MAINE STATE LEGISLATURE

2008 Report to the Legislature

on the

State Nuclear Safety Inspector's Oversight Activities

of the

Independent Spent Fuel Storage Installation (ISFSI)

at

Maine Yankee

Prepared for
Joint Standing Committee on
Utilities and Energy
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Executive Summary

The following report details the State Nuclear Safety Inspector's oversight activities performed at the Maine Yankee site and the Independent Spent Fuel Storage Installation (ISFSI) in Wiscasset.

The Maine Yankee plant was decommissioned over an eight year period from 1997 to 2005. Since the Department of Energy was unable to fulfill its contractual obligations to take the spent nuclear fuel, Maine Yankee was compelled to construct an Independent Spent Fuel Storage Installation (ISFSI) in Wiscasset to store the high level waste in casks until a national repository is available to dispose of the nuclear waste.

As part of the his oversight role of the high level waste stored at the ISFSI, the State Inspector performs the following

- Daily reviews of the operational and security reports from the on-site security staff,
- Environmental surveillance of the Maine Yankee environs to include fresh and saltwater monitoring, seaweed and air sampling, and field measurements of the local radiation levels,
- Participates in the annual Nuclear Regulatory Commission inspection of the facility,
- Participates in the ISFSI's annual emergency plan exercise,
- Radiological groundwater assessments of the old industrial complex and yearly quality assurance checks of Maine Yankee's analysis of the groundwater,
- Monthly reports to the legislature of his activities
- Interfaces with various state agencies also performing oversight functions at the ISFSI.
- Participates in regional and national organizations involved in the Yucca Mountain project in Nevada,
- Investigates websites to keep abreast of national developments on spent nuclear waste management.

In addition, the State Inspector will publish the final comprehensive decommissioning reports and their summary this fall.

The storage of the high level waste in Wiscasset is an important issue. Due to delays in the licensing and construction of the federal repository in Nevada and the recent position of the Obama Administration to terminate the Yucca Mountain repository, the high level waste stored in Wiscasset may be there for decades, or potentially indefinitely.

1.0 Introduction

1.1 Historical Perspective

The State had one nuclear power plant, called the Maine Yankee Atomic Power plant, and it was located in Wiscasset, Maine. It operated from the fall of 1972 to December 1996. The Maine Yankee Plant was initially rated at about 825 megawatts electric or 2440 megawatts thermal and by the end of its life Maine Yankee plant was producing slightly over 900 megawatts electric.

At the time of its last shutdown in December 1996 the plant owners were facing some major issues, principally cable separation and the aftermath of the Nuclear Regulatory Commission's (NRC) Independent Safety Assessment Team (ISAT) findings pertaining to plant safety systems. The State was a participant in the ISAT process. In 1997 the plant owners decided that the likelihood of the nuclear plant operating at a profit was non-existent in light of Maine's electric restructuring act passed that same year. With the availability of cheaper power from Canada, the plant was no longer considered economically viable. In May 1997 Maine Yankee announced that it would either sell or close the plant if there were no buyers. Even though there was a serious assessment performed by Philadelphia Electric Company to purchase the Maine Yankee plant, in July 1997 both parties could not come to an agreement and in August 1997 the Board of Directors voted to shutdown the plant permanently and commence the immediate dismantlement of the nuclear facility. The planning process for the site's decommissioning began shortly after the official closure and the decommissioning lasted eight years.

When the Nuclear Waste Policy Act (NWPA) was enacted in 1982, Congress assumed that a national repository would be available by 1998 for the disposal of the spent fuel. In 1998 the NWPA mandated the Department of Energy (DOE) to take title and possession of the nation's spent nuclear fuel. Since the high level waste repository at Yucca Mountain in Nevada had experienced significant licensing and construction delays, DOE was unable to take title and possession of the nation's spent fuel and consequently breached its legal contracts with all the nation's nuclear power plants.

Early during the decommissioning it became evident that at DOE's current pace the Yucca Mountain repository would open at a much later date than the then projected start date of 2010. DOE's inaction prompted Maine Yankee to construct an Independent Spent Fuel Storage Installation (ISFSI) during decommissioning to store the more than 1434 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 Mountain site should the repository open.

Although President Bush recommended to Congress and Congress approved the Yucca facility as the nation's federal repository for spent nuclear fuel in 2002, the DOE did not submit a license application until June of 2008, which was accepted for review by the NRC in September of 2008. Since then, the Obama Administration and the new Energy Secretary, Dr. Chu, have advocated for the termination of the Yucca Mountain site as it was no longer considered a viable option for disposing of the nation's high level waste and spent nuclear fuel. Energy Secretary Chu plans to assemble a Blue Ribbon Panel of experts to review alternative strategies for managing these waste forms. In the meantime all the spent fuel will remain at their present storage locations until a new management strategy is devised and implemented.

1.2 New Law

With the spent fuel at Maine Yankee likely to be stored in Wiscasset for decades to come, in March of 2008, in the second regular session of the 123rd Legislature, the Legislature enacted and the Governor signed into law the establishment of the State Nuclear Safety Inspector Office within the Department of Health and Human Services to provide independent oversight of the Maine Yankee ISFSI. The law also mandated that an Oversight Group, comprised of various state agencies, Maine Yankee and an independent expert in radiological and nuclear engineering, meet on a quarterly basis to discuss the protection of public health and safety at the ISFSI site and be involved in national activities that would hasten the timely removal of the spent nuclear fuel from the site. The law went into effect June 29, 2008.

The following sections will cover the State Nuclear Safety Inspector's activities for the last half of the 2008 calendar year under certain broad categories covering the ISFSI, environmental surveillance around the Maine Yankee site, remaining pieces of the State's decommissioning efforts, on-going groundwater monitoring program, regional and national activities, and newsworthy items on the national repository situation.

2.0 State Nuclear Safety Inspector Activities

2.1 Independent Spent Fuel Storage Installation (ISFSI)

2.1.1 Annual Inspection

On August 18, 2008, a Regional Inspector from the Nuclear Regulatory Commission (NRC) performed an annual inspection of the Maine Yankee ISFSI. The inspection consisted of field observations and an evaluation of Maine Yankee's programs for radiation protection, self-assessment and corrective actions, surveillance and maintenance, environmental monitoring, fire protection, training and security. The evaluation included a selected examination of procedures and representative records, observations of activities and interviews with personnel. The State Inspector participated in the NRC inspection. The NRC Inspector requested the State's annual environmental radiation results for the ISFSI. The State Inspector forwarded the previous four quarters, monitoring results to the NRC Inspector on August 25th.

On September 18th the NRC Inspector conducted an exit briefing via a conference call of his findings. The NRC issued its official report on the ISFSI inspection on October 17th and related there were no violations or concerns.

2.1.2 Annual Emergency Plan Drill

On an annual basis Maine Yankee is required to perform an emergency plan drill, a radiological drill, a medical drill and a fire drill. Since the Wiscasset Fire and Rescue Department usually participate in both the fire and medical drills, the fire and medical drills are usually combined to minimize resources for both sides. The fire and medical drills were performed earlier in the year.

On October 21st the State Inspector provided comments on Maine Yankee's revised implementing procedures in preparation for the annual emergency plan exercise.

On October 22nd Maine Yankee provided its annual update of the emergency planning program to state agencies at the Maine Emergency Management Agency. The overview consisted of the site's status and spent fuel considerations, emergency classifications, activation of the Maine Yankee emergency response organization, functions performed at the ISFSI control center, and the offsite interface with appropriate local, state and federal organizations.

On October 29th Maine Yankee conducted its annual emergency plan exercise. The drill scenario simulated a hostage taking and terrorist attack on the ISFSI with the terrorists trying to blow up one of the concrete casks housing the spent fuel. Two members of the State Police's Special Forces Unit observed the drill from its inception. The State Inspector responded to the drill. The Special Forces Unit provided excellent feedback during the critique following the two hour long exercise and commended the Maine Yankee security force on their professionalism during the drill.

2.1.3 Daily ISFSI Operations Pass-Ons

The on-shift Security Supervisor forwards the ISFSI Pass-On thrice daily to the State Inspector. The Pass-On provides an overview per shift of the ISFSI status, the cask monitoring status, procedures/surveillances/work in progress, equipment out of service, alarm issues, and team information. It is from these daily reports that the information from condition reports, fire or security related impairments, security event logs and spurious alarms are disclosed in the State Inspector's monthly reports to the Legislature.

2.1.4 Maine Yankee Reports to the NRC

Maine Yankee's annual reports are generally due in the winter/spring time frame. Since this annual report covers the period from July to December of 2008, no annual reports to the NRC were furnished during this time frame. These will be reported in next year's annual report to the Legislature.

2.1.5 Interface with Other State Agencies

On a quarterly basis, as part of the new legislation's mandate the State Inspector, along with the Manager of the Radiation Control Program, meet with the State Police, Public Advocate and the Department of Environmental Protection to discuss oversight activities at the ISFSI. Maine Yankee is also a participant in this process. The initial meeting of the Oversight Group took place on June 23rd with the subsequent meeting taking place on October 14th. Besides the State Inspector's update of current and planned near term activities, the discussion centered on the various groups submitting their activities summaries in preparation for the annual activities and funding reports to the Legislature.

2.1.6 ISFSI Topics

a. ISFSI Status

The status of the ISFSI from July to December was normal, except for the snowstorm on December 21st and the high winds on December 25th. Additional measures were put in place in anticipation of the snowstorm and were terminated once the storm passed.

b. Security Related Events/Impairments

Even though there were no security related impairments for the last half of 2008, there was one failed intrusion zone test in September, which triggered a security event being logged (SEL) for September. The malfunctioning equipment was adjusted and successfully retested. There were at least 12 spurious alarms during this time frame due to environmental conditions. In all instances the alarms were investigated and no further actions were warranted. There were seven SEL's logged in December and all were related to environmental conditions. For example, two of the seven SELs reported were related to the snowstorm on December 21st.

There were a couple of instances that prompted follow-up action from the Local Law Enforcement Agency. There was a minor trespassing issue in August where a person had parked their vehicle at the old East Access Road entrance near the old Bailey Farm House. The Lincoln County Sheriff's Department was contacted to notify the trespasser not to park there anymore. On December 6th the Wiscasset Police Department was notified as a precautionary measure on duck hunters firing shots south of the owner controlled area in Bailey Cove.

c. Fire Related Events/Impairments

There was only one fire related impairment reported during the July to December time frame. In September the main fire alarm control panel had one trouble alarm point tagged out of service for less than a day for a ground fault problem that was later cleared. The problem was caused by heavy rain.

d. Condition Reports

There were 18 condition reports written the last half of 2008. A condition report (CR) is 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. Most of the CR's are administrative in nature. Examples of some CR's written ranged from a supervisor initialing rather than signing a form to high winds blowing over the sand tent to damage to a tractor cab light while moving downed tree limbs to problems with the telephone system to a computer server being down for several hours to tracking corrective actions from audit findings of the site's radiation consultant to security being dispatched on a trespass incident involving two picture takers, who were asked to leave and they did.

e. Other Related Activities

As part of the NRC's regulations, in September the State Inspector received his annual site access and security training, including safeguards training, to maintain his security badge and personal radiation monitoring status.

2.2 Environmental

2.2.1 Radiological Environmental Monitoring Program (REMP) Description and Historical Perspective

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). Besides the media sampling, over the years the State has maintained a robust thermoluminescent dosimeter[1] (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

[1] Thermoluminescent dosimeters (TLD) are 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 crystals is directly proportional to the amount of radiation that the TLD phosphor was exposed to.

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. A further evaluation of whether or not to reduce the scope of the State's radiological environmental monitoring program is planned for the fall of 2009.

2.2.2 REMP Media Results

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. Table 1 below shows the quarterly sampling results for the last half of 2008.

Table 1 – REMP Media Results

		Quarterly Sampling Period	
Media Type	**Positive Results**	July 2008	October 2008
Freshwater	Gross Beta[2]	2.25 pCi/L[3]	1.36 pCi/L
	Tritium (Hydrogen-3 or H-3)	132 pCi/L	186 pCi/L
Seawater	Tritium (H-3)	BIDC*	235 pCi/L
	Potassium-40 (K-40)	275 pCi/kg[4]	142 pCi/kg
Seaweed	Beryllium-7 (Be-7)	111 pCi/kg	60.6 pCi/kg
	Potassium-40 (K-40)	4,160 pCi/kg	4,490 pCi/kg
	Iodine-131 (I-131)	52.7 pCi/kg	BIDC

* BIDC = Below Instrument's Detection Capability

The Health and Environmental Testing Laboratory (HETL) analyzes the samples and employs various analytical methods to measure particular radioactive elements. Except for Iodine-131 (I-131), all the positive results reported highlight naturally occurring background levels and ranges. There are some seasonal variations, but these would be difficult to point out with only two data points. When additional surveillance results become available the data will be plotted to illustrate the trends.

[2] Gross Beta is a simple screening technique employed to measure the total number of beta particles emanating from a potentially radioactive sample, with higher values usually indicating that the sample contains natural and/or man-made radioactive elements. High values would prompt further analyses to identify the radioactive species. A beta is a negatively charged particle that is emitted from the nucleus of an atom with a mass equal to that of an orbiting electron.

[3] A pCi/L is an acronym for a pico-curie per liter, which is a concentration unit that defines how much radioactivity is present in a unit volume, such as a liter. A curie, named after its discoverers Pierre and Marie Curie, is defined as the rate at which a radioactive element transforms itself into another element that is most often another radioactive element. It is mathematically equivalent to 37 billion disintegrations or transformations per second. A "pico" is a scientific prefix for an exponential term that is equivalent to one trillionth (1/1,000,000,000,000). Consequently, a picocurie is a very small unit of radioactivity that equates to only 2.22 disintegrations or transformations per minute.

[4] A pCi/kg is an acronym for a pico-curie per kilogram, which is a concentration unit that defines how much radioactivity is present in a unit mass, such as a kilogram.

The Iodine-131 that was found does not originate from Maine Yankee. With a half life of about 8 days, any I-131 with an inventory of one billion curies would have decayed or disappeared in about a year and a half after the plant shutdown, or about July of 1998. The source is most likely from the Wiscasset Municipal Waste Treatment System. Patients at nearby hospitals are sometimes injected with radioactive Iodine for thyroid scans or uptakes. When the patients return home and eliminate wastes, the waste water containing the I-131 is channeled to their local wastewater treatment plant. The treated water is then discharged into the bay and the I-131 is eventually picked up by the seaweed. Seaweed is a very efficient bio-accumulator for numerous elements and therefore, a good indicator of environmental contaminants.

Tritium (Hydrogen-3 or H-3) and Beryllium-7 (Be-7) are both naturally occurring "cosmogenic" radioactive elements, which mean they are continuously being produced by cosmic-ray interactions in the atmosphere. Be-7 is produced from the high-energy cosmic rays bombarding the oxygen, carbon and nitrogen molecules in the atmosphere. Besides being naturally produced, Tritium is also a man-made element as it is a by product of the fission and neutron activation processes in nuclear power plants.

Since Potassium-40 (K-40) has such a long half life, approximately 1.3 billion years, it is a "primordial" radioactive element, which means it has survived in detectable quantities in the earth's crust since the formation of the earth. Generally speaking K-40 is not normally found in freshwater, but it is readily detected in saltwater due to minerals being washed into streams and rivers and ultimately emptying into the ocean.

2.2.3 Air Sample Results

The State has had an environmental air sampler at the old Bailey Point Farm House since 1970. It is one of the few state environmental locations that is still in existence at its original location. The sampler has operated on a weekly basis from the beginning through the decommissioning and then biweekly thereafter. Besides the bi-weekly gross beta analysis a quarterly composite of the air filters is evaluated for the gamma energy fingerprints of most radioactive elements. During the last half of 2008 there were two such quarterly analyses and their results are listed in Table 2 below.

Table 2 – Air Sample Results

		Quarterly Sampling Period	
Media Type	**Positive Results**	July 2008	October 2008
Air Filters	Gross Beta (range)	14.4 – 23.4 fCi/m^3	17.5 – 23.5 fCi/m^3
	Quarterly Composite (Be-7)	94.9 fCi/m^3[5]	82.3 fCi/m^3

The gross beta values reported are comparable to the historical values seen at Maine Yankee and at the control station on the roof of the Health and Environmental Testing Laboratory

[5] A fCi/m^3 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).

(HETL). However, no comparisons can be made with the control station as the air sampling unit on the roof of HETL was shut down in 2008 pending repairs. As previously mentioned the Be-7 identified is a cosmogenic element that is naturally radioactive.

2.2.4 Thermoluminescent Dosimeters (TLDs)

As outlined in the historical context and as part of its independent oversight, the State had a TLD program to measure the quarterly ambient radiation levels over the years at Maine Yankee, both in the proximity of the power plant and at various locations within a 10 to 20 mile radius from the plant. At present the State's TLD program is focused on two areas - the ISFSI and Bailey Cove.

2.2.4.1 Bailey Cove TLDs

The Bailey Cove surveillance is a remnant of the operating days when the public had raised questions over the radiation levels in the Cove and its impact on clam and worm diggers from the extended shutdown due to the steam generator sleeving project in 1995. The number of TLD locations was reduced in January of 2008 from the initial 40 that covered both sides of Bailey Cove down to 14. The TLD results for Bailey Cove for the last half of 2008 are illustrated in Table 3. To acquire statistical weighting for each location two TLDs are placed at each location. Each TLD has three plastic-like phosphors. The average represents the mean of the six element phospors that capture the radiation and the range depicts the low and high values of the six crystals.

Table 3 – Bailey Cove TLD Results

	Quarterly Exposure Period			
TLD Stations	July – September 2008		October – December 2008	
	Average (mrem)[6]	(Range) (mrem)	Average (mrem)	(Range) (mrem)
1	22.8	(22-24)	28.7	(28-30)
2	20.3	(20-21)	27.2	(25-30)
3	20.5	(19-21)	30.2	(26-37)
4	21.3	(20-23)	27.2	(27-28)
5	23.2	(22-24)	31.2	(30-34)
6	20.3	(19-22)	26.7	(25-28)
7	19.3	(18-21)	26.3	(25-27)
8	23.8	(22-25)	28.2	(27-29)
9	23.2	(23-24)	30.0	(27-33)
10	21.3	(20-23)	26.8	(25-30)
11	17.8	(16-19)	24.8	(24-26)
12	22.2	(21-24)	28.2	(26-29)
13	23.0	(22-24)	29.0	(26-33)
14	20.0	(19-21)	25.2	(24-27)

Although we have good agreement with the individual elements for the summer period, the fall values exhibit a noticeable increase in variability as evidenced by the larger

[6] A mrem or millirem is one thousandth, (1/1000), of a rem. A rem is an acronym for roentgen equivalent man and is based on how much of the radiation energy is absorbed by the body multiplied by a hazard factor that depends on the type of radiation.

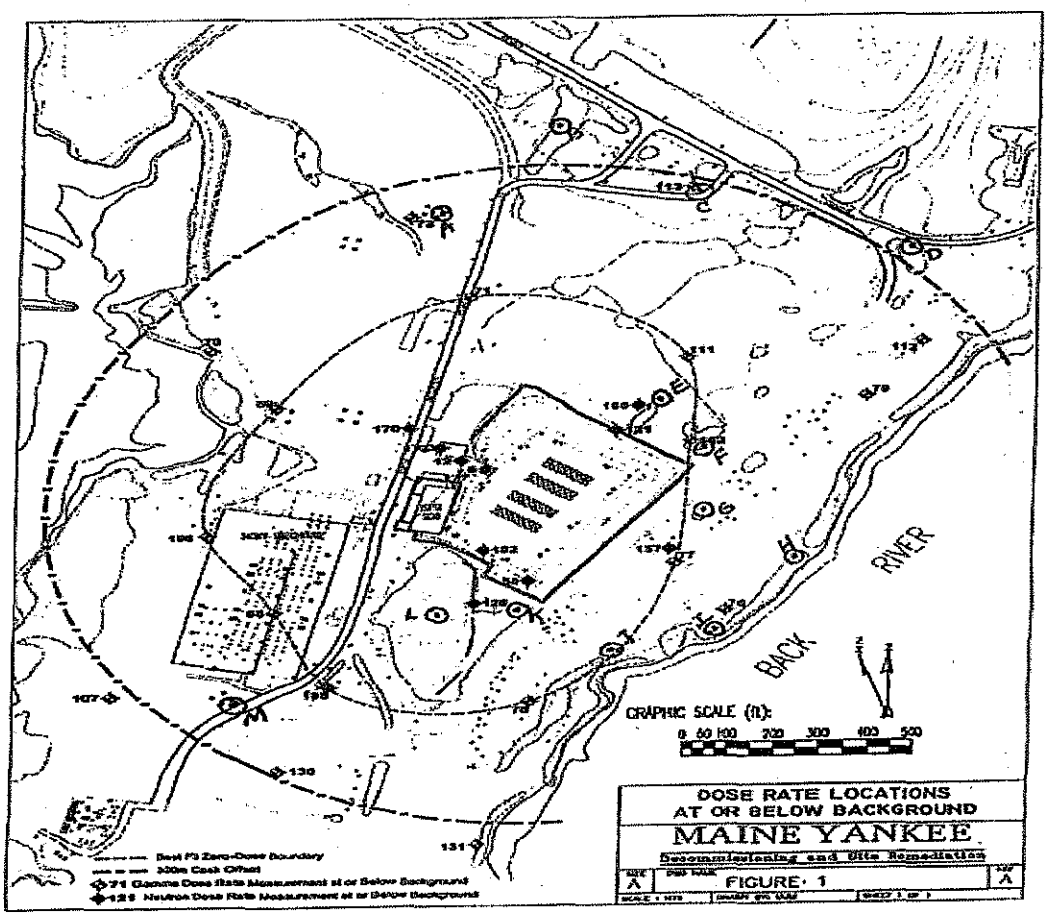
spreads in the ranges. With the advent of winter there should be a slight decrease in the results due to frozen and/or snow cover conditions inhibiting the out gassing of the natural Radon gas. Normally the background values on the coast of Maine range from 13 to 25, with the lower values indicative of their proximity to the water, especially at high tide.

In reviewing the controls and the data from the State's TLD vendor, it was observed that there was a similar increase in the fall 2007 TLD values. In investigating this issue it was found that the mailing of the TLD devices took up to five or more days for them to go from California to Maine. Therefore, there was no control as to which Post Offices the TLDs would reside and what kind of background radiation levels they would be exposed to on their way to Maine. The same would apply for the return trip to California. The effect should be the same for all four quarters, but it appears the handling and shipping is different for the last quarter. This skews the results as it implies the radiation levels at Maine Yankee increased when they did not.

2.2.4.2 ISFSI TLDs

In October of 2000, in preparation for the spent nuclear fuel to be moved from the fuel pool and stored in concrete casks at the ISFSI, the State Inspector, as part of its independent oversight, established 13 TLD locations to monitor the local radiation levels from the ISFSI. The thirteen locations are identified as letters in Figure 1 below.

Figure 1 – State TLD Locations at ISFSI



Since the spent fuel was projected to be moved in the fall of 2001, it was necessary to perform monthly TLD field replacements as opposed to quarterly in order to gather enough field data to establish a pre-operational database. The monthly regimen was maintained until the fall of 2004 when it was converted to a quarterly frequency.

Initially, some of the state TLD locations were co-located with some of Maine Yankee's TLDs for future comparative purposes. However, Maine Yankee reconfigured its TLD locations in 2008 and only 2 remain. Table 4 lists the State results for the last two quarters of 2008.

Table 4 – ISFSI TLD Results

	Quarterly Exposure Period			
TLD Locations	July – September 2008		October – December 2008	
	Average (mrem)	(Range) (mrem)	Average (mrem)	(Range) (mrem)
A	19.2	(17-21)	23.3	(23-24)
B	20.2	(18-22)	26.7	(25-28)
C	21.2	(18-23)	26.5	(25-28)
D	21.3	(21-22)	24.7	(23-26)
E	24.2	(23-26)	28.7	(27-30)
F	26.7	(26-27)	30.5	(29-33)
G	33.0	(28-39)	34.3	(32-37)
H	21.2	(19-22)	27.3	(26-29)
I	20.7	(20-21)	27.5	(25-30)
J	21.7	(21-23)	28.5	(26-31)
K	28.3	(26-30)	33.0	(32-34)
L	23.8	(21-26)	28.8	(27-31)
M	22.0	(20-24)	29.0	(28-30)

In both quarters stations G and K were high due to their proximity to the ISFSI. Station F also shows signs of influence from the ISFSI. The higher ISFSI TLDs results for the last quarter indicate they were also affected in the same manner as the Bailey Cove TLDs, since they are comingled and shipped together. Some variability was observed in the last quarter ranges but not as much as the Bailey Cove data. It should be noted that some of the Bailey Cove TLDs can serve as both a Bailey Cove TLD and an ISFSI TLD, since their location would fulfill one of the 16 points of the compass.

2.3 Maine Yankee Decommissioning

2.3.1 Background

Maine Yankee's decommissioning was completed in the fall of 2005. At that time the State Inspector also commenced his final walk down survey of the site. Certain areas such as the transportation routes exiting the plant site were surveyed after the plant industrial area was decommissioned. 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 walk down survey. The State's survey of the dirt road leading to the old softball field was extended in the fall of 2007

when the State discovered three localized, elevated contaminated areas on the road. Over the next couple months extensive bounding samples were taken to determine the extent of the contamination. Based on the findings a specialized survey, keying on the radioactive element Cesium-137, was performed in June of 2008. The survey did not find any new areas of elevated contamination.

2.3.2 Dirt Road Findings and Closure

Because of the State's findings the original Maine Yankee Class III designation of little or no potential for small areas of elevated activity was deemed incorrect. Therefore, a systematic sampling of the Dirt Road was necessary to ensure that all the State's findings would still pass Maine Yankee's License Termination Plan (LTP) Class I criteria. The final sampling for the road took place on July 10th with the State splitting 18 samples with Maine Yankee.

In August one other area of concern was identified by the railroad tracks adjacent to the Dirt Road as having plant derived radioactivity, (Cobalt-60). The State's soil sample result showed that the value was below the site release limit for Cobalt-60. However, during the investigation of the sample location increased radiation readings were observed and an additional sample was taken. Upon further investigation it was determined that the increased levels were due to two rocks in the sample hole that were reading three to five times above natural background levels. This information was verified by the State's special radiation fingerprinting device, which identified the sources as naturally radioactive Radium and Thorium.

In September 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, specifically Uranium and Thorium and their respective decay series[7], and Potassium-40. On October 16th the State met with Maine Yankee to discuss their findings. The State's analyses reported 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 October 31st the State 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 the issue 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.

2.3.3 East Access Road Survey

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 found to be high, (greater than 30,000 counts per minute), and could mask potential elevated areas. Since then the State Inspector has been monitoring the levels every spring and has observed a steady decrease in the

[7] 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.

ambient radiation levels down to 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.

2.3.4 Confirmatory Reports

The State will publish its decommissioning findings in a confirmatory summary that is expected in October of 2009. As part of that process the State will condense over 40 major survey areas into eleven confirmatory reports that are being worked on by an outside consultant. In 2000 the State contracted with a nationally recognized decommissioning expert with nearly 35 years of experience to ensure proper reviews of Maine Yankee's License Termination Plan and technical submittals to the U.S. Nuclear Regulatory Commission. The independent consultant has been collecting all the State's findings and summarizing them in technical reports that the State Inspector will use to complete the State's confirmatory summary.

The technical reviews of the independent consultant's reports were performed by the State Inspector. From July to December the State Inspector provided comments on the Fuel Building Report for further revision, initiated the first sets of comments on the Spray Building and the multiple soil areas on the radioactive side of the plant, known as Yard West. Also included in the Yard West survey units were the Low Specific Activity (LSA) Building Test Pit and the Personnel Hatch area that accessed the internals of the Containment Building during power operations.

As of the end of December the reports' statuses were nine reports completed, one report awaiting revision and one commented on.

2.4 Groundwater Monitoring Program

2.4.1 Background

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 in 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. It should also be noted that Maine Yankee, as part of its hazardous materials closure of the site for the DEP, is conducting a concurrent 30-year chemical monitoring program to perform sampling of 23 wells from selected past industrialized activities on the Bailey Point Peninsula.

The Agreement between the State and Maine Yankee set an administrative limit of 2 mrem per year per well as a demonstration that it had met the State's groundwater decommissioning standards of a 4 mrem dose per year above background values. If a well exceeded the 2 mrem value after the five year monitoring program ended, Maine Yankee would allow the State to continue monitoring that well. To-date fifteen of the sixteen wells sampled have not exceeded one tenth of the limit, or 0.2 mrem per year. Only well number MW-502 has come close to exceeding the 2 mrem administrative limit and that was back in March of 2006 when the dose was 1.96 mrem.

2.4.2 Sampling

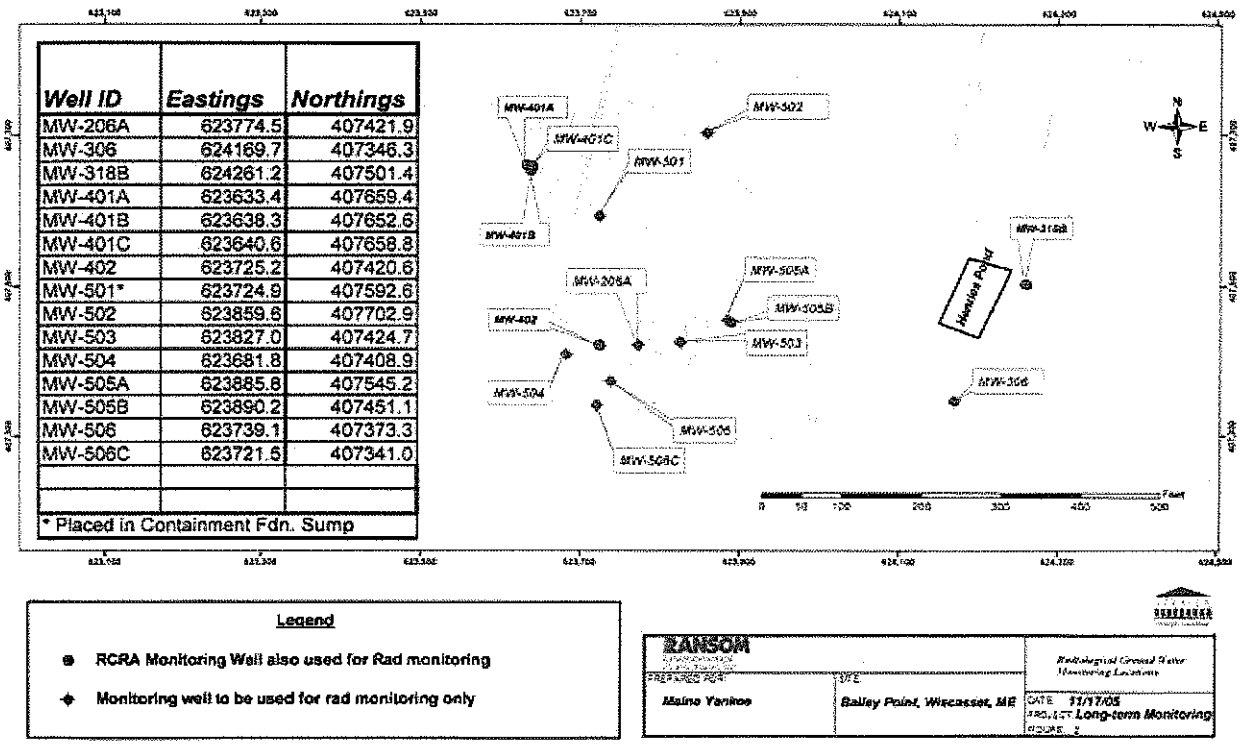
The normal sampling regimen for the groundwater monitoring program is three times a year. However, since the first sampling took place in September of 2005, the annual sampling constitutes the September sampling of the current calendar year and finishes with the June

sampling of the following year. As of September 2008 the groundwater monitoring program had started its fourth sampling year.

According to Maine Yankee's Rad Work Plan Rev 3, their environmental consultant, Ransom Environmental from Portland, samples 16 individual wells on a tri-annual basis and ships the well water samples to the AREVA environmental laboratory in Westborough, Massachusetts for analysis.

Figure 2 below, courtesy of Maine Yankee, illustrates the locations of the 16 sampling wells. Some wells also double as chemical sampling wells. It should be noted that the well ID list inadvertently omitted well MW-318A, which is at the same well location as MW-318B. The letter 'A' signifies that it is a bedrock well, whereas the 'B' denotes a surficial or surface well.

Figure 2 – Monitoring Well Locations



The well water is analyzed for radioactive elements that emit gamma ray radiation, such as Cesium-137 and Cobalt-60, and for tritium, a form of heavy hydrogen that is naturally radioactive and a pure beta particle emitter. In addition to Maine Yankee's vendor laboratory, AREVA, the State Inspector also collects annually from Maine Yankee's consultant, Ransom Environmental, groundwater samples from seven wells to conduct independent quality assurance checks on Maine Yankee's AREVA laboratory by having the State's Health and Environmental Testing Laboratory perform the same types of analyses on gamma emitting radioactive elements and the beta emitter tritium.

2.4.3 Analytical Results for Tritium

In the last half of 2008 Maine Yankee performed one sampling of the 16 wells at the decommissioned industrial complex. The State received the September sampling results in May of 2009. The State, as part of its oversight functions, analyzed seven well water samples from the September sampling event. The results from the State and Maine Yankee analyses are provided in Table 5 below.

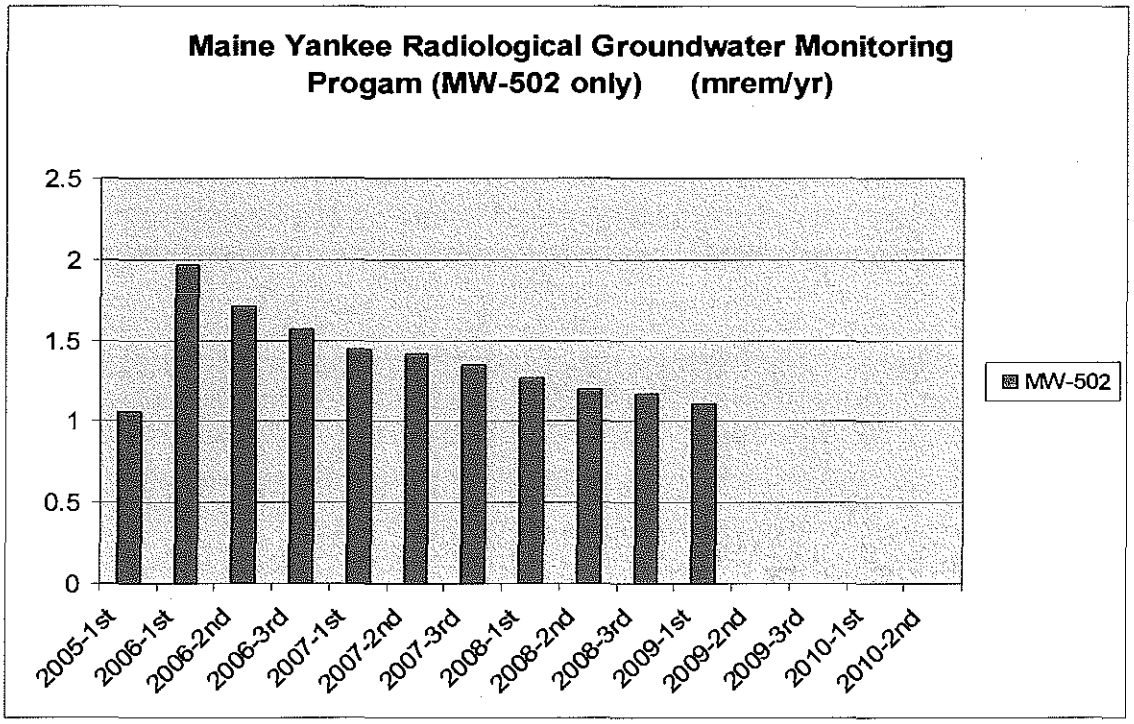
Table 5 – Tritium Results

Well Numbers	Maine Yankee Results (pCi/L)	State Results (pCi/L)
MW-206A	90	
MW-306	-130	186
MW-318A	50	153
MW-318B	-90	
MW-401A	-90	
MW-401B	-30	
MW-401C	-20	
MW-402	40	
MW-501	410	
MW-502	38,720	39,600
MW-503	-50	232
MW-504	70	154
MW-505A	450	415
MW-505B	-120	
MW-506A	230	287
MW-506C	80	

The comparisons between the two laboratories appear to be in fairly good agreement with each other. All seven wells tested by the State had positive indications for Tritium, whereas Maine Yankee had three wells, MW-501, -502, and -505A, with positive indications. (A positive indication is one where the result is greater than its statistical radiological counting uncertainty at the 95% confidence level.) However, six of the State's seven positives and two of the three Maine Yankee positive indications were less than 600 pCi/L. Although Tritium is naturally occurring, it is also a by-product of fission and neutron activation in an operating nuclear plant. Therefore, the State set the natural background limit of Tritium in a well sample to 600 pCi/L. Hence, only a well with a Tritium concentration in excess of 600 pCi/L would be included in the radiological dose assessment.

The elevated Tritium in well MW-502 has been steadily decreasing since its peak value of 59,570 pCi/L in March of 2006 as exemplified by courtesy of Maine Yankee's illustration in Figure 3 below. It is expected that this well will remain elevated for some time as the water infiltration rates are very low. Consequently, the decrease will be slow and steady.

Figure 3 – Monitoring Well MW-502 With Elevated Tritium



The highest Tritium well is currently calculated to give a projected annual radiation dose of 1.2 mrem above naturally occurring concentrations. 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 and its subsequent decay products.

2.4.4 Positive Indications

Besides Tritium as being a recurrent detection in some of the wells, there are other radioactive elements that have had positive indications. In the September sampling the following radioactive elements were identified in trace quantities in six of the wells through gamma spectroscopy, which is a technique that identifies the radioactive elements by their energy fingerprints. They were Cobalt-57, Cobalt-58, Cobalt-60, Iodine-131 and Zinc-65. All the radioactive elements are normally found in a nuclear power plant environment. However, due to their short radioactive half lives Cobalt-58 and Iodine -131 can not physically originate from the plant's operational days. As for the Cobalt-57, Cobalt-60, and Zinc-65 their radioactive half lives are longer and, therefore, the likelihood of their existence is much more probable. In both cases however, since the AREVA laboratory reported only trace amounts of the radioactive elements, which were barely detectable, it is very possible that the results are false positives and probably not really there. Regardless, assuming that the radioactive elements are real, the radiological impacts are extremely small with the highest dose being 0.063 mrem per year as compared to the average U.S. population of 292 mrem per year.

The gamma energy technique also identified Americium-241 in trace quantities in six wells. This is important as Americium is heavier than Uranium, is a potential indicator of other heavier elements such as Plutonium, and is an alpha emitter with higher dose implications. Since the trace values were so low and the gamma technique at these low levels is not very accurate, then another technique, called alpha spectroscopy, was used as it is much more sensitive than the

gamma ray detection technique. All six well samples were re-analyzed and none were found to have positive indications of Americium-241.

2.4.5 Tri-annual Sampling Events and Reports

After each sampling event Maine Yankee submits to the State Inspector a summary report of their findings. The State Inspector reviews the report, comments on the findings and forwards his comments to Maine Yankee for their response. The State Inspector also forwards his comments to the Department of Environmental Protection (DEP) to apprise them of the radiological findings. At the end of the three sampling events an annual report is generated that covers the sampling year's findings with an independent third party validation of the data from an outside vendor. All the raw data is submitted to the DEP and the State Inspector for review. The third annual report was received by the DEP in December and by the State Inspector in January 2009. The annual report is reviewed by several staff persons at DEP, whose primary focus is on the chemical sampling program and they defer to the State's Radiation Program, or the State Inspector in this case, for their expertise in radiological matters. The DEP compiles all the comments and forwards them to Maine Yankee for their response.

2.4.6 Quality Assurance Criteria (Maine Yankee Rad Work Plan)

At the onset of the groundwater monitoring program the DEP requested that Maine Yankee provide a guidance document on how they will carry out the various facets of the Post Decommissioning Radiological Groundwater Agreement. A Work Plan was devised and it describes the well and geoprobe locations, the geologic characterization, field screening for contamination, drilling depth, screen length, sampling dates and collection, analysis, internal laboratory review, data validation, usability and reporting. The development of the Work Plan commenced in 2005 and was finalized in September 2008. The reason for the lengthy delay has been due to protracted discussions and clarifications involving a number of iterations on laboratory acceptance criteria for analyses, data validation and data reporting to the DEP's Environmental and Geographic Analysis Database.

2.5 Other Noteworthy Activities

2.5.I Reports to the Legislature

2.5.1.1 Monthly

As mandated by legislation passed in the spring of 2008, the State Inspector is required to submit monthly reports to the Legislature on his oversight activities of Maine Yankee's Independent Spent Fuel storage Installation (ISFSI) located in Wiscasset. Since the law went into effect on June 29, 2008, the State Inspector has been providing monthly reports to a distribution that includes the President of the Senate, the Speaker of the House, the U.S. Nuclear Regulatory Commission (NRC) at NRC Headquarters in Rockville, Maryland and Region I in King of Prussia, Pennsylvania, Maine Yankee, the Governor's Office, the Department of Health and Human Services, the Department of Environmental Protection, the Public Advocate and the State Police's Special Services Unit. The topics covered in the monthly reports are highlighted in sections 2.1.6, 2.2, 2.3, 2.4 and 2.6 of this report.

2.5.1.2 Annual

Under 22 MRSA §668, as enacted under Public Law, Chapter 539 the State Inspector prepares an annual accounting report of all the funds received into and all disbursements out of the Interim Spent Fuel Storage Facility Oversight Fund. The report is due the first Monday of February. In addition, the State Inspector must annually report his activities

to the Department of Health and Human Services Manager of the Radiation Control Program for inclusion in the Manager's Annual Report of Oversight Activities and Funding to the Legislature. Since the law went into effect in June of 2008 both reports were not due until February of 2009. Consequently, this information will be covered in next year's annual report to the Legislature.

2.5.2 Northeast High Level Radioactive Waste Transportation Task Force (NEHLRWTTF)

With the termination of the State Nuclear Safety Advisor position in August of 2008, the State Inspector became the State's Representative on the NEHLRWTTF. Since then the State Inspector has participated in periodic conference calls on the status of Yucca Mountain and transportation issues that could impact Maine. The NEHLRWT Task Force is an affiliate of the Eastern Regional Conference of the Council of State Governments. The purpose of the Task Force is to not only develop the safest and most efficacious transportation route to ship spent nuclear fuel from the Northeast, but also to provide the State with direct involvement in formulating and establishing national policy in the design of the national transportation system and development of a proposed repository at Yucca Mountain in Nevada.

2.5.3 Yankee Federal Energy Regulatory Commission (FERC) Rate Case Settlement

In September the State Inspector commenced participating in the quarterly conference call briefings relevant to Yankee Atomic, Connecticut Yankee and Maine Yankee. The briefings provide updates to both state and private officials affected by the FERC settlements over the Department of Energy's (DOE) breach of contract to take possession of the spent fuel at Maine Yankee as mandated by the Nuclear Waste Policy Act of 1982, as amended, due to the federal repository at Yucca Mountain not being operational until 2020, and possibly much later. In September 2006 Maine Yankee won a $75.8 million judgment for monetary damages through 2002 in its lawsuit with the DOE in the U.S. Court of Federal Claims. In December 2007 the three Yankee companies filed a second round of damage claims.

2.5.4 Nuclear Waste Strategy Coalition (NWSC)

The State participated in the periodic status briefings of the NWSC. The NWSC is an ad hoc group of state utility regulators, state attorneys general, electric utilities and associate members representing 47 stakeholders in 31 states, committed to reforming and adequately funding the U.S. civilian high-level nuclear waste transportation, storage, and disposal program.

2.6 Some Newsworthy Items

1.0 On September 8th the NRC 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. By law 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.

2.0 The Riverbank Development Corporation met with some local and state officials in September on a proposed hydro project, called an Aquabank, which would generate 1,000 megawatts of electricity for peak load demands and be situated on land formerly owned by Maine Yankee. The project would call for the construction of six cavernous reservoirs and four, three story tall turbines, carved out of the bedrock 2,000 feet below the surface. The electricity would be generated by taking roughly 1.2 billion gallons of water from the Back River and gravity

feeding it down through four large turbines. The water would be stored in six large underground reservoirs and returned to the Back River during off-load demands. The Maine Yankee site may be suitable for this project since it has the electrical infrastructure and its proximity to high voltage transmission lines.

3.0 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."

4.0 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 Environmental Protection Agency's (EPA) Yucca Mountain dose standards. This action was in response to the EPA's September 30th issuance of its final radiation standards for the Yucca Mountain repository. The EPA's dose limit for the first 10,000 years after disposal was set at 15 millirems per year. For the time period 10,000 to 1,000,000 million years the dose standard was established at 100 millirems per year.

5.0 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.

6.0 On November 4th Presidential Candidate Obama is elected President of the United States and vows to terminate the Yucca Mountain Project in Nevada.

7.0 On December 4th the State of Nevada commented at the U. S. Surface Transportation Board's public hearing on its opposition to the Department of Energy's (DOE) application to construct and operate a 300 mile rail line from Caliente, Nevada to the federally designated spent fuel repository at Yucca Mountain in Nevada.

8.0 On December 19th the State of Nevada filed its petition to intervene in the Nuclear Regulatory Commission's (NRC) licensing proceedings on Yucca Mountain. In its 1566 page petition the State of Nevada outlined 229 challenges to what it called flaws in the DOE'S Yucca Mountain license application.

9.0 On December 22nd Clark County in Nevada also filed its petition to intervene in the Nuclear Regulatory Commission's licensing proceedings on Yucca Mountain. It provided 15 contentions against the DOE license application before the NRC. In addition, one tribal group, the Timbisha Shoshone Yucca Mountain Oversight Program Nonprofit Corp, filed three contentions. Five other counties and one additional tribal group have also filed petitions to intervene in the licensing proceedings.

10.0 On December 22nd the State of California submitted a 400 page document outlining its 24 contentions in its petition to intervene on the Yucca Mountain licensing proceedings.