Vermont Yankee Nuclear Power Station

Non-Radiological Historical Site Assessment

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Executive Summary

This Historical Site Assessment (HSA) has been completed to identify areas of the Vermont Yankee Nuclear Power Station (VYNPS) (the "Site") where environmental media may have been impacted by non-radiological contaminants throughout the operating history of the plant. In addition, this document addresses areas of the plant where future decommissioning activities may encounter hazardous materials or areas that contain historic impacts and, therefore, discusses considerations to minimize environmental impacts. The purpose of the assessment is to assist in planning for decommissioning of the power plant. The investigation included: 1) review of a phase I and II environmental site assessment report for the Site prepared as due diligence prior to purchase of the station by Entergy Nuclear Vermont Yankee, LLC, (Reference 1), 2) reports related to incidents of non-radiological contamination of the Site, 3) review of the file required by federal regulation 10 CFR 50.75(g) to document contamination incidents pertinent to decommissioning of the Site, 4) review of selected inspection reports prepared by American Nuclear Insurers (ANI), 5) search of company records describing equipment leaks, spills of hazardous materials and an inventory of components containing elemental mercury, 6) review of databases maintained by the Waste Management Division of the Vermont Agency of Natural Resources, 7) review of various permits related to environmental regulation and issues related to the station, 8) interviews of current or former long-time station employees to identify incidents that may not have been documented in plant records, and 9) inspections of the power station to observe each identified potentially impacted area. This HSA is a living document and will be modified or augmented as additional information is identified.

The assessment identified one hundred thirty four areas on or adjacent to the VYNPS site where current or former activities may have resulted in non-radiological impacts potentially significant to the decommissioning effort. These areas are summarized in the attached Table 1. Potentially impacted areas are classified as Class 1, Class 2 or Class 3, using a classification system similar to the one set forth for classifying potentially radiologically contaminated areas in NUREG-1575, Rev 1 (MARSSIM) (Reference 2), where Class 1 areas have the highest potential for impacts that may be significant to decommissioning. For purposes of classifying potentially non-radiologically contaminated areas, the same concept has been applied, with the substitution of Vermont primary groundwater quality standards (PGQS), federal maximum contaminant levels (MCLs) or risk-based concentrations (RBCs) for MARSSIM's derived concentration guideline levels (DCGLs), which are site-specific radiological criteria for release of an area for unrestricted use.

Eleven areas at VYNPS have been classified as Class 1, fifty two areas as Class 2 and seventy one areas as Class 3. None of the areas is considered to pose a current or expected threat to human health or the

environment that would warrant immediate corrective action. Each area will be characterized for the presence of contamination as it becomes more accessible during decommissioning, to determine the extent to which it may have been impacted. Consistent with the approach prescribed in MARSSIM, those areas classified Class 1 will receive a relatively higher level of scrutiny.

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The 134 potentially impacted areas are subdivided into twelve categories as follows: septic systems (7), owner-controlled areas (16), underground and above ground storage tanks (29), transformers and breakers (21), miscellaneous containers (24), switchyards (3), storm water drainage systems (5), water supply wells (4), chemical storage areas (4), small satellite chemical and flammable material storage areas (10), compressed gas storage areas (6) and nearby off-site areas owned by Entergy (5). These areas are summarized on Table 1 and their locations are shown on Figures 1, 2 or 3. The areas shown on Figures 2 and 3 are also identified in VYNPS operating procedure OP-2106 rev33 "Oil and Hazardous Material Spill Prevention and Control" (Reference 3).

Eighty two of the identified areas were evaluated in 2001 when a comprehensive phase I and phase II environmental site assessment of the power station was completed prior to purchase of the Site by Entergy Nuclear Vermont Yankee, LLC . An additional 52 areas have been identified by the current historical site assessment. Three of the areas not discussed in the 2001 report are generic plant-wide areas where lead and lead-based paint, asbestos or elemental mercury may be present. An additional ten areas either did not exist in 2001 (i.e. the Construction Office Building Overflow Septic System) or were not associated with VYNPS (i.e. off-site properties on Governor Hunt Road). Twenty four areas not previously identified are categorized as the location of miscellaneous containers, are relatively small and pose little risk of contamination that would be significant to decommissioning. The remaining sixteen areas not discussed in the 2001 report may not have been in their current configuration at the time the report was prepared or are areas that were only active early in the plant history and whose existence is not well known or documented.

This investigation has included review of the 2001 phase I and phase II environmental site assessment of the Site, reports related to incidents of non-radiological contamination of the Site, review of the file required by federal regulation 10 CFR 50.75(g) to document contamination incidents pertinent to decommissioning of the Site, review of selected inspection reports by ANI, search of company records of leaks, spills of hazardous materials and an inventory of components containing elemental mercury, review of the spills database maintained by the Waste Management Division of the Vermont Agency of Natural Resources, review of various permits related to environmental regulation of the Site, interviews of current or former long-time station employees, and an inspection of the power plant to observe each identified potentially impacted area.

In 1999 a search was completed of all Potentially Reportable Occurrences (PROs) for the years 1973–1994 and all Event Reports (ERs) for the years 1995-1998 to identify incidents of spills or releases of radioactive materials and hazardous chemicals. That search identified 42 incidents, most of which related to radiological materials. Fourteen of the incidents related to hazardous materials, most of which were relatively minor spills that were immediately contained and remediated. Only one of the 14 (PRO 91-06, describing a leak in a chemistry laboratory drain), appears to have the potential to require remediation during decommissioning. In May 2014 a search was completed of all Condition Reports (CRs) for the years 1999-2014 (Appendix D) to identify spills of hazardous materials that have been documented since the 1999 records search. The 2014 search identified 50 incidents. Thirty four of the incidents were of minor spills (less than a few gallons) of petroleum products including fuel oil, gasoline and hydraulic oil that were immediately contained and remediated. Other incidents included spills of small volumes of elemental mercury from thermometers and gauges, antifreeze from a truck engine cooling system and various chemical leaks including sodium hypochlorite at the plant intake structure. Each of these spills was immediately contained and remediated. CRs 04-2036 and 05-3663, relating to a fire in the Main transformer and a slow leak of oil from the Spare Main transformer, respectively, are the only CRs found that appear to be potentially significant for decommissioning. Table 2 is a summary of spills of petroleum products or other hazardous materials at VYNPS that are recorded in the Vermont Department of Environmental Conservation, Waste Management Division on-line database. As shown in Table 2, all of the spills have been "closed" by VT WMD and all but the two that occurred in the 1970s consisted of small volumes.

Interviews of current or former long-time employees of VYNPS were conducted during April and May 2014 as a means of identifying areas where either radiological or non-radiological contamination may have occurred but that may not have been documented in plant records (Appendix E). Employees who were at VYNPS for many years, particularly during plant construction and early operation, were sought because spill reporting and documentation of contamination incidents then may not have been as complete as they have become more recently. For example, federal regulation 10 CFR 50.75(g), which requires compilation of records of contamination incidents that may have significance during decommissioning, did not exist prior to 1988. Therefore, incidents that occurred prior to approximately 1988 may have been documented but those records may not appear in the 10 CFR 50.75(g) file and may not be easily found.

Nine individuals who still live near VYNPS, were available, and who have an average length of employment at the plant of 36 years were interviewed. All but one of the interviewees began employment at VYNPS during the years 1967 to 1972 and, therefore, had first-hand experience during plant construction. In addition, one of the interviewers had worked at the plant as a Chemistry and Health Physics manager during the years 1969 to 1997. The available interviewees provided a representative sampling of the various departments at VYNPS. In general, results of the interviews corroborated information developed by record searches and plant tours, and did not identify any Class 1 areas that had not been identified by other lines of investigation. A common comment was that interviewees were not aware of incidents that were not reported and recorded, and that it was their

experience that their coworkers generally followed procedures and performed their duties to the best of their ability.

American Nuclear Insurers (ANI) conducts annual inspections of VYNPS as the basis for determining the nuclear liability insurance risk for the station. Inspection Reports for 1998 and 2000 were reviewed. The 1998 ANI report recommended that "underground tanks and piping which contain potentially radioactive fluids or gases should be identified and included in an evaluation/inspection program to verify their mechanical integrity". Although not stated in the report, the recommendation is also relevant to underground tanks and piping which contain hazardous materials other than radioactive fluids, such as petroleum products. The 2000 ANI report acknowledged receipt of a list from VYNPS of all underground piping and the results of a test boring program that did not show contamination levels or isotopes that would be indicative of a piping leak. Nevertheless, because of the age of the piping and the potential for undetected leakage, ANI recommended risk ranking the underground segments of piping based on an engineering protocol that considers piping age, contents, material composition, soil composition, etc. The Nuclear Energy Institute established NEI 09-14 rev 1 (Reference 4) in December 2010. This guideline for the management of underground piping and tank integrity applies to underground piping and tanks containing both radiological and non-radiological fluids. The NEI guideline specifies development of the type of engineering protocol suggested by ANI. VYNPS has implemented NEI 09-14 by development and use of VYNPS procedure SEP-UIP-VTY rev 5 (Reference 5) that provides an inspection schedule based on risk ranking. Therefore, VYNPS appears to be in compliance with ANI's recommendation regarding underground tanks and piping.

Based on identified historical use, each area listed in Table 1 is presumed to have some potential to have been impacted by non-radiological contamination. Other areas not listed in Table 1, such as the plant access gates, metrological towers, parking areas and most plant buildings outside of the power block are presumed not to have been impacted by non-radiological contamination. Potentially impacted areas are classified as Class 1, Class 2 or Class 3, similar to the classification approach in NUREG-1575, Rev 1 (MARSSIM), where Class 1 areas have the highest potential for impacts that may be significant to decommissioning. For purposes of classifying potentially radiologically contaminated areas, MARSSIM defines both Class 1 and Class 2 impacted areas as "areas that have, or had prior to remediation, a potential for radioactive contamination (based on Site operating history) or known contamination (based on previous radiological surveys)". Class 1 areas are distinguished from Class 2 areas in that contaminant concentrations in a Class 1 area are expected to exceed the derived concentration guideline levels (DCGLs), which are the site-specific criteria for release of the Site, whereas in a Class 2 area they are not. Class 3 areas are expected to contain levels of residual contamination at a small fraction of the DCGLs, or none at concentrations greater than the laboratory minimum detection levels. For purposes of classifying potentially non-radiologically contaminated areas, the same concept has been applied, with the substitution of Vermont primary groundwater quality standards (PGQS), federal maximum contaminant levels (MCLs) or risk-based concentrations (RBCs) for DCGLs. Table 3 is a listing of the Vermont primary groundwater quality standards.

As summarized in Table 1, eleven areas at VYNPS have been classified as Class 1, fifty two areas as Class 2 and seventy one areas as Class 3. Class 1 areas have been judged to have a relatively high potential to be impacted by non-radiological contamination that may be significant during decommissioning. Because they are all presumed to have some potential to have been impacted, Class 1, Class 2, and Class 3 areas will each require an appropriate level of characterization before they can be released for unrestricted use. Class 1 areas will require more comprehensive characterization during decommissioning. Class 3 areas will require the least rigorous level of characterization. Each of the Class 1 areas is described below.

This HSA has considered both current and historic uses of the Site which include the following:

- Operational areas – Areas of chemical use, where spills have occurred and where maintenance and storage activities have occurred;
- Leach fields – Considerations include potential chemical releases, permit compliance and use of the permitted North and South Field Application Areas;
- Solid waste management and disposal areas – Historic areas include Area B-2, Area B-5, the former Sonotube Area, the former Wood Burning Area, and any on-site fill disposal area(s) dating back to plant construction;
- Storm water discharge areas – Site runoff directed through the Northern and Southern conveyance systems to the Connecticut River and installed equipment (oil/water separators)
- Transformer and switchyard locations;
- Current and former hazardous waste storage areas;
- Former railroad tracks – Creosote timbers, oils, rails;
- Current and historic above ground storage tanks (ASTs) and underground storage tanks (USTs) – Records indicate that there are 4 active USTs and 6 historic tanks that have been removed;
- Potable water wells; and
- Abutter properties.

In addition to the above, this HSA also has identified specific materials that either have been reviewed or will be sampled during decommissioning to minimize impact to the Site. These include:

- PCBs in caulk, paint or transformer oil;
- Asbestos in paint and insulation;
- Sand blast grit – including RCRA metals and PCBs
- Herbicides and pesticides
- Dioxins potentially related to the 1975 transformer fire

<u>Structural Component Materials - Areas Containing Lead-Based Paint, Asbestos or Elemental Mercury</u>

Three Class 1 locations are generic and apply to relatively wide-spread areas of the plant where lead-based paint, asbestos or components containing elemental mercury are present. Use of lead-based paint was not controlled prior to 1978 and it was widely used during plant construction. In addition, lead blankets and blocks are currently used for shielding in parts of the radiologically controlled area

(RCA). In addition to lead, the potential presence of other RCRA metals (i.e. chromium) will be evaluated to determine their appropriate disposition during future Site decommissioning activities. Investigations will be performed to determine whether asbestos is a structural component (i.e. the Mechanical Cooling Tower bay dividers) or is a component of building materials (i.e. caulk, flooring or paint). Asbestos insulation will require removal by licensed personnel using appropriate personal protective equipment and control of the removed asbestos. Components containing elemental mercury, including switches, gauges, fluorescent bulbs and light ballasts, will require special handling and disposal as universal waste.

Underground Storage Tanks

Based on Site documentation, 4 underground storage tanks exist on Site. These are:

- Tank 1997-1; 550-gallon diesel; double-walled fiberglass tank (installed in 1997)
- Tank 1997-2; 550-gallon diesel; double-walled fiberglass tank (installed in 1997)
- Tank 1997-3; 1000-gallon diesel; double-walled fiberglass tank (installed in 1997)
- Tank 1998-4; 3000-gallon #2 fuel oil; double-walled fiberglass tank (installed in 1998)

All of these tanks are double-walled fiberglass tanks that have automatic interstitial space monitoring and associated alarming systems. Historically, six other USTs were located on the Site. These tanks contained either diesel fuel, gasoline or No. 2 fuel oil and were removed between 1988 and 1997. The largest of these tanks is discussed below; however, all will be evaluated during future site activities.

Former 5,000-Gallon House Heating Boiler Fuel Oil Underground Storage Tank

The former 5,000-gallon house heating boiler fuel oil underground storage tank (UST) was located near the roll up door on the southwest side of the turbine building. The tank was removed in 1994 and replaced with an above ground tank. A buried fill pipe runs westerly more than 200 feet from the fuel oil pump room near the 75,000-gallon main fuel oil tank, under the maintenance building and then northerly under the new warehouse to the UST. The pipe failed a tightness test after the UST was removed. The fill pipe was drained and blanked off but not removed because most of it was inaccessible.

During an environmental site assessment of the station in 1999 prior to its potential sale, four groundwater monitoring wells were drilled in the vicinity of the UST and contaminated soil and groundwater were discovered. An additional five monitoring wells were drilled in 1999 to characterize the extent of contamination. Free-phase fuel oil accumulated in two of the nine monitoring wells. A groundwater monitoring program and a recovery system to remove the accumulated oil were approved by the Vermont Department of Environmental Conservation (VTDEC), Sites Management Section (SMS Site No. 99-2617) and operated for several years. In September, 2008 the SMS issued a "SMAC" (sites management activity complete) designation for Site 99-2617. This designation effectively closed the spill incident, even though low levels of fuel oil constituents and chlorinated solvents were still detectable in some groundwater samples. The nine monitoring wells associated with the spill were permanently abandoned. Although recent guidance for tank closure and investigation published by the

VTDEC (Reference 6) was not available at the time of the tank leak, the associated investigation and remediation appear to have been conducted effectively in accordance with that guidance.

The chlorinated solvents detected were tetrachloroethylene (PCE) and its degradation products. The source of the PCE was likely a dry cleaning operation that had been located in the nearby turbine building truck bay during the mid-1980s. When the turbine building and new warehouse are dismantled soil in the vicinity of the truck bay, the former UST and inaccessible portions of the fill pipe will be characterized in accordance with applicable Vermont guidance (Reference 7) and remediated as required.

Site Transformers

Multiple switch yards, substations and transformers are located at the Site:

- Switchyards and Substations – 345 kV Switchyard, 115 kV Switchyard, VELCO Substation
- Transformers – Main Transformer, Spare Main Transformer (removed), Auto Transformer, Start-up Transformer (T-3A), Start-up Transformer (T-3B), Auxiliary Transformer, West Switchgear Transformer, East Switchgear Transformer, (2) Cooling Tower Transformers, Construction Office Building Transformer, Administration Building Transformer, Turbine Building Transformers, Generator Neutral Grounding Transformer, Peebles Transformer (removed), Spare Cooling Tower Transformer (removed), Plant Service Building Transformer and Circuit Breakers

Most of the larger transformers (Main Transformer, Auxiliary Transformer and (2) Start-up Transformers) are contained within secondary containment vaults whose drainage passes through an oil/water separator and is managed and monitored by Site Procedure OP 2106 (Oil and Hazardous Materials Spill Prevention and Control). Those transformers where releases of oil to the environment are known to have occurred are discussed below.

Main, Spare Main, Auxiliary and Auto Transformers

The Main, Spare Main, Auxiliary and Auto transformers are oil-cooled and have capacities of 27,400, 26,500, 4,920 and 17,200 gallons of oil, respectively. Because of their dielectric and thermal conductivity properties, oils containing polychlorinated biphenyl compounds (PCBs) were commonly used in transformers. Their use was banned in 1979 due to their environmental toxicity and persistence. All transformers at VYNPS now contain non-PCB oil, but because the plant was constructed before 1979, residual PCBs may still be detectable.

An oil spill was reported at the Main transformer in 1996. Sampling conducted in 2001 during the Phase I and II Environmental Site Assessment of the VYNPS site identified PCBs in oil in the oil/water separator (MH-A) to which the containments for the Main and Auxiliary transformers drain. Soil staining was noted at that time in the vicinity of the Main transformer and an active leak was indicated by the presence of sorbent pads within its containment. In June 2004 there was a fire at the Main transformer and transformer oil and fire-fighting foam were spread outside of the transformer containment .

Soil staining that appeared to be weathered and not from an active oil leak was also observed in the vicinity of the Spare Main transformer during the 2001 Phase I and II Environmental Site Assessment. An oil leak from that transformer was reported in 2005 (CR 05-3663) and it was removed from the Site in 2007. No soil staining has been observed in the vicinity of the Auxiliary transformer. However, during the employee interviews conducted during April and May 2014 it was reported that a fire occurred in the Auxiliary transformer prior to 1975 and oil sprayed on the ground beyond the transformer containment. A leak in the Auto transformer occurred in 2003. The spill was remediated by excavation and removal of approximately 25 cubic yards of impacted soil. However, inaccessible impacted soil may remain beneath the concrete pad on which the Auto transformer sits. The areas in the vicinity of each of these transformers, including their containments and oil/water separator MH-A, to which the Main and Auxiliary transformers drain, will be fully characterized during decommissioning.

Chemistry Laboratory Sink Drain Leak

The sink drain in the turbine building chemistry laboratory was discovered to be leaking under the floor slab in 1991. A limited subsurface investigation was conducted in 1991 by drilling one soil boring through the lab floor near the location of the leaking drain. Three soil samples from the depth interval between 2 and 13 feet below the floor were analyzed for both radiological and non-radiological contaminants. A monitoring well was installed to the bottom of the soil boring (15.75 feet below the floor), where bedrock was encountered, but no groundwater entered the well.

Non-radiological contaminants (volatile organic compounds, semi-volatile organic compounds, total metals, ammonia, chloride, nitrite and pH) were not detected in the soil samples at concentrations greater than regulatory limits. Several radionuclides, including H-3, Mn-54, Fe-55, Co-60, Cs-134, Cs-137 and Sr-90, were detected in the soil throughout the sampled depth interval. VYNPS submitted a permit application to the NRC in 1991 to leave low levels of radionuclides in place in accordance with federal regulation 10 CFR 20.302. On March 7, 1996 the NRC approved the application and published a Finding of No Significant Impact in the Federal Register (61 FR 8984).

The drain pipe was abandoned and a new pipeline was installed. Although no non-radiological contaminants were detected at concentrations greater than regulatory limits by the 1991 investigation, the inquiry was limited in scope due to limited accessibility. A more thorough characterization of the area will be conducted during decommissioning to determine if non-radiological contamination associated with disposal of laboratory chemicals in the leaking drain remain in the adjacent soil.

Nearby Off-Site Properties Owned by Entergy

Two Class 1 areas are not located on the VYNPS site, but are properties owned by Entergy near the plant on Governor Hunt Road. The former Evelyn Edson residence at 298 Governor Hunt Road was a residential property from the time it was constructed in approximately 1955 until its purchase by Entergy. A Phase I environmental site assessment of the property (Reference 8) was completed in November 2009, shortly before its purchase by Entergy and no "recognized environmental conditions" (RECs) were identified at that time. During a brief property tour completed in May 2014, the house was

in use by the Town of Vernon as their Emergency Operations Center. The floor in one room in the south end of the basement contains approximately 9-inch square floor tiles. Based upon their size (which is characteristic of floor tiles containing asbestos) and the age of the house, it is likely that these tiles are "asbestos-containing material" (ACM). Also based on the age of the house, lead-based paint may be present. Both the suspected asbestos floor tiles and lead-based paint will require characterization.

The former Edson's Gulf property at 306 Governor Hunt Road is immediately north of the former Evelyn Edson residence. The former Edson's Gulf property was a gasoline filling station and automobile repair facility that was developed in 1967, after the property was subdivided from the 298 Governor Hunt Road property. A Phase I environmental site assessment of the property was completed in October, 2001, shortly before it was purchased by Entergy (Reference 8).

Two USTs containing gasoline were removed from the former Edson's Gulf property in 1990 and were found to be leaking. The incident was reported to VTDEC and is listed as SMS Site No. 93-1485. Seven groundwater monitoring wells were installed during a site investigation in 1993. A soil vapor extraction (SVE) system was operated from December 1994 until August 1999 to remediate contaminated soil and groundwater. Deeper water supply wells were drilled in the bedrock to replace contaminated shallow wells at the nearby Evelyn Edson and Bailey residences. During and after operation of the SVE system a groundwater monitoring program was undertaken to demonstrate further remediation of the spill by natural attenuation. Concentrations of two volatile organic compounds (constituents of gasoline) were still greater than the Vermont PGQS in one monitoring well in 2006.

In addition to the leaking USTs, an oil-stained floor drain in the northern garage bay formerly drained to a drywell located northeast of the garage. An in-ground hydraulic lift in the garage bay may have contained PCB oil. These areas of concern were the subject of a Phase II investigation in November 2007. The upper components of the hydraulic lift (but not the in-ground cylinder) were removed and the floor drain and lift pit were sealed with concrete. A January 20, 2009 letter from VTDEC designated SMS Site No. 93-1485 "SMAC" (site management activities completed) and no additional activity regarding the gasoline leak was required. The drywell to which the former floor drain flowed and the hydraulic lift cylinder apparently have not been removed and will require further characterization.

During a brief property tour completed in May 2014, the former Edson's Gulf property was observed to be in use by the VYNPS Maintenance Department. The garage bays were occupied by various pieces of maintenance equipment. The back room was occupied by various containers of virgin and waste oil staged on secondary containment skids, a 275-gallon above-ground storage tank containing fuel oil for space heating, two steel cabinets for storage of non-flammable chemicals and two steel cabinets for storage of flammable material. A sea-van storage container in the south yard contained additional maintenance equipment and several polyethylene 55-gallon drums filled with water were stored at the exterior rear of the building. All containers appeared to be in good condition, with no indication of spills or leaks.

Summary and Conclusions

None of the potentially impacted areas identified is considered to pose a current or expected threat to human health or the environment that would warrant immediate corrective action. Each area will be characterized as it becomes more accessible during decommissioning, to determine the extent to which it may have been impacted, if at all. It should be noted that the two Class 1 areas where petroleum products were released have been designated "SMAC" sites by the VTDEC. While, a finding of "no significant impact" has been issued by the NRC regarding the chemistry laboratory drain leak, additional characterization for both radiological and non-radiological constituents will be performed when accessibility to the drain line becomes available during decommissioning. As to the remaining Class 1 areas, those where lead-based paint, asbestos or elemental mercury exist are within buildings, not exposed to the environment and are being managed in accordance with site procedures. Both the Main and Auxiliary Transformers are within concrete containment structures that drain to an oil/water separator. Most of the oil released from these transformers during past incidents has been captured in and removed from the separator. The Spare Main Transformer has been removed from the Site and is not a continuing source of contamination. Additional characterization will be conducted in the area of these transformers at the time of their decommissioning.

Future Decommissioning Activities

This historical site assessment has been prepared to catalog available information concerning past and current operation of the Site and the potential for environmental impact. As decommissioning of the station advances and areas become accessible, all areas of the Site will be evaluated to document current conditions and select appropriate remedial responses, if any are required. Characterization will include not only environmental media (soils, sediment and groundwater), but also building materials to determine whether or not hazardous materials are present and may potentially pose a risk to human health and safety or the environment during Site-related activities. Class 1 areas containing lead-based paint, asbestos or elemental mercury will be characterized by sampling suspect surfaces or materials to determine the need for remediation. Subsurface soil and groundwater sampling will be conducted at the remaining Class 1 areas. Several soil and groundwater samples from each area will be analyzed for the contaminants of concern and the results compared to appropriate regulatory criteria to determine the need for remediation. Screening of Class 2 and Class 3 areas to determine whether or not environmental contaminants are present will follow the same process as that used in Class 1 areas but may be less rigorous and require fewer sample analyses. In some areas characterization may be limited to sampling of containment surfaces, surface soil or groundwater from nearby existing monitoring wells.

References

Reference 1- Phase I and II Environmental Site Assessment, Vermont Yankee Nuclear Power Corporation, Environmental Compliance Services, Inc., June 4, 2001.

Reference 2- NUREG-1575 Rev 1, "MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL (MARSSIM)", U.S. Nuclear Regulatory Commission, U.S. Environmental Protection Agency, U.S. Department of Energy, and U.S. Department of Defense, August, 2000.

Reference 3- Vermont Yankee Nuclear Power Station Operating Procedure OP 2106, Rev 33: Oil and Hazardous Materials Spill Prevention and Control.

Reference 4 – NEI 09-14 Rev 3, "GUIDELINE FOR THE MANAGEMENT OF UNDERGROUND TANK AND PIPING INTEGRITY", Nuclear Energy Institute, April 2013.

Reference 5 – SEP-UIP-VTY Rev 5, "VERMONT YANKEE UNDERGROUND COMPONENTS INSPECTION PLAN", Entergy Nuclear Engineering Programs, November, 2013

Reference 6 – "UNDERGROUND STORAGE TANK CLOSURE AND SITE ASSESSMENT REQUIREMENTS", Vermont Agency of Natural Resources, Department of Environmental Conservation, Waste Management and Prevention Division, June, 2010.

Reference 7 – "INVESTIGATION AND REMEDIATION OF CONTAMINATED PROPERTIES PROCEDURE", Vermont Agency of Natural Resources, Department of Environmental Conservation, Waste Management and Prevention Division, April 5, 2012.

Reference 8- Phase I Environmental Site Assessment Reports of Properties Off-Site from Vermont Yankee Nuclear Power Station.

Tables

Figures

Table 1 Summary of Potentially Non-Radiologically Impacted Areas at Vermont Yankee Nuclear Power Station

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Septic Systems				
Main Septic System (4 leach fields, one 9,450-gallon septic tank and one 3,500-gallon septic tank; north of Protected Area, east of 345kV Switchyard)	1	Groundwater in monitoring wells (MWs) monitored semiannually	Groundwater in MWs in leach field and effluent sampled semiannually. The sample results are in compliance with Vermont Agency of Natural Resources (VANR) Groundwater Protection Rules and VANR Solid Waste Management Rules. Regulated by VTDEC Indirect Discharge Permit (IDP) IDP 9-0036. When the septic tanks are pumped the sludge is sampled, analyzed and spread in the South Field Application Area (see COB Septic System).	2
New Warehouse Septic System (two alternating pressurized leach fields and one 3,000-gallon septic tank; south of the Protected Area adjacent to the spray pond)	1	Groundwater in MWs monitored semiannually	Groundwater in MWs in leach field and effluent sampled semiannually. The sample results are in compliance with VANR Groundwater Protection Rules and VANR Solid Waste Management Rules. Regulated by VTDEC Indirect Discharge Permit IDP 9-0036. When the septic tanks are pumped the sludge is sampled, analyzed and spread in the South Field Application Area (see COB Septic System).	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Construction Office Building (COB) Septic System (one pressurized mound leach field and one 5,000-gallon septic tank west of Gate 3, adjacent to the spray pond).	1	Groundwater in MWs monitored semiannually; Total petroleum hydrocarbons (TPH) slightly greater than VT Primary Groundwater Quality Standard (PGQS)	Groundwater in MWs in leach field and effluent sampled semiannually. The sample results are in compliance with VANR Groundwater Protection Rules and VANR Solid Waste Management Rules. Regulated by VTDEC Indirect Discharge Permit IDP 9-0036. Slightly elevated chloride levels likely due to nearby application of road de-icing salt. Sludge from the COB, New Warehouse and Main septic systems is accumulated in the 12,000-gallon COB holding tank before spreading in the South Field Application Area in accordance with VY RP 4615, VTDEC Residuals Management Permit No. F9906, and NRC 10 CFR 20.2002 Septage Spreading Permit.	2
Gatehouse Septic System (one leach field and one 1,000-gallon septic tank east of Gatehouse #1)	1	Groundwater in MWs monitored semiannually	Groundwater in MWs in leach field sampled semiannually. The sample results are in compliance with VANR Groundwater Protection Rules. Regulated by VTDEC Indirect Discharge Permit IDP 9-0036.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Plant Support Building (PSB) Septic System (two alternating pressurized leach fields and one 3,000-gallon septic tank south of the PSB)	1	Groundwater in MWs monitored semiannually	Groundwater in MWs in leach field and effluent sampled semiannually. The sample results are in compliance with VANR Groundwater Protection Rules and VANR Solid Waste Management Rules. Regulated by VTDEC Indirect Discharge Permit IDP 9-0036. Slightly elevated chloride levels likely due to nearby application of road de-icing salt.	3
COB Overflow Septic System (one leach field and one 1,500-gallon septic tank north of the PSB)	1	System was not constructed in June 2001	Built in 2003 to treat larger flows during outages; also treats flow from the Power Uprate Building (PUB); groundwater in MWs in leach field sampled semiannually. The sample results are in compliance with VANR Groundwater Protection Rules. Regulated by VTDEC Indirect Discharge Permit IDP 9-0036.	2
Governor Hunt House Septic System (one leach field and one 1,000-gallon septic tank east of the building)	1	Groundwater in MWs monitored semiannually	Groundwater in MWs in leach field sampled semiannually. The sample results are in compliance with VANR Groundwater Protection Rules. Regulated by VTDEC Indirect Discharge Permit IDP 9-0036.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Owner-Controlled Areas				
North Field Application Area (8 acres)	1	Originally intended for spreading septage, but never used for this purpose; empty, rusted 55-gallon drum half buried in fill removed on June 2, 2001. Debris consisting of plastic sheeting, rebar, glass, concrete and wooden planks found at depths between 3 and 16 feet, associated with sand and gravel borrow pits. Up to 12.4 ppm volatile organic compounds (VOCs) in air (Battelle, 1991). Groundwater in MWs monitored.	Southern 3/4 of area now occupied by new VELCO substation. Area not used for spreading septage. Groundwater in monitoring wells is not currently sampled.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
South Field Application Area (2 acres)	1	Groundwater in MWs monitored quarterly.	Septage sludge and Cooling Tower silt applied to land in this area. Septage is analyzed prior to each land application. Analyses are completed at the end of each 5-year term of the Residuals Certificate. Groundwater in MWs sampled for radiological constituents quarterly and for non-radiological constituents semi-annually and prior to land applications; Soil sampled for non-rad constituents prior to land applications. Sample results comply with IDP permit ID-9-0036 requirements.	2
Laydown Area southeast of Cooling Towers	1	Not discussed	Several soil and asphalt piles; discarded fuel shipping boxes. During an interview with a former employee it was reported that cable unused during plant construction was buried in this area. In sufficient quantity the cable may produce elevated levels of copper or other metals in soil and/or groundwater.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Area "B-2" (between East and West Cooling Towers)	1	Temporary storage of sediment collected from the cooling towers	Sediment from cooling towers no longer stored here; two flammable liquids cabinets containing small containers of various oils. No evidence of spills but characterization of area for possible radiological contamination related to storage of sediment will be required. Waste oil reportedly spread on the ground in this area early in the plant history.	2
Road Salt and Sand Storage Shed (north of 345 kV Switchyard)	2 & 3	Not discussed	Salt and sand stored under roof, on concrete slab and protected from weather, minimizing potential impact to groundwater. An interview with a former employee revealed that this area was formerly used for storage of lawn maintenance equipment.	2
Soil Piles northeast of VELCO Substation	1	Not discussed	Storage of silt vacuumed from west cooling tower wet well, soil removed during construction of ISFSI, etc. Material needs radiological and non-radiological characterization.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Area "B-5" (west of 115kV Switchyard)	1	Radiological activity in soil reported in file 10CFR50.75(g)	No evidence of impacted soil; likely removed during construction of VELCO switchyard.	3
Former Wood Burning Area northwest of the 345kV Switchyard, between the two railroad spurs (Area B-6)	1	Ash observed in the grass. No evidence of current use.	Area no longer identifiable; likely removed during construction of VELCO switchyard.	3
Sonotube Area (south of North Field Application Area)	1	Storage of sediments dredged from area of circulation water (CW) intake in October 1997 under permit by U.S Army Corps of Engineers Permit # 199702302 and VT DEC Case # SA-1-0379	Removed from site during construction of VELCO switchyard; sampled, analyzed, and confirmed clean. See report "Available CT River Dredging History at Intake Structure".	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Main Plant Ventilation Stack	1, 2 & 3	Not discussed	42,000 pounds of activated carbon remains in buried pipes west of the stack which were part of the (no longer used) interim off-gas system. Off-gas was passed through the carbon for approximately one month in 1973 and the system was then abandoned in place. Soil at the base of the stack has been amended by addition of several tons of salt to increase its conductivity and improve grounding of the lightning protection system. A nesting pair of peregrine falcons (the species was removed from the federal endangered species list August 25, 1999) has taken up residence on the vent stack. Disturbance of the birds (or their young) may require a state permit.	2
Dry Cleaning Operation in the Turbine Building Truck Bay		Not discussed	Operated from approximately 1982 to 1985 to clean protective clothing worn in the Radiologically Controlled Area (RCA). Low concentrations of chlorinated solvents were detected in groundwater monitored at the site of the leaking 5,000-gallon fuel oil UST outside the Turbine Building truck bay.	2
Parts Washer in Rad Waste Building	1	Not discussed	Operated from approximately 1982 to 1985 to clean tools. Unit reportedly used Freon, but other synthetic organic solvents may have been used.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Concrete Batch Plant (south of cooling towers)	1	Not discussed	Used during plant construction; construction debris stored there then. No evidence of the batch plant now. After plant start-up the area was used for construction demobilization lay down. Material including staging, temporary buildings and other construction residual was liquidated within approximately 2 years of plant start-up.	3
Areas where lead is/was used		Not discussed	Use of lead-based paint was not controlled prior to 1978; lead-based paint was widely used during plant construction. Lead blankets and blocks are used for shielding in parts of the Protected Area.	1
Areas where asbestos is/was used		Not discussed	Asbestos is present as pipe insulation in many areas of the plant, particularly the Turbine Building. In 1999 an inventory of asbestos insulation at VYNPS identified 79,410 cubic feet of asbestos. Baffles in the cooling towers are comprised of asbestos containing material.	1

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Areas where mercury is/was used		Not discussed	Mercury is used in switches, gauges and fluorescent bulbs throughout the plant. Various spills have been reported and cleaned up.	1
Underground and Aboveground Storage Tanks (USTs/ASTs)				
Former 5,000-gallon House Heating Boiler Fuel Oil UST west side of Turbine Building; removed in 1994	1	TPH and VOCs [benzene, ethylbenzene, toluene and xylene (BETX); tetrachloroethylene (PCE) and trichloroethylene (TCE)] exceeded the Vermont Primary Groundwater Quality Standards (PGQS); free-phase oil was present in 2 of 9 MWs; active removal of light non-aqueous phase liquids (LNAPL) and groundwater monitoring was in progress and was approved by VTDEC (SMS Site # 99-2617). The source of PCE was reportedly a former dry cleaning operation in the Turbine	VT DEC issued a SMAC (Sites Management Activity Complete) designation for SMS Site #99-2617 on September 16, 2008, effectively closing the spill although low levels of fuel oil constituents and solvents were still detectable in some monitoring wells. Nine MWs associated with the spill were permanently abandoned by filling with bentonite. The buried fill pipe to the former UST runs more than 200 feet from the fuel oil pump room near the 75,000-gallon main fuel oil AST, west under the maintenance building and then north under the new warehouse to the UST. When the UST was removed the fill pipe failed a pressure test. The buried fill pipe was blanked off but not removed because overlying structures, systems and components (SSCs) make it inaccessible. Fuel oil may have leaked to soil and groundwater from the fill pipe in inaccessible areas that were not investigated.	1

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
		Building truck bay.		
1,000-gallon gasoline double-walled fiberglass UST northeast of the South Warehouse Building	2	Installed in 1997. Used to fuel vehicles. Passed April 2001 leak detection monitoring.	The 1,000-gallon double-walled UST has a Veeder-Root automatic interstitial monitoring system. The new UST was converted from gasoline to diesel after September 11, 2001 because the more flammable gasoline presented a higher security risk. VT UST Program ID No. 806.	2
550-gallon diesel double-walled fiberglass UST northeast of the South Warehouse Building	2	Installed in 1997. Used to fuel vehicles. Passed April 2001 leak detection monitoring.	Tank has a Veeder-Root automatic interstitial monitoring system. VT UST Program ID No. 806.	2
550-gallon diesel double-walled fiberglass UST adjacent to the John Deere diesel emergency generator building, south of North Warehouse	1 & 2	Installed in 1997. Used to operate the small John Deere emergency generator. Passed April 2001 leak detection monitoring.	Tank has a Veeder-Root automatic interstitial monitoring system. VT UST Program ID No. 806.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
3,000-gallon #2 fuel oil double-walled fiberglass UST west of the PSB	1 & 2	Installed in 1998. Used to heat the PSB. Passed June 2001leak detection monitoring.	Tank has a Veeder-Root automatic interstitial monitoring system. Not regulated by VTANR.	2
Former waste oil UST northeast of the South Warehouse Building (east of 1,000-gallon and 550-gallon diesel USTs)	1	Not discussed	Drained, cleaned and removed from the site; no associated contaminated soil.	3
75,000-gallon Main Fuel Oil AST (for emergency diesel generators) immediately south of the Advanced Off-Gas (AOG) Building	2	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas containing ASTs.	Tank was drained, cleaned and lined in 2013. Secondary containment dry, with no staining. A VYNPS Chemistry Department permit requires sampling and analysis of rainwater accumulated in the secondary containment for radiological constituents and oil prior to draining to the river.	2
15,000-gallon nitrogen AST east of the reactor building	3	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas	Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
		containing ASTs.		
12,000-gallon House Heating Boiler #2 fuel oil AST immediately west of the Turbine Building	2	Located in vicinity of former 5,000-gallon House Heating Boiler fuel oil UST; see above	Double-walled tank installed in 1995 with Veeder-Root automatic interstitial monitoring system. Tank and associated underground piping cathodically protected. Secondary containment dry, with no staining. Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	2
11,000-gallon lube oil AST in lube oil pump room of the Turbine Building	2	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas containing ASTs.	Lube oil tank and adjacent lube oil polishing filter with small integral tank appear to be well maintained and in good condition, with no visible indication of leaks or spills. The pump room also contained (8) steel 55-gallon drums of virgin turbine lube oil, (9) 5-gallon poly buckets of virgin turbine lube oil and (10) 2.5-gallon steel safety cans of waste oil. All containers appeared to be in good condition, with no leaks.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
9,600-gallon diesel AST for Station Black-Out Generator; south of New Warehouse	2	Not constructed in June 2001	Generator and double-walled steel diesel AST at base of generator installed in 2012 because back-up power through the Vernon Hydro tie line could no longer be relied upon. Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	2
1,000-gallon gasoline AST southeast of Gate #1	2	Not constructed in June 2001	Tank constructed as part of plant modifications instituted industry-wide after September 11, 2001 terror attacks, to remove gasoline from the protected area. Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	2
(2) 800-gallon diesel generator day tanks (ASTs) in Turbine Building	2	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas containing ASTs.	Tanks appear to be well maintained and in good condition, with no visible indication of leaks or spills.	3
(2) 275-gallon diesel generator lube oil ASTs in diesel generator rooms	2	See above	Tanks appear to be well maintained and in good condition, with no visible indication of leaks or spills.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
500-gallon waste oil AST in the Containment Access Building (CAB)	1	See above	Waste oil was burned for space heating. That practice was discontinued and the tank removed in ~2006 when the old CAB was demolished and the new CAB was constructed in its footprint.	3
500-gallon waste oil AST in the North Warehouse	2	See above	Heavy gauge steel tank surrounded by containment structure; no indication of leaks. Radiologically contaminated waste oil was burned for space heating in this building between approximately 1995 and 2011. Unburned particulates may have accumulated on the north roof and on the ground, beneath the drip line.	2
350-gallon diesel fire pump AST in the intake structure	2	See above	Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	3
500-gallon double-walled portable diesel AST located adjacent to the John Deere diesel emergency generator building, south of North Warehouse when not in use	2	See above	Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
1,000-gallon double-walled portable diesel AST located north of the northeast corner of south warehouse when not in use	2	Not discussed	Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	3
1,230-gallon sulfuric acid AST in chemical storage building adjacent to the intake structure	3	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas containing ASTs.	Tank and secondary containment appear to be well maintained and in good condition, with no indication of spills or leaks. During an interview an employee recalled that the acid tank was overfilled once sometime during the 1970s and acid entered the river. A leak from the acid tank was reported in 1997.	3
5,000-gallon sodium hypochlorite AST in chemical storage building adjacent to the intake structure	3	See above	Tank and secondary containment appear to be well maintained and in good condition, with no indication of spills or leaks. Minor leakage from system components that entered the storm drain and river have been reported in 1996	2
275-gallon polyethylene tote of Bulab (water treatment chemical) outside	3	Not discussed	Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills. There was an incidental spill of Bulab outside of the chemical storage building.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
of the chemical storage building on asphalt adjacent to the intake structure				
330-gallon polyethylene tote of Superchlor (water treatment chemical) outside of the chemical storage building on asphalt adjacent to the intake structure	3	Not discussed	Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	3
2,900-gallon sodium bromide AST in chemical storage building adjacent to the intake structure	3	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas containing ASTs.	Tank and secondary containment appear to be well maintained and in good condition, with no indication of spills or leaks.	3
275-gallon fuel oil AST in Shipping and Receiving Building	2	Building not constructed in June 2001	Tank used for space heating; has adequate secondary containment to capture entire contents; no visible staining.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
190-gallon B5B Portable Diesel Fire Pump Fuel Tank south of 345kV switchyard	2	Not discussed	Emergency pump to augment plant fire protection system pumps. Tank appears to be well maintained and in good condition, with no visible indication of leaks or spills.	3
150-gallon ethylene glycol AST on the roof of the AOG Building	2	All ASTs have secondary containment including double-walled construction, concrete berms and floor drains connected to oil/water separators. No staining observed in the areas containing ASTs.	No tank found on roof. Ethylene glycol is filled directly into AOG chillers on a large skid on the upper level of the building. Equipment is well maintained and in good condition, with no indication of leaks or spills.	3
Transformers and Breakers				
Main Transformer (west side of Turbine Building); 27,400-gallon capacity of non-PCB oil	2	Within a concrete containment vault that drains to oil/water separator MH-A; PCBs in oil in MH-A; PCBs in storm water up to 41 ppm; soil staining in vicinity of the transformer. Active leak indicated by presence of sorbent pads.	Minor oil spill reported at Main transformer in 1996. Main transformer fire on June 18, 2004; transformer oil and fire fighting foam were spread outside of containment. Minor seepage from transformer casing appears to be greatest when not in service (outages) due to cooling and shrinkage of gaskets. Containments for Main, Auxiliary, and Startup Transformers T-3A and T-3B are all connected and drain to MH-A. The source of PCBs detected in MH-A may have been an explosion and fire in the Auxiliary Transformer in 1973 (see discussion of Auxiliary Transformer below).	1

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Spare Main Transformer east of 345kV Switchyard; 26,500-gallon capacity of non-PCB oil	2	Soil staining in vicinity of the transformer appears to be weathered and not from an active leak. Drains to separator MH-A	Transformer oil leaking to the ground. This transformer was removed from the site in 2007.	1
(2) Start-up Transformers T-3A and T-3B (west side Turbine Building); 3,720-gallon capacity each of non-PCB oil	2	Within concrete containment vaults connected to the North Storm Drain system via MH-A. No soil staining observed.	No staining observed.	2
Auxiliary Transformer (west side Turbine Building); 4,920-gallon capacity of non-PCB oil	2	Within a concrete containment vault connected to the North Storm Drain system via MH-A. No soil staining observed.	No staining observed. During an employee interview it was noted that there was an explosion and fire in the Auxiliary Transformer in 1973. Oil was sprayed on the ground beyond the containment. No record of this incident was found. Based on its age, this transformer may have contained PCBs.	1

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Auto Transformer (on concrete pad within fenced area of 345kV switchyard); 17,200-gallon capacity of non-PCB oil	2	No soil staining observed.	No staining observed. During an interview with a former employee it was noted that there was an historic oil leak in the auto transformer. This leak occurred in December 2003, was reported to the VTDEC (Entergy letters 177803 and 173550) and was remediated by excavation and removal of approximately 25 cubic yards of impacted soil. Inaccessible contaminated soil may remain under the concrete pad.	1
Vernon Hydro Tie Transformer (within concrete containment northwest of west cooling tower); 788-gallon capacity of non-PCB oil	2	No soil staining observed.	No staining observed.	2
Construction Office Building Transformer (on concrete pad north of COB); 210-gallon capacity of non-PCB oil	2	No soil staining observed.	Concrete pad has 2.5-inch high berm formed of masonry bricks around the perimeter of the pad.	2

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Administration Building Transformer(east of Admin Bldg.);375-gallon capacity of non-PCB oil	2	Not discussed	On concrete pad in containment basin filled with crushed stone. No staining observed.	2
Plant Service Building Transformer (on concrete pad west of PSB); 248-gallon capacity non-PCB oil	2	No soil staining observed.	No staining observed.	2
Cooling Towers East Transformer (in concrete containment north of east towers); 545-gallon capacity of non-PCB oil	2	No soil staining observed.	Sample of oil in transformer identified PCBs at 249 ppm in January 2005. Material containing PCBs at greater than 50 ppm but less than 500 ppm is considered "PCB contaminated". Source of contamination is unknown but may be residual remaining after change out of oil previously containing PCBs. No staining observed.	2
Cooling Towers West Transformer (in concrete containment north of west towers); 545-gallon capacity of non-PCB oil	2	No soil staining observed.	Sample of oil in transformer identified PCBs at 246 ppm in January 2005. Material containing PCBs at greater than 50 ppm but less than 500 ppm is considered "PCB contaminated". Source of contamination is unknown but may be residual remaining after change out of oil previously containing PCBs. No staining observed.	2

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Keene Line Breaker (on concrete pad within 115kV Switchyard)	2	No soil staining observed.	No staining observed.	2
Bus Line Breaker (on concrete pad within 115kV Switchyard)	2	No soil staining observed.	No staining observed.	2
Coolidge Line Breaker (on concrete pad within 115kV Switchyard)	2	No soil staining observed.	No staining observed.	2
T-6-1A Sample Panel Area Transformer; 215-gallon capacity of non-PCB oil	2	In Turbine Building, within secondary containment berm; no staining observed.	Surrounded by one-foot high concrete containment dike. No staining observed.	3
T-7-1A MUD (Make-Up Demineralized Water) System Transformer; 215-gallon capacity of non-PCB oil	2	In Turbine Building, within secondary containment berm; no staining observed.	Surrounded by one-foot high concrete containment dike. No staining observed.	3
T-8-1A Switchgear Room Transformer; 215-gallon capacity of	2	In Turbine Building, within secondary containment berm; no staining observed.	Surrounded by one-foot high concrete containment dike. No staining observed.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
non-PCB oil				
T-9-1A Switchgear Room Transformer; 215-gallon capacity of non-PCB oil	2	In Turbine Building, within secondary containment berm; no staining observed.	Surrounded by one-foot high concrete containment dike. No staining observed. Rack of approximately 20 compressed carbon dioxide gas bottles for fire suppression adjacent to transformer.	3
T-10-1A Standard Air Receivers Transformer; 367-gallon capacity of non-PCB oil	2	In Turbine Building, within secondary containment berm; no staining observed.	Surrounded by one-foot high concrete containment dike. No staining observed.	3
Generator Neutral Grounding Transformer (beneath generator); 44-gallon capacity of oil	2	In Turbine Building, within secondary containment berm; no staining observed.	Normally not energized, so the risk of fire is very low. Access to this transformer is poor and as of 1997 it still contained PCB oil; however, OP-2106 Rev. 33 lists it as containing "non-PCB oil".	3
Miscellaneous Containers				
Intake and Discharge Structure Hydraulic Gate Operating Systems; (2) 210-	2	Not discussed	Each system contains hydraulic oil in a sump tank contained within a moated fiberglass building. Systems not observed.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
gallon capacity each of non-PCB oil				
Cooling Tower Fan Gearboxes (11 per tower, 22 total);12.5-gallon capacity each of non-PCB oil	2	Not discussed	Gearboxes do not have oil containment devices. Gearboxes not observed. During an interview with a former employee it was noted that the environment in the cooling towers is conducive to growth of legionella (legionnaires' disease). Sampling and analysis every two years has shown no presence of legionella.	3
Switchyards				
345kV Switchyard	1	Perimeter curtain drain drains to outfall north of the North Storm water System Outfall.	All equipment in the switchyard is now owned by VELCO, while the land is owned by Entergy. Sorbent pads are visible beneath a transformer in the switchyard.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
115kV Switchyard	1	Perimeter curtain drain drains to two separate outfalls discharging to the CT River north of the 345kV Switchyard outfall. Two half-buried, empty and rusted 55-gallon drums were observed on the embankment of the west shore of the CT River, northeast of the 115kV Switchyard, outside the fenced Owner Controlled Area; drums were removed on May 31, 2001.	All equipment in the switchyard is now owned by VELCO, while the land is owned by Entergy. No staining observed.	2
VELCO Substation	1	Not constructed in June 2001	All equipment in the substation is now owned by VELCO, while the land is owned by Entergy. No staining observed.	2
Storm Water Drainage Systems				
General Note: storm water drainage is regulated by three permits: VTDEC General Permit 3653-9015 is for drainage from the access road and paved parking lot north of the 345 kV switchyard, the VELCO substation, and the security barrier system. A state-approved treatment system consisting of a retention pond and detention basins/settling ponds has been installed. VTDEC General Permit 4213-9015 is for drainage from the ISFSI and associated roadway. ISFSI drainage is treated by a separate sand filter system. VTDEC Multi Sector General Permit 3653-9003.R is for drainage from the remainder of the plant site.				

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
North System Outfall	1	Drains portions both inside and outside the Protected Area. Outfall is east of plant stack. Dissolved PCBs detected in MH-A oil/water separator of this system. Apparent source is drainage from the Main Transformer containment vault.	No staining observed. Waste water from the turbine building was released to the North Storm Drain in 1983.	2
South System Outfall	1	Drains portions both inside and outside the Protected Area. Outfall is inside the Cooling Water Discharge. Oil/water separator (MH-C) had no oil on May 8, 2001. Oil/water separator (MH-B) connected to sump in containment for 75,000-gallon Main Fuel Oil AST.	No staining observed. During an interview an employee recalled that a valve on the turbine lube oil pipeline was misaligned during an outage in the late 1970s. Oil was pumped through the oil tank vent to the roof of the turbine building. From there it flowed to a downspout, through the storm water drain and to the river at the discharge structure. In 1976 the Condensate Storage Tank overflowed approximately 83,000 gallons that drained to the river (Reportable Occurrence No. RO-76-22/1T).	2
Southeast System Outfall	1	System consists of one catch basin draining to outfall south of the East Cooling Tower.	No staining observed.	2
345kv Switchyard Outfall	1	Perimeter curtain drain drains to outfall north of the North Storm Water System Outfall.	No staining observed.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
115kv Switchyard Outfall	1	Perimeter curtain drain drains to two separate outfalls discharging to CT River north of the 345kV Switchyard outfall.	No staining observed.	2
Water Supply Wells (all in bedrock)				
West (Main) Well (west of 345kV Switchyard)	1	Source ID# 283, depth 555 feet, yield 75 gallons per minute (gpm); tested quarterly for coliform bacteria.	The only water supply well currently in operation, supplying potable water to all buildings except the PSB and Power Uprate Building (PUB). Sample results in compliance with requirements of permit WSID #8332.	3
NEOB Well (north of Plant Service Building)	1	Source ID#6642, depth 500 feet, yield 30 gpm; tested quarterly for coliform bacteria.	Supplies potable water to the PSB and PUB buildings. Sample results in compliance with requirements of permit WSID # 20738.	3
COB Well (north of Construction Office Building)	1	Source ID#214, depth 362 feet, yield 12 gpm; Activated carbon filtration system to remove chlorinated solvents; tested quarterly for coliform bacteria and chlorinated solvents.	Permanently abandoned by pressure grouting with bentonite on February 4, 2013 (see COB Well Completion Report).	3

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Southwest Well (southwest of Turbine Building)	1	Source ID#253, depth 500 feet, yield 6 gpm; tested quarterly for coliform bacteria.	No longer used as a source of potable water. Remains in use for process water, but is permanently disconnected from the potable water system via an air gap.	3
Chemical Storage Areas				

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
North Warehouse (inside the protected area)	1, 2 & 3	Area properly labeled and in good condition; No leaks or damaged containers observed	Building has a 3-inch high concrete berm around its inside perimeter; 500-gallon waste oil tank with independent containment near center of building on north wall. (2) steel 55-gallon drums and (10) 5-gallon poly buckets of waste oil within the berm with the 500-gallon AST. Radiologically contaminated waste oil was formerly burned for space heating but that practice was discontinued in 2011 (see discussion of waste oil tank above). In 1995 a drum of mixed waste was found to be leaking oil. (2) 275-gallon poly totes and ~(30) steel 55-gallon drums of waste oil awaiting shipment are stored in southeast corner of building. Various pieces of radiologically contaminated equipment are stored throughout the building, in addition to spent lead-acid batteries, used ethylene glycol, PCB-containing items (such as fluorescent lamp ballasts and small low-voltage capacitors) and waste computer parts. (2) storage cabinets for flammable materials are located on south wall. Material properly labeled and in good condition. No leaks or damaged containers observed. The North Warehouse is a RCRA permitted hazardous waste storage area and will be properly closed in accordance with RCRA regulations.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
South Warehouse (outside the protected area)	1, 2 & 3	Area properly labeled and in good condition; No leaks or damaged containers observed	Vehicle maintenance was performed at the site of the South Warehouse during plant construction. Petroleum products related to that activity may be present in the soil or groundwater. Approximately 2,000 gallons of virgin and waste oils are stored in steel 55-gallon drums within a containment berm at the east end of the building. Drums are in good condition, with no evidence of spills or leaks. Lead-acid batteries are charged and stored in a locked battery work cage in southwest corner of the building.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Hazardous Materials Storage Building (east of South Warehouse)	3	Area properly labeled and in good condition; No leaks or damaged containers observed	Building has steel walls and floor. Six-inch high steel grate supports plywood floor above steel subfloor. Six-inch gap in plywood around perimeter of floor allows drainage of potential spills and containment within underlying steel subfloor.	2
Hazardous Waste Storage Building (west of Main Septic System leach fields, adjacent to Grounds Maintenance Building)	2 & 3	PP-7503 provides details of VYNPS Hazardous Waste Program	Small containers of spent solvents, oily rags, etc (ignitable, corrosive, reactive, toxic or specific listed wastes). Area properly labeled and in good condition; No leaking or damaged containers observed. Regulated under EPA ID VTD 045011533. Entergy Nuclear Management Manual ENN-EV-106 Rev 0 describes the Waste Management Program.	2
Small Satellite Chemical and Flammable Material Storage Areas				

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
South Warehouse Flammable Materials Cage (outside the Restricted Area)	3	Area properly labeled and in good condition; No leaks or damaged containers observed	No staining or damaged containers observed.	3
Pipe Storage Building (Clean Workshop)	1, 2 & 3	Area properly labeled and in good condition; No leaks or damaged containers observed	(2) flammable materials cabinets, paint storage, insulation shop. Area properly labeled and in good condition; No leaking or damaged containers observed.	2
Former Environmental Laboratory Facility (ELF - north of discharge structure)	1	Area properly labeled and in good condition; No leaks or damaged containers observed	Building has been removed. Formerly contained small quantities of chemicals (acids, etc.) used to prepare samples for shipping and petroleum products (fuels) for use in boats used for sampling in the river.	3
Grounds Maintenance Building (west of Main Septic System leach fields)	1, 2 & 3	Area properly labeled and in good condition; No leaks or damaged containers observed	Storage of lawn mowers, snow plows, string trimmers, etc. No leaking or damaged containers observed.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Containment Access Building (CAB - east of AOG building)	2 & 3	Area properly labeled and in good condition; No leaks or damaged containers observed	Original CAB was a Quonset hut structure that existed from approximately 1985 to 2006. The current CAB was constructed within the footprint of the old CAB to provide a ceiling sufficiently high to accommodate the transporter for the spent fuel dry storage casks and the shield cask. No chemicals or flammable materials are stored in the CAB currently. Waste oil was formerly burned in the CAB, but that practice has been discontinued.	3
Turbine Building Machine Shop	2 & 3	Area properly labeled and in good condition; No leaks or damaged containers observed	(1) flammable materials storage cabinet, (1) non-flammable materials storage cabinet, (1) parts washer, (1) oily rag storage can, (1) cart containing welding/cutting gas cylinders. No visible leaking or damaged containers.	2
New (Stores) Warehouse	2 & 3	Not discussed	(7) flammable materials cabinets and (2) acid cabinets. Ventilation for each cabinet hard-piped to outside of building. No visible leaking or damaged containers.	2

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Turbine Building Chemistry Laboratory	3	Area was noted to be properly labeled and in good condition, with no leaks or damaged containers observed. The leaking drain pipe discovered in 1991 was not discussed.	Drain pipe from chemistry lab sink was discovered to be leaking under the floor slab in 1991. Pipe was abandoned in place. Limited subsurface investigation showed radionuclides to be present in soil beneath the floor but no non-rad contaminants. 10 CFR 20.302 permit application made to NRC in 1991 to leave low levels of radionuclides in place. Application approved by NRC March 7, 1996 and published "Finding of No Significant Impact" in Federal Register (61 FR 8984).	1
West Side of Turbine Building inside Roll-up Door	3	Area properly labeled and in good condition; No leaks or damaged containers observed	Virgin resin in chemical storage cabinets. Former location of dry cleaning operation.	2
Instrumentation and Control Chemicals Cabinet (3rd floor of Administration Building)	1	Area properly labeled and in good condition; No leaks or damaged containers observed	(1) flammable materials storage cabinet, No visible leaking or damaged containers.	3
Compressed Gas Storage Areas				

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
East of the South Warehouse	3	Area properly labeled and in good condition; No leaks or damaged containers observed	Area properly labeled and in good condition; No leaking or damaged containers observed.	3
North of the South Warehouse	3	Area properly labeled and in good condition; No leaks or damaged containers observed	Area properly labeled and in good condition; No leaking or damaged containers observed.	3
Inside southwest corner of the Turbine Building	3	Area properly labeled and in good condition; No leaks or damaged containers observed	Air compressors and associated compressor oil. No leaking or damaged containers observed.	2
West of the Turbine Building		Area properly labeled and in good condition; No leaks or damaged containers observed	Compressed gas no longer stored at this location.	3
Northeast of the Switchgear Rooms and North of the Control Room	3	Area properly labeled and in good condition; No leaks or damaged containers observed	Storage of argon and other instrument gases, as well as carbon dioxide for fire suppression. Area properly labeled and in good condition; No leaking or damaged containers observed.	3
Hydrogen skid south of the cooling towers	2 & 3	Not constructed in June 2001	Area properly labeled and in good condition; tanks appear to be well maintained, with no evidence of leaks.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Nearby Off-Site Properties Owned by Entergy				
Former Edson's Gulf, 306 Governor Hunt Road (now VYNPS Facilities Garage)	1, 2 & 3	Property not owned by VYNPS in June 2001. Phase I ESA completed Oct 11, 2001 prior to purchase by Entergy. Property is a state listed site (SMS #1993-1485) due to a release of gasoline from 2 USTs and impacts to groundwater and water supply wells. USTs removed in 1990. Seven monitoring wells installed during site investigation in 1993. Soil vapor extraction system operated from Dec 1994 to Aug 1999. Replacement wells drilled in bedrock for Evelyn Edson and Bailey residences. Two VOCs exceeded VT PGQS in one MW in 2006. Other areas of concern include a petroleum-stained floor drain in north bay of garage that drained to a drywell and an in-ground hydraulic lift. The floor drain and lift pit have	Property is immediately north of former Evelyn Edson residence (298 Governor Hunt Rd) and used by VYNPS Maintenance for equipment storage. During May 1, 2014 inspection the following items were observed in the back room: (1) ~100-gallon poly waste oil tank; (2) 55-gallon steel lube oil drums on secondary containment skid; (2) steel non-flammable chemical cabinets; (2) steel flammable material cabinets; (1) 275-gallon steel fuel oil AST; (1) sea-van storage container in the south yard containing equipment; (3) 55-gallon steel drums of virgin lube oil- two on a wooden pallet, one on bare ground on east side of building; ~(6) 55-gallon poly drums containing water; (1) ~ 200-gallon steel portable diesel tank. All containers in good condition; no visible indications of spills or leaks.	1

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
		been sealed with concrete. Phase II investigation of these areas completed Nov 30, 2007. Letter from VTDEC dated Jan 20, 2009 designated SMS Site No. 93-1485 as "Site Management Activities Completed" and no additional work regarding the gasoline leak required.		
Former Evelyn Edson Residence 298 Governor Hunt Road	1 & 2	Property not owned by VYNPS in June 2001. Phase I ESA completed November 6, 2009 prior to purchase by Entergy. No Recognized Environmental Conditions (RECs) identified.	May 1, 2014 inspection: site is occupied by the Town of Vernon and used as their emergency response center. Two 120-gallon propane tanks (fabricated in 2012) on concrete pads at southeast exterior corner of house. (1) 275-gallon fuel oil tank in basement. Suspected asbestos floor tiles in south room in basement. No visible indications of spills or leaks.	1

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Former Lagro Property: White House ("Double wide") 394-396 Governor Hunt Road (now VYNPS Environmental Facility)	1, 2 & 3	Property not owned by VYNPS in June 2001. Phase I ESA completed May 19, 2008 prior to purchase by Entergy. Two residences (394 and 396) formerly existed on the property; only the house at 394 Governor Hunt Road ("Double Wide") remains. Two vehicles burned at the site in approximately 1996-1998. A 275-gallon kerosene UST was removed from the trailer at 396 Governor Hunt Road in October 1999. No UST closure report is available. No other issues indicating a risk to soil or groundwater identified.	May 1, 2014 inspection: the "Double Wide" is used by the VYNPS Environmental Program and Radiological Environmental Monitoring Program (REMP) for offices and environmental sample processing. One 275-gallon fuel oil AST is in the basement. One pad-mounted transformer is on north side of driveway. No visible indications of spills or leaks.	2
Former Zaluzny Residence, 422 Governor Hunt Road	1, 2 & 3	Property not owned by VYNPS in June 2001. Phase I ESA completed February 16, 2012 prior to purchase by Entergy; 2,000-gallon fuel oil UST removed from south side of residence January 30, 2012; tank did not leak; no Recognized Environmental Conditions.	May 1, 2014 inspection identified portable light towers and generators stored in the garage by VYNPS Maintenance. One 275-gallon fuel oil AST in basement. No visible indications of spills or leaks.	3

Plant Area*	Location Shown on Figure	Area Status Reported in June 2001 Phase I&II Environmental Site Assessment**	Area Status in May, 2014	Impact Class*
Land between Plant Fence and Entergy Fence behind properties on east side of Governor Hunt Road	1	Not discussed	Leased to local farmers for hay fields	3

* Based on identified historical use, each area listed is presumed to have some potential to have been impacted by non-radiological contamination. Potentially impacted areas are classified as Class 1, Class 2 or Class 3, consistent with the classification system for potentially radiologically contaminated areas in NUREG-1575, Rev 1 (MARSSIM), where Class 1 areas have the highest potential for impacts that will be significant to decommissioning. For potentially radiologically contaminated areas, MARSSIM defines both Class 1 and Class 2 impacted areas as "areas that have, or had prior to remediation, a potential for radioactive contamination (based on site operating history) or known contamination (based on previous radiological surveys)". Class 1 areas are distinguished from Class 2 areas in that contaminant concentrations in a Class 1 area are expected to exceed the derived concentration guideline levels (DCGLs), which are the criteria for release of the area for unrestricted use, whereas in a Class 2 area they are not. Class 3 areas are expected to contain levels of residual contamination at a small fraction of the DCGL, or none at concentrations greater than the laboratory minimum detection levels. For purposes of classifying areas potentially contaminated with non-radiological materials, the same concept has been applied, with the substitution of Vermont primary groundwater quality standards (PGQSs), federal maximum contaminant levels (MCLs) or risk based concentrations (RBCs) for MARSSIM's DCGLs.

** Phase I and II Environmental Site Assessment, Vermont Yankee Nuclear Power Corporation, Environmental Compliance Services, Inc., June 4, 2001

Table 2 Summary of Vermont Waste Management Division Spills Database for Vermont Yankee Nuclear Power Station

Spill No.	Date Reported	Nature of Incident	Quantity (gallons)	Date Closed
36	2/6/1993	Mineral oil spill	<1	2/8/1993
53	7/2/1975	Tank Overfill	700	1/1/2000
54	3/6/1991	Radioactive waste leak		3/6/1991
76	8/5/1978	Overflow in Turbine Vent	100	1/1/2000
121	5/30/1991	Oil Leak to River	5	5/31/1991
167	6/14/1993	Drum found at dam		8/24/1993
200	8/19/1991	Penetrant release	0.25	8/19/1991
218	9/17/1990	Oil spill	10	9/17/1990
241	9/8/1992	Drum tipped over	55	9/8/1992
267	9/15/1993	Gasoline Tank Leak	0.25	9/16/1993
279	12/13/1991	Spill during transfer	2	12/17/1991
WMD 012	1/18/1994	Diesel fill line broke	10	1/18/1994
WMD 016	1/17/1997	Equipment Failure on Truck	6	1/27/1997
WMD 018	1/16/1996	Spill in Cooling Tank area	1	1/15/1996
WMD 022	1/14/2010	Hydraulic Oil Leak	<1	1/15/2010
WMD 042	1/23/2013	Motor Oil from Truck	3.5	1/23/2013
WMD 069	3/4/2005	Mercury leak	4 lbs	3/7/2005
WMD 136	5/8/2003	Transformer leak	2	5/8/2003
WMD 137	4/1/2013	Hydraulic Hose on Truck	4	4/1/2013
WMD 163	5/13/1994	Delivery spill	1	5/13/1994
WMD 174	6/6/2003	Hydraulic leak	4	6/6/2003
WMD 193	6/24/1996	Leak to moat		6/26/1996
WMD 194	5/16/2000	Leak from Propane Tank	40 lbs	5/16/2000
WMD 210	6/18/2004	Transformer fire	10	6/18/2004
WMD 236	7/27/2004	Lawn mower line failure		7/27/1994
WMD 237	8/5/2003	UST overfill	16	4/9/2004
WMD 263	8/12/2002	Oil Leak at Fan	15	8/12/2002
WMD 312	10/14/1994	Dump truck leak	5	10/31/1994
WMD 315	6/18/2008	Diesel spill from pump	5	6/18/2008
WMD 394	12/3/2003	Transformer leak		2/11/2004
WMD 409	11/16/1999	Spill in Driveway	5	11/16/1999
WMD 413	11/25/1997	Hydraulic line leak	10	11/25/1997
WMD 419	11/24/1999	Gasoline tank overfill	5	11/24/1999
WMD 559	11/19/2008	Equipment Maintenance	<1	11/19/2008
WMD 577	12/1/2008	Diesel spill during delivery	5	12/1/2008
WMD 586	12/1/2008	AST release	5	12/1/2008

Table 3 Vermont Primary Groundwater Quality Standards

Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)	Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)
Acetone	700.0	350.0	Benzene*	5.0	0.5
Acifluorfen	1.0	0.1	Benzo(a)pyrene	0.2	0.1
Alachlor	2.0	0.7	Beryllium	4.0	1.0
Aldicarb	7.0	3.5	Beta Particle and Photon Radioactivity	4 millirems/yr	50 pCi/liter[2]
Aldicarb Sulfone	7.0	3.5	Boron	600.0	300.0
Aldicarb Sulfoxide	7.0	3.5	Bromacil	90.0	45.0
Aldrin	0.05	0.05	Bromate	10.0	5.0
Alpha Particle Activity (Gross)	15 pCi/liter	5 pCi/liter	Bromochloromethane	90.0	9.0
Ametryn	60.0	30.0	Bromomethane	10.0	1.0
Ammonium Sulfamate	2000.0	1000.0	Bromoxynil	14.0	1.4
Anthracene	2100.0	1050.0	Butylate	350.0	175.0
Antimony	6.0	3.0	Cadmium	5.0	2.5
Arsenic	10.0	1.0	Carbaryl	70.0	7.0
Asbestos	7 E6 fibers/liter[1]	0.7 E6 fibers/liter[1]	Carbofuran	40.0	20.0
Atrazine	3.0	1.5	Carbon Tetrachloride*	5.0	0.5
Azoxystrobin Technical	1476.0	147.6	Carboxin	700.0	70.0
Bacteria (Total Coliform)	Absent	Absent	Chloramben	100.0	50.0
Barium	2000.0	1000.0	Chloramines	70.0	35.0
Baygon	3.0	1.5	Chlordane	2.0	0.44
Bendiocarb	3.0	1.5	Chlorite	1000.0	500.0

Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)	Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)
Benefin	2100.0	1050.0	Chlorobenzene	100.0	50.0
Benomyl	350.0	175.0	Chloroisopropyl Ether(Bis-2)	300.0	150.0
Bensulide	50.0	25.0	Chloromethane	30.0	15.0
Bentazon	200.0	100.0	Chlorothalonil	1.5	0.15
Chlorotoluene (ortho)	100.0	50.0	Dichloroethene (trans-1,2)	100.0	50.0
Chlorotoluene (para)	100.0	50.0	Dichlorophenoxyacetic Acid (2,4)	70.0	7.0
Chlorpyrifos	20.0	10.0	Dichloroprop	140.0	14.0
Chromium	100.0	50.0	Dichloropropane (1,2)*	5.0	0.5
Cimectacarb	1050.0	105.0	Dichloropropene (1,3)	0.5	0.5
Clopyralid	330.0	165.0	Dieldrin	0.02	0.02
Copper	1300.0	650.0	Dimethrin	2000.0	1000.0
Cyanazine	1.0	0.5	Dinoseb	7.0	0.7
Cyanide	200.0	100.0	Dioxane (para)	20.0	20.0
Dacthal	7.0	0.7	Diphenamid	200.0	100.0
Dalapon	200.0	100.0	Diquat	20.0	10.0
Dazomet	88.0	44.0	Disolfoton	0.3	0.03
Di(2-ethylhexly)adipate	400.0	200.0	Diuron	10.5	5.0
Di(2-ethylhexyl)phthalate	6.0	3.0	Endothall	100.0	50.0
Diazinon	0.6	0.3	Endrin	2.0	1.0
Dibromochloropropane*	0.2	0.02	Ethofumesate	280.0	28.0
Dicamba	189.0	18.9	Ethoprop	1.0	0.1
Dichlorobenzene (meta)	600.0	300.0	Ethylbenzene	700.0	350.0
Dichlorobenzene (ortho)	600.0	300.0	Ethylene Dibromide	0.05	0.01
Dichlorobenzene (para)	75.0	37.5	Ethylene Glycol	7000.0	700.0

Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)	Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)
Dichlorodifluoromethane	1000.0	500.0	Ethylene Thiourea	5.0	5.0
Dichlorethane (1,1)	70.0	35.0	Etridiazole	1.0	0.1
Dichlorethane (1,2)*	5.0	0.5	Fenamiphos	2.0	1.0
Dichloroethene (1,1)	7.0	0.7	Fenarimol	630.5	315.25
Dichloroethene (cis-1,2)	70.0	35.0	Fluometuron	90.0	45.0
Fluoranthene	280.0	140.0	Lead	15.0	1.5
Fluorenes	280.0	140.0	Lindane	0.2	0.1
Fluoride	4000.0	2000.0	Maleic Hydrazide	4000.0	400.0
Flurprimidol	700.0	350.0	Maneb	35.0	17.5
Flutolanil	1400.0	140.0	Manganese	840.0	420.0
Fluvalinate	70.0	35.0	MCPA	10.0	1.0
Fonofos	10.0	5.0	Mecoprop	35.0	3.5
Formaldehyde	1000.0	100.0	Mercury	2.0	0.5
Fosetyl-Al	2343.0	234.3	Metalaxyl	350.0	35.0
Glufosinate-ammonium	20.0	10.0	Methomyl	200.0	100.0
Glyphosate	700.0	350.0	Methoxychlor	40.0	4.0
Haloacetic Acids (Total)	60.0	6.0	Methyl Ethyl Ketone	4200.0	2100.0
Halofenozide	46.0	23.0	Methyl Isobutyl Ketone	560.0	280.0
Halosulfuron-methyl	990.0	495.0	Methyl Parathion	2.0	1.0
Heptachlor	0.4	0.088	Methyl-tert-butyl Ether	40.0	20.0
Heptachlor Epoxide	0.2	0.06	Methylene Chloride	5.0	0.5
Hexachlorobenzene*	1.0	0.22	Metolachlor	70.0	35.0
Hexochlorobutadiene	1.0	0.5	Metribuzin	32.5	16.25
Hexachlorocyclopentadiene	50.0	25.0	Molybdenum	40.0	20.0

Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)	Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)
Hexane (n)	420.0	210.0	Myclobutanil	120.0	12.0
Hexazinone	200.0	100.0	Naphthalene	20.0	10.0
Imidacloprid	93.0	9.3	Napropamide	70.0	35.0
Iprodione	280.0	140.0	Nickel	100.0	50.0
Isophorone	100.0	50.0	Nitrate	10000.0	5000.0
Isoxaben	175.0	17.5	Nitrates + Nitrites (total)	10000.0	5000.0
Nitrites	1000.0	500.0	Terbacil	90.0	45.0
Ortho-phenylphenol	18.0	9.0	Terbufos	0.9	0.45
Oxamyl	200.0	100.0	Tetrachlorodibenzo-p-Dioxin (2,3,7,8)	0.00003	0.000011
Paclobtrazol	455.0	45.5	Tetrachloroethane (1,1,1,2)	70.0	35.0
Paraquat	30.0	3.0	Tetrachloroethylene*	5.0	0.5
Pendimethalin	280.0	140.0	Thallium	2.0	1.0
Pentachloronitrobenzene	6.0	3.0	Thiophanate Methyl	560.0	280.0
Pentachlorophenol	1.0	0.3	Thiram	35.0	3.5
Phenol	2100.0	210.0	Toluene	1000.0	500.0
Picloram	500.0	250.0	Toxaphene	3.0	2.2
Polychorinated Biphenyls	0.5	0.25	Triadimefon	10.0	1.0
Prometon	100.0	50.0	Trichlorfon	1.5	0.15
Pronamide	50.0	25.0	Trichlorobenzene (1,2,4)	70.0	35.0
Propamocarb hydrochloride	924.0	92.4	Trichlorobenzene (1,3,5)	40.0	20.0
Propachlor	90.0	45.0	Trichloroethane (1,1,1)	200.0	100.0
Propazine	10.0	5.0	Trichloroethane (1,1,2)	5.0	2.5
Propham	100.0	50.0	Trichloroethylene	5.0	0.5

Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)	Substance	Substance Enforcement Standard (ppb, except as noted)	Preventive Action Level** (ppb, except as noted)
Propiconazole	104.0	10.4	Trichlorofluoromethane	2100.0	1050.0
Propham	100.0	50.0	Trichlorophenoxyacetic Acid (2,4,5)	70.0	7.0
Quinclorac	369.0	184.5	Trichlorophenoxypropionic (2,4,5)	50.0	25.0
Radium (Combined 226 + 228)	5 pCi/liter	0.5 pCi/liter	Trichloropropane (1,2,3)	5.0	0.5
Selenium	50.0	25.0	Triclopyr	487.0	243.5
Simazine	4.0	2.0	Trifloxystrobin	410.0	205.0
Styrene	100.0	50.0	Trifluralin	5.0	2.5
Tebuthiuron	500.0	250.0	Trihalomethanes (Total)***	80.0	8.0
Trimethylbenzene (1,2,4)	5.0	2.5			
Trimethylbenzene (1,3,5)	4.0	2.0			
Uranium	20.0	2.0			
Vinyl Chloride*	2.0	0.5			
Xylenes	10000.0	5000.0			
Zineb	350.0	175.0			

* Contaminants of special concern to the Vermont Department of Environmental Conservation and the Department of Health.

Contact the Department of Environmental Conservation if these contaminants are found in a drinking water source for additional information concerning resampling and risk notification.

** Where the preventive action level (PAL) is below the substance's detection limit, the PAL has been redefined at the detection limit.

*** Comprised of Bromodichloromethane, Bromoform, Chloroform and Dibromochloromethane.

[1]Greater than 10 micron length

[2]The PAL has been established based upon the Safe Drinking Water Act monitoring requirements, not a percentage of the Enforcement

Standard. Please see CFR 40 Sections 141.16 and 141.26.

Figure 1 Site Plan Showing Locations Potentially Impacted by Non-Radiological Contaminants

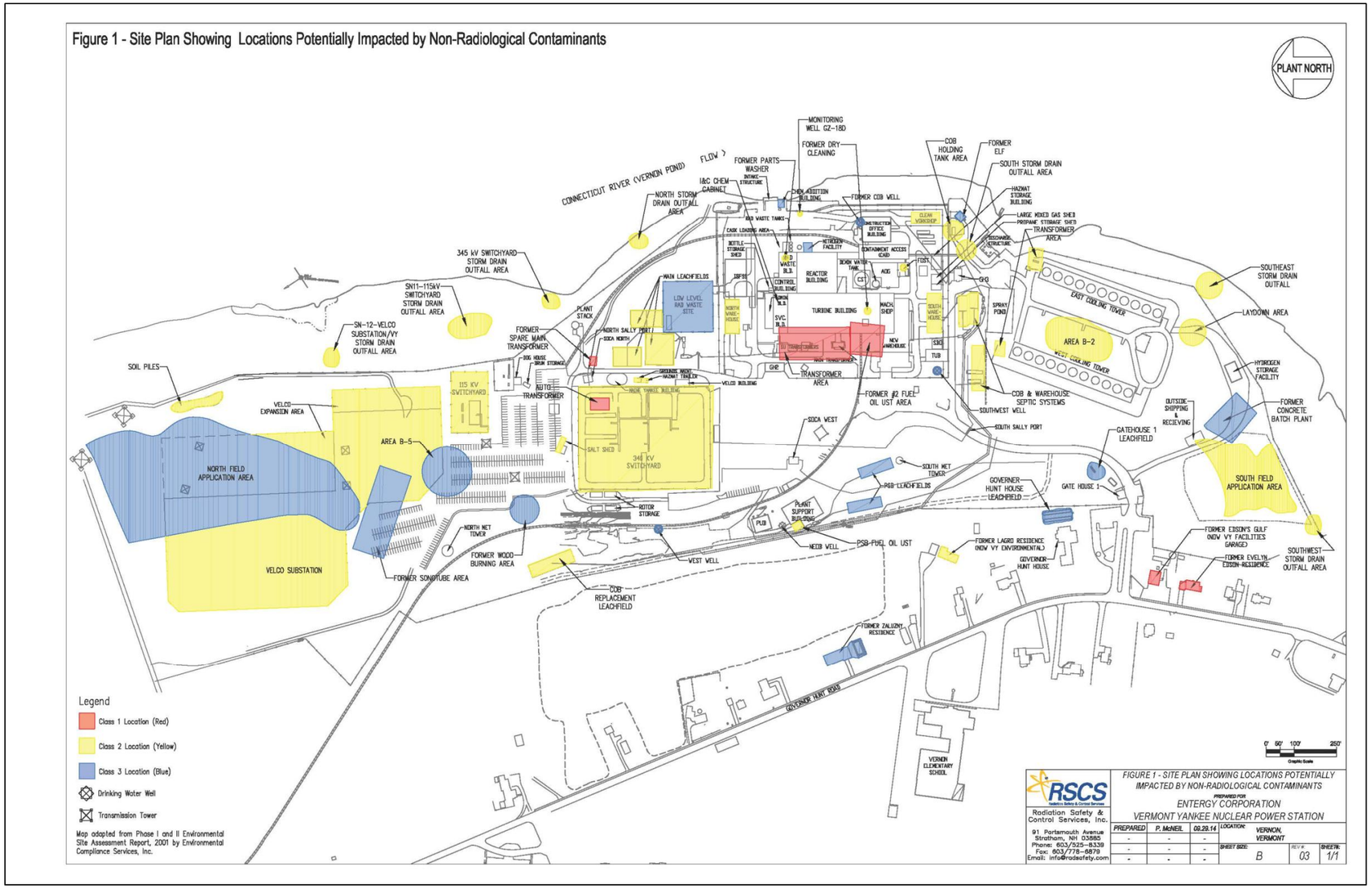

Figure 2 Oil Storage Locations

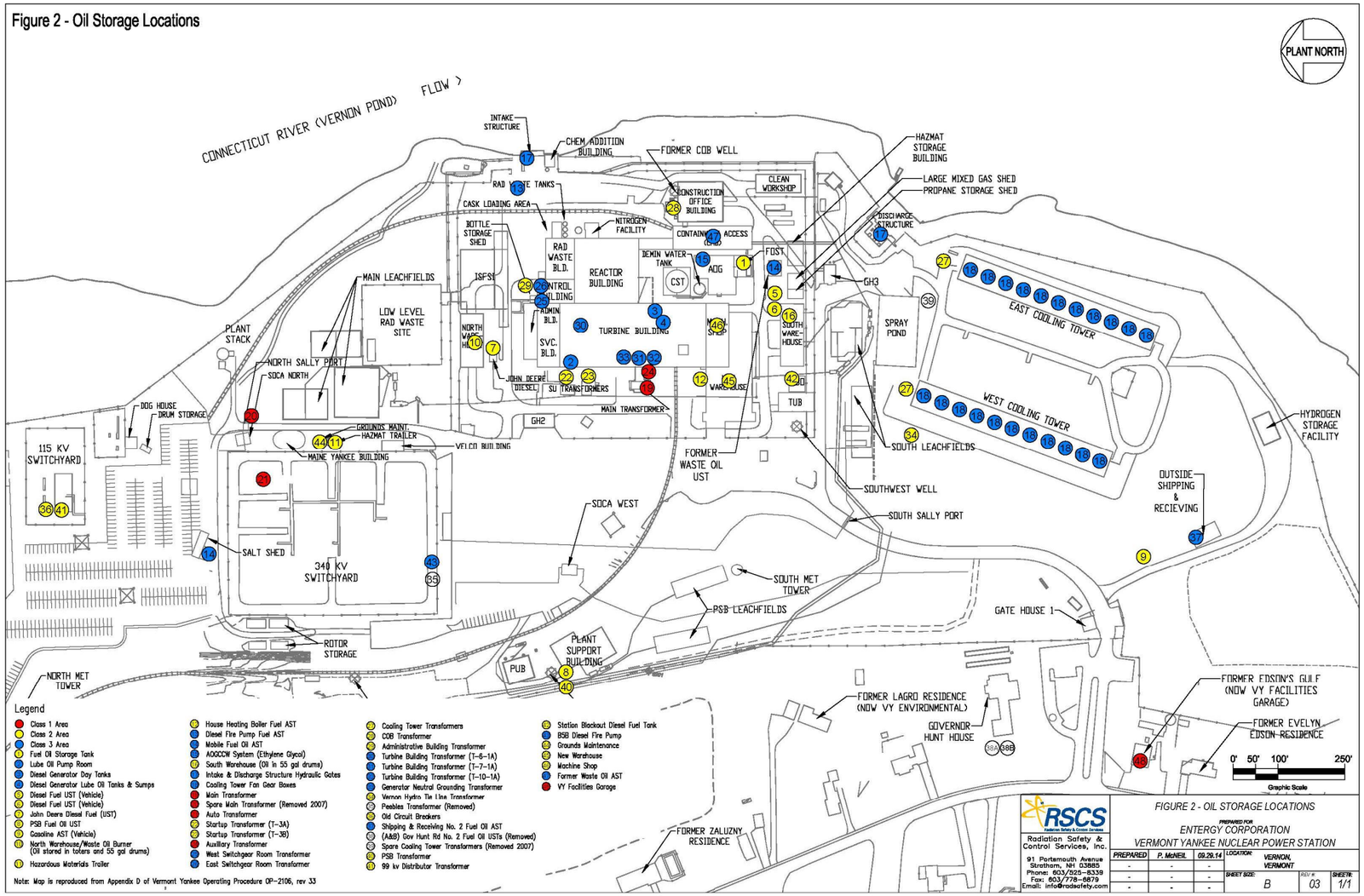

Figure 3 Chemical and Hazardous Material Storage Locations