-based process. The themes ranged from weighing the collective interests of individuals, communities, and society to autonomy of the consent-giver to receiving adequate information and understood for both the consent-seeker and the consent-giver to obtaining consent prior to a decision or action to governing by principles that would be operationalized into specific procedural rules. Some of the challenges ranged from agreeing that action is needed to protecting the process from external pressure and coercion to socio-technical complexities to social distrust to full disclosure of information to trade-offs and expectations for negotiated agreements to voluntary consent to who issues consent to determining consent in a hierarchy of political jurisdictions to procedures for how and when consent is expressed to lacking a legally defined consent-seeker. The web link for the report can be accessed by positioning the cursor over the underlined text and following the directions.