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COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WESTERN REGIONAL OFFICE

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October 16, 2008

Yankee Atomic Electric Company
49 Yankee Road
Rowe, MA 01367
Attention: Wayne Norton, President

RE: Rowe-BWSC-RTN #1-13411
Phase II – Comprehensive Site Assessment Report
Final Report - Review
310 CMR 40.0000
Yankee Nuclear Power Station
49 Yankee Road

Dear Mr. Bourassa:

The Massachusetts Department of Environmental Protection (the MassDEP) has completed review of the Final Phase II - Comprehensive Site Assessment (Phase II) Report for environmental assessment of the Yankee Nuclear Power Station (YNPS) in Rowe, MA, according to the MassDEP's Bureau of Waste Site Cleanup (BWSC) regulations at 310 CMR 40.000 (the Massachusetts Contingency Plan, or the MCP). The MassDEP's approval of this Final Phase II Report, as described below, represents the final approval necessary to achieve site closure under the Massachusetts Contingency Plan. The Final Phase II Report consists of a number of individual reports, submitted on behalf of Yankee Atomic Electric Company (Yankee) by its consultants to satisfy the requirements of the MassDEP's October 7, 2005 review of the Interim Phase II Report (the Interim Phase II Review). The primary environmental consultant for the Final Phase II reports was ERM, Inc. of Boston, MA, and the Licensed Site Professionals (LSPs) of record for these reports were John McTigue and Gregg Demers of ERM.

YNPS was shut down in 1992 and has undergone decommissioning in accordance with Nuclear Regulatory Commission (NRC) regulations under 10 CFR Part 50. All radiological issues associated with decommissioning fall under the authority of the NRC, the Massachusetts Department of Public Health's Radiation Control Program (the MADPH), the MassDEP and the United States Environmental Protection Agency (the EPA), as applicable. The NRC issued on August 10, 2007 a partial release of the YNPS License Termination Plan (LTP) for all areas of the YNPS site except the Independent Spent Fuel Storage Installation (ISFSI). The MADPH issued its partial release approval to YNPS on March 14, 2008.

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057, TDD# 866-539-7622 or 617-574-6868.

DEP on the World Wide Web: <http://www.mass.gov/dep>

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Non-radiological contamination at the site falls under the authority of the MassDEP and the EPA, as applicable. The assessment and remediation of polychlorinated biphenyls (PCBs) at the YNPS was primarily performed according to the authority and oversight of the EPA, in accordance with EPA Toxic Substance Control Act (TSCA) requirements and approvals. The EPA approval letter for the PCB remediation was issued to Yankee on April 26, 2006, and the required PCB Remediation Certification statement was completed by Yankee on March 28, 2007. The MassDEP had previously classified the YNPS site as a Tier 1B site, according to the BWSC regulations at 310 CMR 40.000.

The Final Phase II Report contains the results of assessment for both radiological and non-radiological parameters at the site. All assessment and remedial actions at the YNPS site have at this point been completed (with the exception of the ISFSI utilized for spent fuel storage, which is not within MassDEP authority). Yankee completed cumulative (radiological and non-radiological) Human Health and Ecological Stage II Risk Assessments (the Risk Assessment) for the YNPS site, according to MCP regulations and requirements, following remedial actions. As agreed to by the MassDEP, the Phase II investigation and Report were completed within the context of the MCP for the purposes of site closure, but not as a formal Release Tracking Number (RTN) for the entire site. The MassDEP is issuing this Review of the Final Phase II Report according to its authority under M.G.L. c. 21E and the regulations promulgated thereunder at 310 CMR 40.000.

The Final Phase II Reports submitted by Yankee in response to MassDEP's Interim Phase II Review included the reports outlined below (note that all documents associated with the YNPS site are public information and may be viewed or copied at the MassDEP Regional Office in Springfield, MA, or at the Yankee Public Document Repository in Greenfield, MA):

- Groundwater Monitoring Plan to Support Closure under the Massachusetts Contingency Plan, dated September 1, 2006;
- Supplemental Phase II Comprehensive Site Assessment Report, dated September 21, 2006, by ERM, Inc.;
- Human Health Risk Assessment Work Plan & Environmental Risk Characterization Work Plan, dated September 11, 2006, by Gradient Corp.;
- Revised Beneficial Use Determination (BUD) for Structures, dated November 6, 2006, by ERM, Inc.;
- Addendum to the Phase II Comprehensive Site Assessment Report, dated February 6, 2007, by ERM, Inc.;
- Method 3 Risk Characterization, dated November 2007, by Gradient Corp.;
- Response Action Outcome Statements, RTN 1-13411, dated February 25, 2008, by ERM, Inc.; and
- Post-Closure Maintenance and Monitoring Report, dated May 6, 2008 by MACTEC, Inc.

On June 9, 2007, MassDEP issued to Yankee the Revised Beneficial Use Determination (BUD) Permit approval (the BUD Permit) regarding the disposition of on-site structures and fill material within the historical Industrial Area of the plant site. As required, Yankee submitted to MassDEP a Groundwater Monitoring Plan, which was approved by MassDEP on June 19, 2007 (copy of approval attached).

The YNPS site was divided into three land areas for the purposes of assessment and remediation. These areas are:

- The Radiologically Controlled Area (RCA), which is approximately a 4-acre parcel immediately surrounding the former operating nuclear plant area;
- The Industrial Area, which is approximately a 13-acre parcel immediately surrounding the RCA, within the previous YNPS plant fence line, which formerly contained industrial structures

associated with the plant; and

- The Non-Industrial Area, which is that portion of YNPS property outside the fenced Industrial Area, containing woodlands, roadways, etc., which encompasses approximately 1,783 acres, including surface water bodies adjacent to and downstream from YNPS site. The Southeast Construction Fill Area (SCFA) is just outside the previous Industrial Area, and has been assessed and remediated according to separate permit approvals from the MassDEP's Solid Waste Section.

The Interim Phase II Review contained a detailed summary of environmental assessment work performed as part of the Interim Phase II Report - that summary will not be repeated in this Review; however, a copy of the Interim Phase II Review is attached for reference. This Final Phase II Review will not summarize in detail the additional assessment results, but will address whether the requirements of the Interim Phase II review have been satisfactorily completed, for each of the environmental media assessed at the site. For each of the following review sections, the applicable conditions of the Interim Phase II Report requirements are listed.

1. Final Phase II Report – General (Interim Ph. II Condition 14)

The cumulative Final Phase II Report contained the following information, as required:

- Summaries of additional assessment work, including analytical data (non-radiological and radiological) in tabular form, with appropriate standards or criteria for each media shown (for reference purposes);
- Updated basemaps, depicting the locations of soil sampling locations, groundwater monitoring wells, surface water and sediment sampling locations, and fish sampling locations;
- Groundwater contour maps of the Industrial Area and immediate vicinity, and updated maps of tritium concentrations in groundwater;
- Contour maps of the top of bedrock, top of till, and top of glaciolacustrine unit;
- Contour maps of gross alpha and gross beta activity in site groundwater monitoring wells;
- Historic summaries of Radiological Environmental Monitoring Program (REMP) monitoring performed prior to 1971;
- The ASTM Phase I BWSC (21E) assessment report for the Non-Industrial Area of the Facility; and
- Cumulative (radiological and non-radiological) Human Health and Ecological Stage II Risk Assessments for the YNPS site, prepared in accordance with approved Scopes-of-Work (SOWs), according to MassDEP regulations and requirements.

2. Soil - Assessment (Interim Ph. II Conditions 2, 3, 4 & 6)

Decommissioning activities within the Industrial Area resulted in the removal of substantial volumes of soil (and demolition material, including concrete rubble) for proper disposal as radiological waste at permitted off-site disposal facilities, according to NRC requirements. Soil remediation was also completed for non-radiological parameters within the Industrial Area, and in more limited amounts in the Non-Industrial Area. Confirmatory soil samples were obtained after remedial activities were completed. As required in the BUD Permit, following assessment and soil removal, a 3-foot thick layer of clean soil was placed over the entire, 3.5-acre BUD Fill Area, which encompasses the RCA at the center of the Industrial Area.

A total of approximately 2,700 soil samples have been obtained and analyzed for non-radiological

parameters as part of the assessment of the YNPS site. The soil sampling required by the Interim Phase II Review was completed, both within the Industrial Area and in the Non-Industrial Area. All of these additional soil samples were analyzed at a minimum for the standard non-radiological parameter list for the YNPS site (as approved by MassDEP), which consists of all samples being analyzed for volatile organic compounds (VOCs) by EPA Method 8260 and the thirteen (13) Priority Pollutant metals by EPA Method 6010B, and selected additional samples being analyzed for various portions of the following parameter list:

- Semi-volatile organic compounds (SVOCs) by EPA Method 8270;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082;
- Extractable petroleum hydrocarbons/volatile petroleum hydrocarbons (EPH/VPH) by the MassDEP method;
- Dioxins and furans;
- Hydrazine;
- Pesticides; and
- Herbicides by EPA Method 8151.

The results of full radiological analyses for approximately 1,600 soil samples were utilized in the Risk Assessment review, including the specific additional soil sampling required by the Interim Phase II Review. A large amount of additional radiological monitoring and assessment of soils (and other media) was performed at the YNPS site to satisfy the NRC and MADPH requirements for the NRC License Partial Site Release, as part of the Final Status Survey (FSS) for the site.

All soil samples were analyzed for the presence of radionuclides by gamma spectroscopy, and as outlined in the LTP requirements, a minimum of 5% of these samples were also analyzed for the Hard-To-Detect (HTD) radionuclides H-3 (tritium), Am-241, C-14, Cm-243/244, Fe-55, Ni-63, Pu-238, Pu-239/240, Pu-241, Sr-90 and Tc-99. For all media samples, including soil, the radiological analyses by gamma spectroscopy at a minimum quantified the FSS list of radionuclides Ag-108m, Cs-134, Cs-137, Co-60, Eu-152, Eu-154, Eu-155, Nb-94 and Sb-125. The LTP states that these radionuclides are analyzed as part of the entire gamma spectroscopy library, and that if any other radionuclides were detected by gamma spectroscopy above minimum detectable activities (MDAs), they would have been reported as part of these analyses.

Following remedial activities, the results of soil analyses (both radiological and non-radiological) do not exceed the risk criteria of the Risk Assessment.

3. Groundwater - Assessment (Interim Ph. II Conditions 2, 3, 4, 7, 8, 9 & 10)

A total of 83 groundwater monitoring wells have been installed and monitored at the site to date, including 22 wells installed in 2006 subsequent to (and, in part, in response to) the Interim Phase II Review. Due to decommissioning activities, 26 monitoring wells have been properly abandoned in accordance with MassDEP guidelines. Currently, there are a total of 57 monitoring wells on-site, consisting of shallow (water-table) wells, intermediate depth wells, and deep, bedrock wells. Groundwater flow maps show that groundwater flow beneath the previous Industrial Area is primarily towards the Deerfield River below Sherman Dam (towards the vicinity of Sherman Spring), with some indication of a minor amount of deeper, radial flow towards Sherman Reservoir.

Groundwater samples were analyzed for the standard YNPS non-radiological parameter list, and the additional samples required in the Interim Phase II Review were also analyzed for boron, as required. Several monitoring wells have historically shown limited exceedances of groundwater standards for non-radiological parameters, primarily for arsenic.

All groundwater samples were analyzed during at least four quarterly Phase II monitoring rounds for the presence of radionuclides by gamma spectroscopy, and also for the HTD radionuclides. All groundwater samples from all monitoring rounds were analyzed at a minimum for tritium, gross alpha and gross beta, and a significant number of selected monitoring wells have also been analyzed historically for the gamma spectroscopy and the HTD parameter list.

The former Visitors' Center potable well was sampled and analyzed for radiological analyses, and the results of the last two years of sampling and analysis of the YNPS Facility potable well were included in the Final Phase II Report. The results showed no exceedances of any MA Drinking Water Standards & Guidelines (MCLs), and no detectable tritium or other plant-related radionuclides.

The Final Phase II Report states that tritium continues to be the only plant-related radionuclide detected in groundwater at YNPS site. The source of the tritium contamination in groundwater at the site was the result of a documented leak(s) in the former Spent Fuel Pool/Ion Exchange Pit complex (SFP/IXP complex) which began in the 1960s, within the center of the former Industrial Area/RCA. The tritium contamination in groundwater extends laterally downgradient from the former SFP/IXP complex location towards Sherman Spring and the Deerfield River, primarily in the shallow glaciolacustrine unit. The deeper tritium contamination is more limited in extent and concentrations, extending at depth into the sand layers within the glacial till and into bedrock in one well, MW-105B (within the former RCA), and extending laterally from the former SFP/IXP complex a shorter distance towards Sherman Reservoir.

The June 19, 2007 Post-Closure Groundwater Monitoring Plan approval issued to Yankee by MassDEP requires continued sampling of 4 monitoring wells and Sherman Spring, within and downgradient of the BUD Area, during the post-closure monitoring period of 30 years and includes analyses for the radionuclides by gamma spectroscopy, Sr-90 and tritium. Tritium monitoring is also required at 2 additional site monitoring wells, non-radiological monitoring is required at 4 additional site monitoring wells, and 30-year post-closure monitoring (radiological and non-radiological) is also required at 3 monitoring wells located at the SCFA.

During the most recent monitoring in March of 2008, tritium continued to be detected in 8 of the site monitoring wells, with the highest tritium concentration of 25,700 picoCuries/liter (pCi/l) in well MW-107C, an intermediate-level well screened at a depth of 27 to 32 feet immediately downgradient of the former SFP/IXP complex location (this has decreased from a concentration of 48,000 pCi/l in 2003 in this well). In 2008, tritium continued to be detected in bedrock monitoring well MW-105B, at 4,710 pCi/l (equivalent to 2003 levels), while the water sample from Sherman Spring was non-detectable (ND) for tritium (decreased from previous levels).

The groundwater sample from well MW-107C continues to exceed the USEPA drinking water criteria (MCL) of 20,000 pCi/L. However, as required by the BUD Permit, the recorded deed notification(s) for the BUD Area, which encompass this well location and the central area of groundwater tritium contamination, prohibits the installation or use of any water supply wells within the BUD Area. **Given the BUD Area deed restrictions and based on the remaining data outside the BUD Area, the results of groundwater analyses for both radiological and non-radiological parameters do not exceed the risk criteria of the Risk Assessment.**

4. Surface Water - Assessment (Interim Ph. II Conditions 2, 3, 4, & 11)

As part of the entire Phase II Assessment, a total of 126 surface water samples were collected from the site and surrounding vicinity, with samples collected from upstream (background) locations, Sherman Reservoir, the Deerfield River, Sherman Spring, the East and West Storm Drain Ditches, and in Wheeler Brook (as part of the SCFA assessment). Initial Phase II surface water samples were analyzed for the standard YNPS non-radiological parameter list and for radionuclides by gamma spectroscopy and for HTDs. All of the additional surface water samples required in the Interim Phase II Review were obtained as required and analyzed for the thirteen (13) Priority Pollutant metals plus lithium and boron, and for radionuclides by gamma spectroscopy plus tritium.

The additional surface water samples showed slightly elevated levels of some metals in Sherman Spring and the Deerfield River immediately downriver of the YNPS. Tritium was detected in Sherman Spring and the West Storm Drain Ditch in 2006. **The results of the surface water analyses for both radiological and non-radiological parameters do not exceed the risk criteria of the Risk Assessment.**

5. Sediment - Assessment (Interim Ph. II Conditions 2, 3, 4, & 11)

As part of the entire Phase II Assessment, a total of approximately 700 sediment samples were collected from the site and surrounding vicinity, with samples generally collected from the same locations as surface water samples. Initial Phase II surface water samples were analyzed for the standard YNPS non-radiological parameter list and for radionuclides by gamma spectroscopy and for HTDs. All of the additional sediment samples required in the Interim Phase II Review were obtained as required and analyzed for the thirteen (13) Priority Pollutant metals plus lithium, boron and total uranium, and for radionuclides by gamma spectroscopy plus HTDs.

As part of decommissioning activities, PCB-contaminated sediments (from PCB-containing paints previously used at the YNPS) were remediated from Sherman Reservoir and the West Storm Drain Ditch in accordance with TSCA approvals from the EPA, as noted previously. Confirmatory sediment samples were obtained from these areas after remediation.

The additional sediment samples showed slightly elevated levels of some metals and some radionuclides (including Cs-137) in Sherman Spring, the Deerfield River immediately downriver of the YNPS, and in Sherman Reservoir near the Cooling Water Discharge. Total uranium was slightly elevated in the Deerfield River immediately downriver of the YNPS. **The results of the sediment analyses for both radiological and non-radiological parameters do not exceed the risk criteria of the Risk Assessment.**

6. Fish - Assessment (Interim Ph. II Conditions 2, 4, & 12)

Fish were collected in the Summer/Fall of 2006 from background locations upriver at Harriman Reservoir; two locations within Sherman Reservoir (the East Storm Drain Outfall near the YNPS facility, and the northern end of Sherman Reservoir); and the Deerfield River immediately downriver of the YNPS facility, upriver of the Monroe Bridge dam. Fillets from the fish were analyzed for PCBs (both Aroclors and congeners), for radionuclides by gamma spectroscopy, and for tritium.

Fish samples from Sherman Reservoir showed slightly elevated levels of PCBs, relative to the background samples from Harriman Reservoir. Fish samples from Sherman Reservoir showed

detectable, but very low levels of tritium, while the background samples from Harriman Reservoir and the samples from the Deerfield River were non-detectable for tritium. The Final Phase II Report concluded that the detectable levels of tritium were naturally-occurring and not related to YNPS plant operations. No other radionuclides were detected by gamma spectroscopy in the fish samples, except for naturally-occurring K-40. **The results of the fish analyses for both radiological and non-radiological parameters do not exceed the risk criteria of the Risk Assessment.**

6. **Risk Assessment – Results** (Interim Ph. II Conditions 13 & 14)

As required by the Phase II Interim Review, Yankee's consultant, Gradient Corp., submitted to MassDEP the Scopes-of-Work (SOWs) for cumulative (radiological and non-radiological) Human Health and Ecological Stage II Risk Assessments (the Risk Assessment) for the YNPS site, according to the regulations, requirements and guidance as outlined in the MCP. The SOWs were approved by MassDEP's Office of Research & Standards (ORS) on December 6, 2006. The completed Method 3 Risk Characterization (the Risk Assessment) for the YNPS was submitted to MassDEP on November 13, 2007. **The Risk Assessment concludes that the YNPS site meets the MassDEP's Risk Assessment standards for cumulative risk attributable to the site (radiological and non-radiological) of no more than 1×10^{-5} Excess Lifetime Cancer Risk (ELCR) and no more than a Hazard Index (HI) of 1.**

USEPA/Region I provided assistance to MassDEP/ORS in the review of the Risk Assessment. The ORS review of the Risk Assessment was issued on December 31, 2007 (copy attached). **The ORS review memorandum states that the Risk Assessment is consistent with the risk assessment requirements of the MCP.**

The NRC's August 10, 2007 Partial Site Release issued in accordance with the YNPS License Termination Plan (LTP) concluded that the YNPS site meets the NRC approved Yankee Atomic Electric Company's LTP/FSS standard of no more than 25 millirem/year (mrem/yr) total radiation dose above background, or Total Effective Dose Equivalent (TEDE) attributable to the site. The MADPH's March 14, 2008 partial site release approval concluded that the YNPS site meets the MADPH standard of no more than 10 mrem/yr TEDE attributable to the site. Neither of these approvals required the placement of the 3-foot soil cover over the BUD Fill Area (the RCA) to meet these respective dose-based standards.

The MassDEP's approval of the Risk Assessment conclusions are contingent, in part, on the Deed Notifications (Activity and Use Limitations; or AULs) for the YNPS site, which contain the following requirements (among others) for 30-year post-closure maintenance and monitoring by Yankee:

- The continued maintenance of the three-foot layer of clean soil placed over the 3.5-acre BUD Fill Area in the central portion of the YNPS site, and the requirements for no excavations or other invasive procedures within that soil layer;
- The requirement that no potable water supply wells may be installed or used within the BUD Area; and
- The requirements for continued monitoring of the YNPS site, including the BUD Area and the SCFA.

Yankee recorded the Deed Notification for the SCFA on October 3, 2007, and the Deed Notification for the YNPS portion of the BUD Area on February 1, 2008, and TransCanada recorded the Deed Notification for the TransCanada portion of the BUD Area on June 27, 2008. Yankee executed Financial Assurance Mechanisms (FAMs) for the BUD Area on November 25, 2007, and for the SCFA on February 11, 2008, consisting of letters-of-credit in the monetary amounts approved by MassDEP, for 30-

year post-closure maintenance and monitoring costs. As noted previously, the MassDEP's June 19, 2007 approval of the Groundwater Monitoring Plan requires long-term monitoring of the BUD Area and the SCFA.

II. MASSDEP DETERMINATIONS

Personnel of the MassDEP have reviewed the Final Phase II Report for the YNPS in accordance with MGL c. 21E, the regulations promulgated thereunder at 310 CMR 40.0000 (the Massachusetts Contingency Plan, or the MCP), and applicable MassDEP policies and guidance. The MassDEP has determined that the Final Phase II Report is acceptable in accordance with MGL c. 21E and 310 CMR 40.0000, and that YNPS has achieved site closure under the MCP, subject to the conditions outlined below.

1. Yankee shall continue to comply with the requirements for post-closure maintenance and monitoring of the entire BUD Area (both the YNPS portion and the TransCanada portion of the BUD Area), as outlined in the MassDEP's Revised BUD Permit Approval, dated June 9, 2007.
2. Yankee shall continue to comply with all of the stipulations contained within the Deed Notification for the YNPS portion of the BUD area, as recorded on February 1, 2008, at the Greenfield Registry of Deeds, Book 5455, Page 320.
3. Yankee shall continue to comply with all of the stipulations contained within the Deed Notification for the SCFA, as recorded on October 3, 2007 at the Greenfield Registry of Deeds, Book 5401, Page 167.
4. Yankee shall continue to comply with the requirements for post-closure monitoring of the YNPS BUD Area (including the portion of the BUD Area on the TransCanada property) and the SCFA, as outlined in the MassDEP's approval of the Groundwater Monitoring Plan dated June 19, 2007, including the requirement for submittal of monitoring results to MassDEP within 45 days of the date of sampling. As outlined in the attached ORS Risk Assessment review memo, the metal thallium shall be added to the analytical parameter list for sampling of Sherman Spring as part of post-closure monitoring.
5. Yankee shall continue to comply with the post-closure maintenance and monitoring requirements for the SCFA, as outlined in separate correspondence from MassDEP.
6. Yankee shall continue to comply with all other applicable local, state and federal regulations and requirements, including those of the NRC, EPA, MADPH, and the Rowe Conservation Commission.
7. Appropriate Health & Safety (H&S) measures shall be utilized for all post-closure maintenance and monitoring work at the YNPS.

MassDEP is issuing this Final Report Review for public comment. In accordance with 310 CMR 40.1400, Yankee shall publish a legal notice in a newspaper which circulates in the community of Rowe, which shall identify that the Final Report Review has been issued and which shall identify the 30-day public comment period. MassDEP will accept public comments on the Final Report Review for a period of 30 days following MassDEP's receipt of documentation that the legal notice has been published.

The MassDEP reserves the right to require additional investigatory or remedial work at the YNPS site, if continued monitoring results indicate such a need. If you should have any questions or comments regarding this correspondence please contact Larry Hanson (#413-755-2287) or David Howland (#413-755-2280) of this office.

Sincerely,



Michael J. Gorski
Regional Director

Yankeeph2final908 LH

cc: Joe Bourassa - Yankee Atomic Electric Company
Robert Mitchell - Yankee Atomic Electric Company
John McTigue - ERM, Inc.
Rowe Board of Selectmen
Rowe Board of Health
Michael Whalen, MA DPH - Radiation Control Program
John Hickman - Nuclear Regulatory Commission
Anna Symington, Tony Kurpaska - DEP/WERO/BWSC
David Howland, Steven Ellis, Daniel Hall - DEP/WERO
Nancy Bettinger, Carol Rowan - West - DEP/Boston/Office of Research & Standards
Earnest Waterman, Kimberly Tisa, Mary Ballew, Philip Newkirk - EPA
Franklin Regional Council of Governments
Citizens Awareness Network - Deborah Katz
TransCanada - William Taylor, Thomas Hwang, Esq.



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DEVAL L. PATRICK
Governor

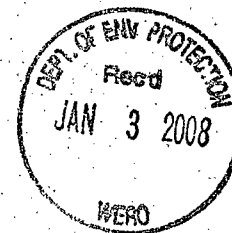
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LAURIE BURT
Commissioner

MEMORANDUM

To: Larry Hanson, Project Manager
David Howland, Regional Engineer *CRW*
Through: Carol Rowan West, Director, ORS
From: Nancy Bettinger, ORS *NB*
Date: December 31, 2007
Subject: Method 3 Risk Characterization
Former Yankee Nuclear Power Station
Rowe, Massachusetts



As requested, ORS has reviewed the revisions made to the Method 3 Risk Characterization for the former Yankee Nuclear Power Station site in Rowe, Massachusetts. The revised Method 3 Risk Characterization was submitted to MassDEP by Gradient Corporation on behalf of Yankee Atomic Electric Company in response to ORS's August 24, 2007 comments on the June 2007 draft of the Method 3 Risk Characterization.

The risk assessment is comprehensive, clearly presented, and consistent with the risk assessment requirements of the MCP. Gradient has incorporated most of the recommendations offered by ORS in our August 2007 memorandum. In our view, the risk assessment is essentially complete. For the record, however, ORS wishes to note the following:

- Where surface water concentrations of contaminants of concern exceed Massachusetts Surface Water Quality Standards, a condition of "no significant risk" does *not* exist by definition under the MCP. For toxics, the National Recommended Water Quality Criteria (NRWQCs) are cited as Massachusetts Surface Water Quality Standards. The Risk Characterization report acknowledges that the maximum detected levels of some inorganics (cadmium, copper and lead) in Wheeler Brook surface water do exceed the criteria (surface water standards), but it does not state explicitly that a condition of "no significant risk" does not exist in Wheeler Brook. The practical implication of a condition of significant risk in Wheeler Brook is that long term monitoring, which is already planned, will be needed to confirm that the sources of contamination to the Brook



and thus to Sherman Reservoir have been eliminated, and that contaminant concentrations in surface water are decreasing as expected.

- The maximum detected concentration of cadmium in Sherman Reservoir of 0.00009 mg/L slightly exceeds the hardness-adjusted surface water standard of 0.00008 mg/L. This apparent exceedance may be insignificant by itself for two reasons: (1) The maximum detected concentration reported in Table 3-20 is the same as the maximum Sherman Reservoir concentration; and (2) The absolute value of the exceedance is small. Nevertheless, considering that the maximum is based on only three samples, additional monitoring may be warranted in order to evaluate whether exceedances persist.
- The thallium concentration (0.003 mg/L) in the sample collected from Sherman Spring in the Deerfield River Study Area is significantly higher than the NRWQC for protection of human health (0.00047 mg/l). Sherman Spring discharges to the Deerfield River. The human health-based surface water standard is not applicable to the Sherman Spring itself, which is not fishable. Nevertheless, additional monitoring in Sherman Spring may be prudent to ensure that contaminant levels in the spring decrease as expected.
- In ORS's August 24, 2007 memorandum, the fourth bullet under the "Human Health" heading calls for a fuller description of uses and activities that will be prohibited by Activity and Use Limitations and other institutional controls applied in the vicinity of the site. This comment was not explicitly addressed in the November 2007 revision of the Method 3 Risk Characterization. Nevertheless, ORS understands that the activities of concern will be addressed in the AULs that are applied.
- In ORS's August 24, 2007 memorandum, the sixteenth bullet under the "Human Health" heading notes several typographical errors in the toxicity value tables. Most appear to have been corrected in the November 2007 revision. At least one error remains, but it will not affect the outcome of the risk assessment.

If you have any questions about this memorandum, please feel free to contact me at (617)556-1159 or at nancy.bettinger@state.ma.us.



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OCT 31 2008

Yankee Atomic Electric Company
49 Yankee Road
Rowe, MA 01367
Attention: Wayne Norton, President

RE: Rowe-DSWM-08-253-008
DEP Solid Waste Permitting
SE Construction Fill Area (SCFA)
Closure Certification & **Permit Approval**
Yankee Nuclear Power Station
49 Yankee Road
BWPSW43
Transmittal #W120065

Dear Mr. Norton:

The Solid Waste section of the Massachusetts Department of Environmental Protection (the Department) has completed review of the Final Closure Certification (Closure Certification) report and permit application for the Southeast Construction Fill Area (the SCFA) of the Yankee Nuclear Power Station (YNPS) in Rowe, MA. The Closure Certification report was prepared on behalf of Yankee Atomic Electric Company (Yankee) by its consultant, Environmental Resources Management (ERM) of Boston, MA, and was signed and stamped by Gregg A. Demers, Massachusetts-registered Professional Engineer (P.E.) #39434 of ERM.

As a part of decommissioning activities for the YNPS, the SCFA was assessed and closed in accordance with the Department's Solid Waste regulations at 310 CMR 19.000. The SCFA is a fill area of approximately 1.2 acres in size, located immediately southeast of the former Yankee industrial facility (within Yankee property), where soil and debris from construction activities at the site was historically placed.

MassDEP previously issued to Yankee the following Solid Waste permit reviews/approvals for the SCFA:

- the Final Comprehensive Site Assessment (CSA) permit approval, dated April 9, 2002;
- the Corrective Action Alternatives Analysis (CAAA, or remedial feasibility) permit approval, dated April 13, 2004; and
- the Corrective Action Design (CAD) Final Closure Plan permit approval, dated January 11, 2005.

The Closure Certification Report was submitted in compliance with



MassDEP's CAD Plan approval for the remediation of the SCFA. The Closure Certification report documents that the closure activities were performed at the SCFA in accordance with the approved plans and as required by the MassDEP, and proposes post-closure maintenance and monitoring of the SCFA.

The Closure Certification report includes the following information:

- Summary text describing the final closure activities completed for the SCFA;
- Plans and cross-sections of the SCFA following remediation;
- Test-pit logs and photographs; and
- A post-closure maintenance and monitoring plan.

As a part of decommissioning activities for the YNPS, the SCFA was assessed and closed in accordance with applicable environmental regulations, including the Nuclear Regulatory Commission (NRC) regulations 10 CFR Part 50, and the applicable regulations of the Massachusetts Department of Public Health's Radiation Control Program (the MA RCP), the United States Environmental Protection Agency (the EPA), and the MassDEP.

Assessment of the SCFA consisted of the installation and monitoring of groundwater monitoring wells, sampling and analysis of surface water and sediment from Wheeler Brook near the SCFA, landfill gas monitoring around the perimeter of the SCFA, and sampling and analysis of soils from the SCFA prior to and during remediation. The CSA report and the Closure Certification Report state that radiological monitoring of the SCFA, Wheeler Brook and the surrounding area has shown results that are consistent with natural background levels, i.e., there has been no evidence there of any facility-related radionuclides or radioactivity, except for a small amount of radiologically-impacted asphalt removed from the SCFA during remedial activities, as outlined below.

As part of the Final CSA, ERM previously completed a Qualitative Risk Assessment for the SCFA in accordance with the requirements outlined in the Department's Landfill Technical Guidance Manual (the LAC). ERM concluded that no significant risk of harm to human health or the environment was identified for the SCFA, although several metals, including iron and manganese, were elevated in the surface water of Wheeler Brook immediately downgradient of the SCFA. The MassDEP's Office of Research & Standards (ORS) December 31, 2007 review of the Method 3 Risk Characterization (the Quantitative Risk Assessment) for the entire YNPS site noted that the exceedance of surface water standards for cadmium, copper and lead in Wheeler Brook immediately downgradient of the SCFA requires that long-term surface water monitoring of Wheeler Brook be continued to demonstrate that these levels are decreasing over time.

Remediation of the SCFA was performed from July, 2005 through May, 2006, and consisted of excavation of the upper portion of the SCFA, with removal of approximately 13,000 cubic yards of non-conforming material (primarily soil) from the excavated area. Non-conforming material consisted of soil impacted by polychlorinated biphenyls (PCBs), construction & demolition (C&D) debris (primarily scrap metal), C&D debris and soil containing asbestos-containing material (ACM), and approximately 50 cubic yards of radiologically-impacted asphalt (containing the radionuclide Co-60 slightly above background levels).

Portions of the soils within the SCFA were contaminated by PCB-containing paint chips generated during the maintenance of the YNPS facility; the assessment and remediation of PCBs at the SCFA was governed by an EPA Toxic Substances Control Act (TSCA) permit approval. All of the non-conforming material was removed off-site for disposal at proper, permitted disposal facilities, except for approximately 1,800 cubic yards of PCB-impacted soil which was thermally treated on-site at YNPS according to an EPA TSCA permit approval, and which was reused on-site as fill according to the MassDEP's June 19, 2007 Beneficial Use Determination (BUD) permit.

Upon completion of excavation and removal activities, Yankee completed a total of 14 test pits at the SCFA, to the natural soils at the base of the SCFA fill (maximum 22 feet in depth). The test pits, which were inspected by MassDEP personnel, contained only very minor amounts of remaining C&D debris. Several of the test pits contained sawdust at the base of the SCFA, which had apparently been produced by an historic sawmill which operated at the location of the SCFA, prior to the construction of the YNPS. The maximum residual PCB concentration remaining in the soils of the SCFA following remediation was 6.45 milligrams/kilogram (mg/kg), which meets the EPA TSCA Low Occupancy Criteria of 25 mg/kg.

Clean fill was used to grade the SCFA excavation area to proper slopes to facilitate drainage, and 6 inches of clean topsoil was then placed over the SCFA and seeded with grass. MassDEP inspections subsequent to the seeding showed that the grading work was acceptable and that a healthy grass cover had been established.

ERM proposes to inspect the SCFA on a quarterly basis for three years, and to repair any erosion which might be observed. In accordance with Yankee's "Post-Decommissioning Planting Plan and Specifications", the SCFA will not be mowed but will be allowed to undergo natural plant succession. Groundwater monitoring will be performed at one upgradient well and two downgradient wells in accordance with Yankee's "Post-Closure Groundwater Monitoring Program", annually for 5 years, then every 2 years for the remainder of the 30-year post-closure monitoring period, with analyses for the non-radiological parameters outlined at 310 CMR 19.132, as well as tritium. Surface water will be sampled at the previous five locations along Wheeler Brook on the same frequency and for the same parameters as groundwater.

Yankee submitted to MassDEP a copy of the Record Notice of Landfill Operation for the SCFA, as outlined in 310 CMR 19.141, including a survey map of the SCFA and appropriate supporting documentation. The documentation contained proof that the Record Notice was recorded on October 3, 2007 at Book 5401, Page 167, in the Franklin County Registry of Deeds. On February 11, 2008, Yankee executed a Financial Assurance Mechanism (FAM) in the amount of \$72,625.00 for post-closure maintenance and monitoring at the SCFA, and provided documentation to the MassDEP of such execution.

MASSDEP DETERMINATIONS

In accordance with 310 CMR 19.130 (31)(d), the MassDEP has reviewed the Closure Certification Report and has performed inspections of the SCFA both during and after closure. Based on the review of the Report, the

inspections and the consultant's certification; the MassDEP is issuing this letter of compliance certifying that the SCFA has been closed in accordance with the approved plans.

In accordance with 310 CMR 19.140(6), the post-closure period begins on the date of this determination. In accordance with 310 CMR 19.142, the post-closure period extends for a minimum period of 30 years from the date of this approval, however, the MassDEP may reduce (upon written request by the permittee) or extend (in order to ensure protection of public health, safety or the environment) the 30-year post-closure period. This certification permit shall remain valid for the entire post-closure period.

Note that this document is a permit issued pursuant to MGL Chapter 111 Sections 150A and 150A1/2 and the regulations promulgated thereunder at 310 CMR 16.00 and 310 CMR 19.000. This permit is subject to the standard conditions presented at 310 CMR 19.043(5) and to the conditions and requirements listed below:

1. Yankee Atomic Electric Company (Yankee) is the permittee for the SCFA.
2. During the post-closure period, the permittee shall perform the following activities at the SCFA as described in 310 CMR 19.142, Landfill Post-Closure Requirements, of the Solid Waste Management Facility Regulations, and as further specified in this permit:
 - (a) Perform inspections for settlement and erosion during all monitoring rounds for the entire post-closure period;
 - (b) Take corrective actions to remediate and/or mitigate conditions that would compromise the integrity of the final cover (topsoil and vegetative cover);
 - (c) maintain the integrity of the final cover (topsoil and vegetative cover); and
 - (d) monitor and maintain the environmental monitoring systems for surface water and groundwater.
3. All maintenance/repair of the SCFA final cover conducted as a result of storm damage, erosion, or other circumstances shall be summarized and reported to the MassDEP within thirty (30) days of the date of the repair/maintenance.
4. The permittee shall submit a post-closure report, as required by 310 CMR 19.142 (6) Reporting Requirements, not later than February 15th of each year.
5. The SCFA shall not be used for any post-closure activity without prior written approval from the MassDEP. The performance of any activity on the SCFA that compromises the final cover or failure to adequately maintain the final cover shall invalidate the certification and may be considered to be a violation of this permit. Under no circumstances shall excavations or penetrations be made into the SCFA surface without prior written MassDEP approval.

6. Yankee shall comply with all of the stipulations contained within the Deed Notification for the SCFA, as recorded on October 3, 2007 at the Greenfield Registry of Deeds, Book 5401, Page 167.
7. Yankee shall comply with the continuing requirements for post-closure groundwater monitoring of the SCFA, as outlined in the MassDEP's approval of the YNPS Groundwater Monitoring Plan dated June 19, 2007, including the requirement for sampling of monitoring wells CFW-1, CFW-5, and CFW-6 annually for 5 years, then every 2 years for the remainder of the 30-year post-closure period. As proposed in the Closure Certification Report, surface water samples shall be obtained from each of the five previous SCFA surface water sampling locations on the same frequency and for the same timeperiods as the SCFA groundwater sampling.
8. The SCFA groundwater and surface water samples shall be analyzed for the parameters outlined in 310 CMR 19.132 (1)(h)(1-3), including VOCs by EPA Method 8260 and dissolved metals, and also for tritium. All VOC analyses by EPA Method 8260 shall be performed as outlined in 310 CMR 19.132(h)(1-3), specifically methyl ethyl ketone, methyl isobutyl ketone, and acetone shall be included, and unknown peaks having intensities greater than 5 times the background intensity shall be identified.
9. Results of SCFA monitoring, including data in tabular form and laboratory analytical data sheets, shall be submitted to the MassDEP within 45 days of the date of sampling.
10. MassDEP reserves the right to modify the SCFA environmental monitoring program at any time.
11. Yankee shall comply with all other applicable local, state and federal regulations and requirements concerning the SCFA, including those of the NRC, EPA, MADPH, and the Rowe Conservation Commission.
12. Appropriate Health & Safety (H&S) measures shall be utilized for all post-closure maintenance and monitoring work at the SCFA.
13. Should utilization of FAM monies be required according to the regulations outlined at 310 CMR 19.051(9), the MassDEP reserves the right to utilize any portion of the FAM for post-closure maintenance and monitoring at the SCFA. The permittee shall submit to the MassDEP revised estimates of post-closure maintenance and monitoring costs every two years following the issuance of this Closure Certification approval.
14. The MassDEP and its agents and employees shall have the right to enter upon the SCFA site at all reasonable times and with reasonable notice, to inspect the SCFA and any equipment, structure or land located thereon, take samples, recover materials or discharges, have access to and photocopy records, to perform tests and to otherwise monitor compliance with this Permit and all environmental laws and regulations. This right of entry and inspection shall be in addition to the MassDEP's access authorities and rights under applicable federal and states laws and regulations, as well as any permits or other agreements between the Permittee and the MassDEP.

Pursuant to 310 CMR 19.037(5), any person aggrieved by the issuance of this approval, except as provided for under 310 CMR 19.037(4)(b), may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. c. 111, s. 150A and C. 30A not later than thirty [30] days following notice of this decision. The standing of a person to file an appeal and the procedures for filing such appeal shall be governed by the provisions of M.G.L. c. 30 A. Unless the person requesting an appeal requests and is granted a stay of the terms and conditions of the permit by a court of competent jurisdiction, the permit decision shall remain effective or become effective at the conclusion of the 30 day period.

Any aggrieved person intending to appeal the decision to the superior court shall provide notice to the MassDEP of said intention to commence such action. Said Notice of Intention shall include the MassDEP File Number (08-253-008) and shall identify with particularity the issues and reason(s) why it is believed the approval decision was not proper. Such notice shall be provided to the Office of General Counsel of the MassDEP and the Regional Director for the regional office which made the decision. The appropriate addresses to which to send such notices are:

Office of General Counsel
MassDEP
One Winter Street
Boston, MA 02108

&

Regional Director
MassDEP
436 Dwight Street - 5th Floor
Springfield, MA 01103

No allegation shall be made in any judicial appeal of this decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in those regulations, provided that matter may be raised upon a showing that it is material and that it was not reasonably possible with due diligence to have been raised during such procedures or that matter sought to be raised is of critical importance to the public health or environmental impact of the permitted activity.

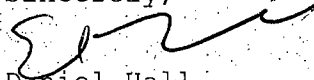
This approval pertains only to the solid waste management aspects of the proposal and does not negate the responsibilities of the owners or operators to comply with any other local, state or federal laws and regulations now or in the future.

Yankee/Rowe - Southeast Construction Fill Area
Closure Certification Approval
SWM File #08-253-008

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The MassDEP reserves the right to require additional investigatory or remedial work at the SCFA, if continued monitoring results indicate such a need. If you should have any questions or comments regarding this correspondence please contact Larry Hanson (#413-755-2287) of this office.

Sincerely,



Daniel Hall
Section Chief, Solid Waste Management
Western Regional Office

Yankscfacert

cc: Joe Bourassa - Yankee
Gregg Demers - ERM, Inc.
Rowe Board of Selectmen
Rowe Board of Health
Michael Whalen, MA DPH - Radiation Control Program
John Hickman - Nuclear Regulatory Commission
David Howland - DEP/WERO
Nancy Bettinger - DEP/Boston/Office of Research & Standards
Kimberly Tisa - EPA
Franklin Regional Council of Governments
Citizens Awareness Network - Deborah Katz

AFTER 5 DAYS RETURN TO
THE COMMONWEALTH OF MASSACHUSETTS
DEPT. OF ENVIRONMENTAL PROTECTION
WESTERN REGION
436 DWIGHT STREET - 5TH FLOOR
SPRINGFIELD, MASSACHUSETTS 01103

BWP



~~John Hickman~~ Randy Hall EBB E3D2M
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Office of NRR
Washington, DC, 20555