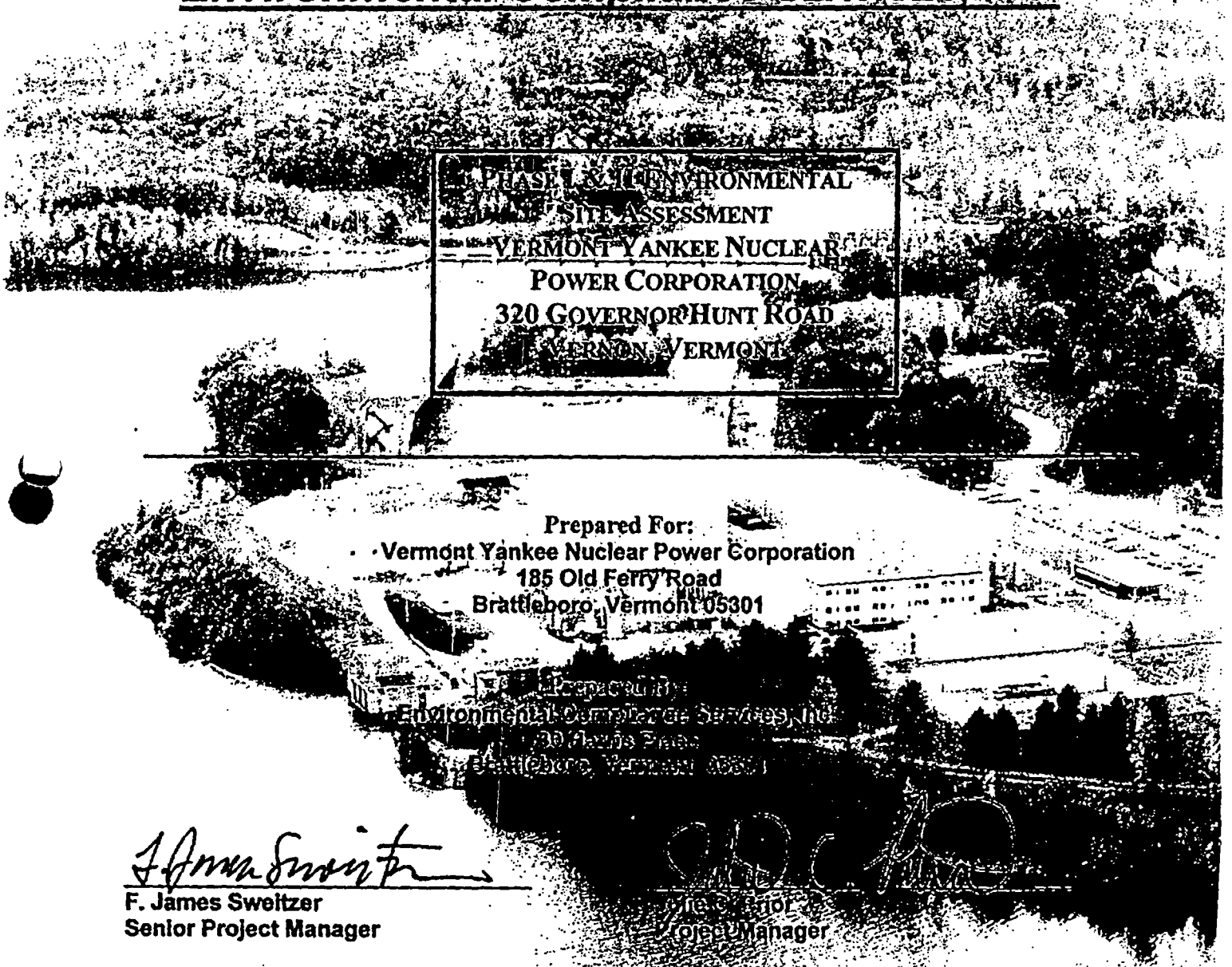
Environmental Compliance Services, Inc.



PHASE I & II ENVIRONMENTAL SITE ASSESSMENT
VERMONT YANKEE NUCLEAR POWER CORPORATION
320 GOVERNOR HUNT ROAD
VERNON, VERMONT

Prepared For:
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EXECUTIVE SUMMARY

ECS completed both and Phase I and Phase II ESA for the subject property. The Phase I scope of work meets the requirements of the American Society of Testing and Materials (ASTM) Standards on Environmental Site Assessments for Commercial Real Estate, E-1527-00. Reasonably ascertainable and publicly available documents have been reviewed as part of this assessment. In addition, site reconnaissance and interviews with VYNPC personnel were conducted to supplement the research effort, and aid in the development of the Phase II scope of work. The Phase I and Phase II ESA focused on the potential release of petroleum and/or hazardous materials to soil, groundwater and surface water and is not intended as a compliance audit particularly concerning the operation of the nuclear power facility, and handling and storage of radioactive materials. The presence of hazardous materials in use as building materials, such as asbestos, lead paint, urea formaldehyde or radon was also not investigated in this report.

The subject property is located on Governor Hunt Road in the town of Vernon, Vermont in Windham County (Figure 1). The subject property is the site of the Vermont Yankee nuclear-powered electrical generating station. The 120-acre subject property is located on the west shore of the Connecticut River, immediately upstream of the Vernon Hydroelectric Station and is zoned for industrial usage. The subject property is bounded on the north, west, and southwest by privately-owned land, and on the east and south by the Connecticut River.

Based upon the information obtained as part of the Phase I ESA, ECS identified seven (7) areas of Recognized Environmental Conditions (RECs) of concern that require further inquiry, including subsurface investigations. The RECs were identified as follows:

1. Subject property Septic Systems (6)
2. Owner Controlled Areas (North Field, South Field, Area "B-2", Area "B-5")
3. Former/Current Underground Storage Tanks (USTs)
4. Former Wood Burning Area
5. Current water supply wells (4)
6. Primary and Secondary Transformers
7. Subject property Storm Water Drainage System (North and South)

Subsurface investigations were completed to address each of the RECs, through a program of soil borings (both auger and direct-push), monitoring well installations, and the collection of soil, sediment, septic waste, septic effluent, wastewater, sludge/oil, and surface water samples. Field screening analyses for the presence of VOCs were completed in current or former UST areas. Laboratory analyses were completed based upon suspected contaminants of concern, for VOCs, TPH, PAH, PCBs, and both total and dissolved PP13 metals. Radiological analyses were completed for Gross Alpha and Beta activity, and for selected radioisotopes using Gamma Spectrometry, including Tritium. A total of 46 soil samples, 6 septic waste samples, 34 groundwater samples, 7 storm drainage wastewater samples, 1 sediment, 1 surface water, and 1 oil sample were collected during the Phase II ESA.

In order to evaluate concentrations of VOCs, TPH, PAH, PCBs, metals, and radiological parameters that were reported in samples above method detection limits, ECS has made comparisons to both state and federal standards. According to policy established by the VTDEC, evaluation of risk to human health and the environment posed by releases of oil or hazardous materials can be accomplished using standard EPA and Vermont Department of Health approaches. Specifically, the VTDEC relies upon Primary Groundwater Quality Standard (PGQS) published in the Vermont Groundwater Rule. For specific soil standards, the VTDEC relies on values published by EPA Region III as Risk-Based Concentrations (RBC), as well as the Massachusetts Contingency Plan (MCP) Method 1 standards published by the Massachusetts Department of Environmental Protection (MADEP).

The results of organic and inorganic analyses completed on samples from the subject property indicated exceedances of PGQS standards for TPH in groundwater in the vicinity of the COB Holding tank and the Former #2

Fuel Oil UST area. In addtion, VOCs were detected in the region of the Former #2 Fuel Oil UST area; this area is currently being addressed through an approved monitoring program established by the VTDEC for SMS Site # 99-2617. The North Drain System wastewater was found to contain dissolved concentrations of PCBs, and oil present in oil/water separator MH-A of this system also contained PCB concentrations.

Based upon these results, ECS makes the following recommendations regarding the organic and inorganic testing data:

- the presence of TPH at 2.0 mg/L in the groundwater sample collected from well COB-1 and 3.0 mg/L in the sample from well 101 has been determined to be in excess of the PGQS of 1.0 mg/L. However, with the fact that these wells are located within close proximity to the Connecticut River and that no drinking water supply wells are located downgradient of this area of the subject property, ECS is of the opinion that any further assessment of this area is not warranted. However, due to the exceedance of the PGQS guideline, the data should be reported to the VTDEC;

- several VOCs and TPH were identified in groundwater in the vicinity of the Former #2 Fuel Oil UST area. Because this area of the subject property is currently listed as a Disposal Site with the VTDEC (SMS Site # 99-2617), the release of both petroleum and chlorinated solvents to soil and groundwater appears to be adequately addressed through the ongoing monitoring program. ECS therefore is not recommending any additional evaluation of this area. However, this data should be reported to the VTDEC under separate cover, referencing SMS Site # 99-2617;

- the presence of dissolved PCB concentrations in wastewater within the North Storm Drain system warrants further action. Specifically, the oil and PCBs appear to be accumulating in the MH-A oil/water separator through drainage from the Main Transformer containment vault. In order to prevent any discharge of the PCBs or oil to soil, groundwater, or the storm drain system, ECS recommends that the Main and Start-up Transformer vaults be more fully evaluated for current oil levels and PCB content, and a program established to flush the containment vaults to remove any residual oil. In addition, VYNPC may consider permanently closing off MH-A from the downstream side of the North Storm Drain system, to prevent any accidental releases of oil.

With regards to radiological testing of samples collected from the subject property, ECS concluded the following:

1. Gross Alpha scanning revealed radiation above action levels for the Radium (5 pCi/L) or Uranium (15 pCi/L) radionuclides in groundwater collected at the Main Septic System area, North Field area, and the three drinking water systems. The Gross Alpha radiation detected in the drinking water samples was determined to be from naturally occurring radioactive materials;

2. Gross Beta radiation was not detected in any of the samples tested above the lower limit of detection (LLD);

3. low concentrations of Thorium, Proactinium, Radium, Lead, Bismuth, Actinium, and Thalium ranging from 0.21-7.09 pCi/g were relatively consistently detected in soil across the VYNPC property. Potassium-40 was the most abundant radionuclide consistently detected in soil with concentrations ranging from approximately 11-18 pCi/g. These ranges are considered to be well within the background levels for this naturally occurring radioactive material;

4. Cesium-137 was detected in soil and sediment samples at concentrations considered to be consistent with the background level Duke Engineering & Services determined for the subject area;

5. Tritium was not detected in groundwater samples above the LLDs except for two samples (MW-1 and 9) located in the Protected Area, and the COB Well drinking water sample. For each sample, the Tritium concentrations were well below the MCL of 20,000 pCi/L established by the Federal EPA for drinking water;

6. Tritium was not detected in soil, sediment or wastewater (reported as solids) samples above the LLDs except for soil samples collected in the South Field, where septic sludge is permitted to be spread. Tritium levels ranged from 69-407 pCi/g. The Ingestion and Groundwater Leaching SSLs established by the EPA are 8,580 pCi/g and 80 pCi/g, respectively. The detection of Tritium in soil samples collected at the 0-4 foot depth range is considered to be the result of historical septic sludge application by VYNPC; and

7. the absence of man-made radioactive materials other than Cobalt-60 and Cesium-137 in the samples tested during this investigation indicates that a release of radioactive material has not occurred to soil, sediments, surface water, groundwater or septic system waste materials in the areas investigated.

Based upon these conclusions, ECS makes the following recommendations regarding the radioactive material testing results:

- sample collection from monitoring wells 1101 and 1102 (Main Septic System) and VY01A (North Field) and analysis of Uranium and Radium radionuclides to determine source of Gross Alpha radiation levels of 23.95 to 67.0 pCi/L, which exceed the proposed Uranium MCL of 20 pCi/L and the Radium MCL of 5 pCi/L; and

- evaluate the potential storage capacity of the South Field for septic waste by characterizing the vertical extent and degree of Tritium in soil through subsurface investigations. Samples should be collected at 4-foot intervals until groundwater is encountered in areas exhibiting elevated Tritium concentrations.

The findings and conclusions documented in this report have been prepared for the specific application to this project and have been developed in a manner consistent with that level of care and skill exercised by members of the environmental science profession currently practicing under similar conditions in the area. No warranty, expressed or implied, is made. The conclusions and recommendations of this assessment are derived from visual observation of the conditions on the subject property at the time of the assessment including a review of historical and regulatory agency files available during the period of assessment, and data acquired from subsurface investigations completed during the assessment period. ECS did not evaluate the subject property for the presence of asbestos-containing materials, lead-based paint, urea formaldehyde foam insulation or radon. The above stated conclusions are limited accordingly.

1.0 INTRODUCTION

1.1 - PURPOSE

The purpose of this study was to conduct an environmental site assessment (ESA) of the Vermont Yankee Nuclear Power Corporation (VYNPC) property located at 320 Governor Hunt Road in Vernon, Vermont to assess the potential presence of recognized environmental conditions (RECs) of concern, and to assess if these conditions are likely to occur because of current or past activities at the subject property or nearby properties.

The corporate headquarters of VYNPC located at 185 Old Ferry Road in Brattleboro, VT was simultaneously assessed via a separate ESA. Results of that assessment are presented under separate cover.

1.2 - SCOPE OF WORK - PHASE I ESA

The scope of work meets the requirements of the American Society of Testing and Materials (ASTM) Standards on Environmental Site Assessments for Commercial Real Estate, E-1527-00. As per ASTM, the minimum search distance for a particular record may be reduced at the discretion of the environmental professional for such factors as urban/rural areas and presumed migration conditions based on hydrogeology. Reasonably ascertainable and publicly available documents have been reviewed as part of this assessment. The scope of work conducted for this study included a review of readily available municipal and regulatory agency databases and records through a FirstSearch database search, files of the Vermont Department of Environmental Conservation (VT DEC) in Waterbury, VYNPC file records, and a visual inspection of the subject property.

Based on the identification of RECs through a Phase I evaluation of site conditions, Phase II subsurface investigations, including soil, sediment, wastewater and groundwater sample collection and laboratory analyses were conducted.

2.0 SUBJECT PROPERTY DESCRIPTION

2.1 - SUBJECT PROPERTY OVERVIEW

The subject property is located on Governor Hunt Road in the town of Vernon, Vermont in Windham County (Figure 1). The subject property is the site of the Vermont Yankee nuclear-powered electrical generating station. The 120-acre subject property is located on the west shore of the Connecticut River, immediately upstream of the Vernon Hydroelectric Station and is zoned for industrial usage. The subject property is bounded on the north, west, and southwest by privately-owned land, and on the east and south by the Connecticut River.

Construction of the single 540 megawatt (MW) Boiling Water Reactor (BWR) plant began in 1967. Commercial operation began on November 30, 1972. The subject property is divided into the Protected Area and the Owner Controlled Area. The Protected Area is completed enclosed by a high-security electronically surveillanced chain-link fence and maintained by security personnel 24-hours per day. Buildings located within the Protected Area of the property include the Reactor Building, the Turbine Building, the North and South Warehouses, the Containment Access Building (CAB), Advanced Off-gas Building, the Rad Waste Building, the Warehouse/Maintenance Building, the Control Room Building, the Administration Building, the Construction Office Building (COB) built in 1989, the New Warehouse built in 1990, and various small storage sheds and outbuildings.

The Owner Controlled Area comprises all the remainder of the property outside the Protected Area, and is completed enclosed by a chain-link perimeter fence. Access is gained by vehicular traffic through Gate 1 off of Governor Hunt Road. Buildings located within the Owner Controlled Area of the property include the Governor Hunt House/Visitors Center and the Plant Support Building (PSB) built in 1998. The area adjacent to the power station buildings and the parking lots are covered with asphalt and the surrounding land in covered with grass, shrubs and trees. A site locus map is presented in Figure 1.

Properties in the subject area including the subject property are served by privately-owned water and sewer systems. A tax map obtained from the Vernon Lister's office, which shows the layout of the abutting properties in relation to the subject property is provided as Figure 2.

The following information is provided as an overview of the subject property:

Address:	320 Governor Hunt Road
County:	Windham
Property Size:	120 acres
Property Owner(s):	Vermont Yankee Nuclear Power Corporation
USGS Quadrangle:	Brattleboro, Vermont
Latitude, Longitude:	42°46'43.97" North, 72°30'50.36" West
Zoning :	Residential/Industrial
Lister's Map:	Map No. 36, Lot No. 21

Year Built:
1967 - 1972 Main Power Station Buildings;
1989 Construction Office Building (COB);
1990 New Warehouse Building;
1998 Plant Support Building.

The subject property elevation is approximately 70 meters (231 feet) above mean sea level. Topography of the subject property and local area slopes easterly, toward the Connecticut River, which is at an elevation of approximately 60 meters (216 feet) above mean sea level (Figure 1).

2.2 - GEOLOGICAL SETTING

Information of the geology at the subject property was obtained from three previous investigations completed at the site. The first investigation was presented in the report *"Vermont Yankee Nuclear Project Geology Report"* prepared by Goldberg-Zoino and Associates, Inc. (GZA) in 1966 for the siting of the power station. The second investigation was completed in 1988 by Wagner, Heindel & Noyes (WHN), involving a detailed hydrogeological assessment. The third investigation was completed in 1991 by Battelle, in conjunction with Hanson, Shannon & Wilson and WHN, as a comprehensive site characterization investigation of the feasibility for the land application of low-level radioactive wastes in the North Field portions of the subject property.

2.2.1 - Overburden Sediments

The subject property is situated on a glacially derived river terrace, located approximately 30 to 50 feet above the current floodplain of the Connecticut River. This terrace is comprised of glaciolacustrine and fluvial sediments deposited during the last glacial ice age, and has been subsequently incised by the river channel.

Unsaturated overburden sediments across the subject property are comprised of fill, underlain by fluvial and glaciolacustrine deposits of coarse sand and gravel interbedded with layers of fine sand and silt. The average thickness of these unsaturated sediments--taking into account seasonal fluctuation of the water table--ranges between approximately 4 feet in the region of the North Field (well 104S) to 30 feet in the South Field (well 201). The unsaturated sediments have been described by WHN as Unit A, consisting of loose to medium dense, interbedded very fine to medium sand, silty fine sand and sandy silt. Unit A was typically used for fill across the property during the construction of the power station.

Saturated overburden sediments are laterally continuous across the property, with a vertical gradation from coarser to finer grained sediments with increasing depth. These sediments were described by WHN as Units A, B, C, D, and E. Unit A was described above as unsaturated; however in some areas of the property it was shown to be saturated. Unit B is a fluvial deposit comprised of well graded fine to coarse sand and gravel. Units C and D are comprised of glaciolacustrine sediments, grading from a fine sand to silt with depth. Unit E is comprised of a discontinuous layer of fine to coarse sand grading to silty, gravelly sand, where silt increases to the south and west, and gravel increases to the north and east. This unit is interpreted as a diamicton derived from colluvium and/or till, and was deposited directly on the bedrock surface.

In general, the saturated sediments are thinnest in the central portion of the property, ranging from 20 feet at the south end of the property (Boring 2A)(GZA, 1966) to 40 feet at the north end (boring VY-02A)(Batelle, 1991). These relatively thin areas of overburden are coincident with a bedrock ridge that trends southwest to northeast. The overburden sediments thicken to east and west, with contacts between the units also showing dip to the east and west away from the bedrock ridge. For the northern portion of the property, overburden thickness of up to 120 feet were reported along the western edge (VY-04A), and up to 85 feet along the eastern edge (Batelle, 1991). For the region of the property in the vicinity of the power station buildings, thicknesses range from 50 feet to the west (Boring 16) to 45 feet to the east (Boring 4)(GZA, 1966). In addition, the sediments generally thicken in a northerly direction as bedrock deepen. A thickness of up to 140 feet was reported to the north of the property (Batelle, 1991).

2.2.2 - Bedrock Geology

The unconsolidated overburden sediments are underlain by an Ordovician granitic gneiss known as the Oliverian Plutonic Series, and Devonian intrusive granite of the New Hampshire Plutonic Series. The rock has been characterized as hard and unweathered and typically closely jointed and locally intensely fractured (Batelle, 1991). An erosional surface was developed on the bedrock surface as a result of both Pleistocene glacial scour, and the erosion of the pre-glacial Connecticut River valley. The bedrock relief in the area of the property ranges from 25 feet to at least 75 feet. A ridge of bedrock trends northeast beneath the property, with a decrease in elevation of the bedrock surface observed to the north and south of the power station buildings.

2.3 - HYDROLOGICAL CONDITIONS

The hydrological conditions of the property have been previously investigated and reported in the studies outlined above under Section 2.2. In addition, ECS has compiled a detailed inventory of both existing and newly installed monitoring wells, including both elevation and location survey data, in order to develop a site-wide groundwater potentiometric map. Discussed below is a general discussion of the hydrogeologic conditions of the property, as presented in past reports. The discussion of ECS's interpretation of current potentiometric data is presented below in Section 2.3.2.

2.3.1 - Surface Water Hydrology

There are no permanent streams that flow onto the subject property from upgradient sources. The property is internally drained either by the stormwater drainage system in the vicinity of the power station buildings (outside radioactive control areas), switchyards, and the North Field, or locally by direct infiltration to the subsurface in most unpaved areas. The storm water drainage system discharges to the Connecticut River at various outfalls along the west bank of the Connecticut River. Although the unconsolidated sediments at the subject property are generally well drained, ponding of surface water has been observed in at least certain portions of the North Field area (Batelle, 1991).

2.3.2 - Groundwater Hydrology

Groundwater at the subject property occurs under unconfined conditions within both unconsolidated glacial overburden sediments and underlying fractured bedrock. Based upon measurements taken by ECS on May 4, 2001, depth to groundwater in wells screened at the water table ranged between approximately 16 feet and 30 feet below ground surface (bgs). Evidence of ponded groundwater in the vicinity of the COB, New Warehouse, and Main septic leachfields was indicated by

shallow water levels ranging between approximately 8 and 16 feet bgs. In addition, perched groundwater was indicated in the North Field, where water levels as shallow as approximately 5 to 6 feet bgs were measured. These depths to groundwater are expected to fluctuate seasonally.

Historic data has indicated an overall decreasing gradient of the water table towards the east-northeast in the region of the North Field, east in the vicinity of the power station buildings, and southeast in the South Field. Shallow groundwater flow is therefore expected to vary accordingly across the subject property (Batelle, 1991). The general direction of shallow groundwater flow, however, was expected to be to the east towards the Connecticut River.

Gradient and slug test data previously collected at the property indicate that in general, a vertically downward gradient exists within the unconsolidated aquifer, and between overburden and bedrock. For the central and northern portions of the subject property, in the regions of the 345 kilovolt (Kv) Switchyard and the North Field, the horizontal gradient was measured at 3.5%. This gradient was determined to steepen along the east side of the North Field to about 7%. Slug test data was collected in the area of the North Field, for both the shallow water table portion of the aquifer (Units A, B, & C, unconfined), and for the deeper sediments and bedrock (Units D & E, unconfined and confined). These data were used to estimate hydraulic conductivity values, indicating an average value of $1.18x10^{-3}$ centimeters/second (cm/sec), or 3.3 feet/day for Units D & E , $2.03x10^{-2}$ cm/sec (57.5 ft/day) for Unit C, and $2.62x10^{-2}$ cm/sec (74.3 ft/day) for Units A&B.

Pumping test data of the West Well (bedrock well) completed by WHN indicated drawdown in overburden at the bedrock surface of between 0.54 feet to 0.11 feet, with bedrock fractures interpreted to be a major influence in the drawdown. An Apparent Transmissivity value of 0.087ft2/sec and Storativity value of 0.0042 (dimensionless) were calculated.

3.0 SUBJECT PROPERTY RECONNAISSANCE & FILE REVIEW

3.1 - INTERVIEWS

Interviews were completed with Mr. David Tkatch and Mrs. Barbara Williams of VYNPC Chemistry Department throughout the duration of the investigation. Both Mr. Tkatch and Mrs. Williams provided both current and historical information, which is discussed in the various sections throughout the report.

3.2 – SUBJECT PROPERTY RECONNAISSANCE AND FILE REVIEW

ECS personnel conducted a reconnaissance of the subject property on April 23, and 25, 2001 with Mrs. Barbara Williams of VYNPC. The following sections document the subject property conditions as observed during the reconnaissance. Subject property files were reviewed and referenced for each reconnaissance section. Photographs of the subject property are provided in Appendix A. Reference is made to the Site Plans (Figures 3 and 4) for the location of specific features, or to Appendices contained VYNPC documents related to specific power station activities.

3.2.1 - Chemical Storage Areas

Several chemical storage areas were observed at the subject property. The main storage areas included the south and north warehouses, and south of the maintenance shop in the Hazardous Materials Storage building. Other smaller satellite chemical and flammable storage areas include the following: maintenance paint shop; clean workshop; Environmental Laboratory Facility (ELF); grounds maintenance building; CAB; Turbine Building maintenance shop; Turbine Building chemistry laboratory; west-side of the Turbine Building adjacent to roll-up door; and, the Instrumentation & Control (I&C) chemicals cabinet (Appendix A, Section 1, Photo #'s 12, 16, 17).

The compressed gas storage areas include the following: east of the south warehouse, east of the PSB, north of the South Warehouse, southwest corner of the Turbine Building, west of the Turbine Building and northeast of the switchgear rooms (Appendix A, Section 1, Photo #'s 11, 13).

All observed chemical storage areas were properly labeled and in good condition. No leaks or damaged containers were visually observed.

A copy of the Vermont Yankee's Hazardous Waste Program (PP7503) dated March 2, 2000 which provides full detail of the facilities hazardous materials use and storage procedures is included as Appendix B.

3.2.2 -Hazardous Waste

3.2.2.1 - Routine Generation

Hazardous waste generated at the VYNPC facility on a routine basis includes waste motor oil and fluids from vehicle maintenance, and equipment drips and blowdown; waste chemicals from the chemistry laboratory where in-house analysis of soil, wastewater, groundwater and process water samples is performed; oily rags; filters and spent spray cans

used in general equipment maintenance; ethylene glycol from miscellaneous sources; broken mercury-containing fluorescent lamps; used ballasts and small capacitors; lead wastes; used NiCad, Lithium and alkaline batteries; and unwanted computer parts.

The following information regarding waste streams and disposal services were retrieved from VYNPC files:

- Spent Lead-acid batteries are collected and stored on impervious surfaces, under cover in the North Warehouse while awaiting transportation to a state approved recycler. Pinetree Recycling, Inc. of Marlborough, NH has provided disposal services to VYNPC.

- Ethylene glycol is collected in the North Warehouse or AOG penthouse and transported to a state approved recycling facility. Tri-State Automotive has provided disposal services to VYNPC.

- Mercury-containing lamps (whole and intact) are managed as Universal waste and shipped to a state approved recycler. Salesco Systems, USA, Inc of Braintree, MA has provided disposal services to VYNPC.

- Computer parts are collected in the North Warehouse or Corporate Warehouse at 185 Old Ferry Road, as appropriate, and shipped to a state approved reclamation facility. Advanced Recovery, Inc. of Belleville, NJ has provided disposal services to VYNPC.

- Scrap metal and used spray cans (emptied of contents via puncture) are deposited in the metal collection dumpster located on the North Site until the dumpster is full, at which time it is sent to a recycler. George's Recycling of Greenfield, MA has provided disposal services to VYNPC.

- Used batteries (non Lead-acid) are managed as Universal Waste and shipped to an approved manufacturer or recycler for recycling. Inmetco of Ellwood City, PA has provided disposal services to VYNPC.

- Fluorescent light ballasts (no-leaking) are managed as Universal Waste and shipped to an approved destination facility. Clean-Harbors, Inc. of Braintree, MA has provided disposal services to VYNPC.

Radioactive waste routinely generated includes Asbestos, incinerable waste, compactable/non-incinerable waste, metal, wood, Torus Lead waste, "Green-Is-Clean" (GIC) dirt and mixed wastes. This material is shipped off site to state or federally approved destinations. Processed Resin and dry active waste is transported off site for burial. A monthly accrual worksheet for March 2001 is provided in Appendix C. Dry active waste streams include non-compactable metal, compactable trash, incerable wood, Reactor water Clean-up (RCU) resin, Torus filters, condensate and waste Demineralizer Resin and Reactor vessel components.

3.2.2.2 - Non-Routine Generation

Polychlorinated biphenyls (PCBs) were once used as electrical equipment dielectrics to reduce fire hazards on site. PCB items taken out of service for disposal are collected in the machine shop broken tool cage inside the Restricted Area, and in the South Warehouse waste cage outside the Restricted Area. Fluorescent lamp ballasts and small, low voltage capacitors (< 9 lbs) are exempt from regulation under 40 CFR 761. These items, however are accumulated per Vermont Hazardous Waste Management Regulations as Universal Wastes. The PCB items are accumulated in the North Warehouse Satellite Accumulation Location until they are prepared for transportation for off-site disposal. Clean Harbors, Inc. has provided disposal services to VYNPC.

Approximately every 18 months the VYNPC facility undergoes a refueling outage and routine maintenance activities. During this time spent fuel rods are replaced and stored in the spent fuel containment pool within the Reactor Building. Although non-routine wastes may be generated during these outages, they will vary according the specific maintenance schedule developed for each outage period. All wastes are recorded on the monthly waste accrual worksheets generated during the specific outage period.

3.2.3 - Solid Waste

According to VYNPC personnel all solid waste generated at the subject property is removed by authorized waste haulers.

During ECS reconnaissance of the subject property, construction related debris was observed in the northern and southern open areas of the property. An empty, rusted 55-gallon drum was observed half buried among piles of fill material overgrown with Sumac plants, in the northern area. VYNPC reported that this drum was removed on June 2, 2001.

River sediments, previously excavated by VYNPC were stored in this area in "sonotubes". Piles of what appeared to be construction debris and/or fill materials were also present in the southern open area of the property. Vegetation consisting of Staghorn Sumac in the north area, and a mix of saplings and 10 year old tree species and ground cover was growing on the mounds of fill material.

Two half-buried, empty and rusted 55-gallon drums were observed on the embankement of the west shore of the Connecticut River, northeast of the 115 Kv Switchyard and outside the fenced Owner Controlled Area. One of these drums was labeled "Stephenson Chemicals, Georgia". VYNPC reported that these two drums were removed from the embankment on May 31, 2001.

Photographs of the waste disposal areas are included in Appendix A, Section 2, Photo #'s 12, 13, 14, 19, 22, 23, 26, 27, 37, 38, and 39.

3.2.4 - Land Application Areas

Two locations at the subject property are designated as septic sludge land application areas, the North Field and the South Field. The land application of this sludge is permitted by Vermont Department of Environmental Conservation (VTDEC) Solid Waste Management Facility Certification #SWCF9906 (ID#253) and the NRC Septic Spreading Permit, (10CFR20.2002).

The area of the North Field is approximately 8 acres and the South Field is approximately 2 acres. The fields are designed to accept septic sludge from the power station septic systems on an annual basis. Currently, the subject property utilizes only the South Field for septic sludge spreading. Interviews conducted with Mr. Tkatch and Mrs. Williams of VYNPC, indicated the North Field has never been utilized as a land application area currently or historically. The North Field is currently used as a haying field by a local farmer (Appendix A, Section 2, Photo #'s 11, 15, 16, 17, 24, 25, 28, and 40).

A copy of the VYNPC Routine Procedure (RP 4615) for Septic Certification and IDP Requirements, dated December 27, 2000, is included as Appendix D.

3.2.5 - Use of Fill Material

The use of fill materials on the subject property occurred during the construction of the power station buildings. The fill material, consisting of soil and blasted bedrock, was generated during the construction of the building foundations. During site investigations completed by WHN in 1989, test pits completed at both the north and south portions of the Owner Controlled Area of the property documented average fill thicknesses ranging from 3 to 6 feet (Batelle, 1991).

Fill encountered by WHN in the North Field area varied up to 20 feet in thickness, with the deeper fill deposits associated with sand and gravel borrow pits. Test pitting of these fill areas completed by WHN confirmed the presence of debris layers at depths between 3 and 16 feet, typically at the depth of the water table. Observed debris included plastic sheeting, rebar, glass, concrete, and wooden planks. Air monitoring indicated reported organic vapor concentrations of up to 12.4 parts per million (Batelle, 1991).

Although the 1989 WHN study was only focused on the North and South Field areas of the subject property, it is assumed that fill materials also are present within the vicinity of the power station buildings and cooling towers.

3.2.6 - Soil or Groundwater Contamination

Nine groundwater monitoring wells were observed within the Protected Area of the subject property, in the vicinity of the House Heating Boiler 12,000 gallon #2 fuel oil aboveground storage tank (AST). According to VYNPC employees, the groundwater monitoring wells were installed as a result of the removal of a 5,000 gallon #2 fuel oil underground storage tank (UST). It was also noted by VYNPC personnel that two of the nine monitoring wells contained free-phase light non-aqueous phase liquid (LNAPL). A LNAPL removal program is currently in progress. According to VYNPC employees, groundwater collected from the area of the nine monitoring wells contains concentrations of Tetrachloroethene (PCE). VYNPC employees indicated the PCE source originated from the former dry cleaning operations historically performed inside the Turbine Building.

Groundwater monitoring well networks were also observed in the areas of the main septic leachfield, the New Warehouse leachfield, the COB leachfield, the South Field, the North Field, the Gatehouse leachfield, the PSB leachfield and the Governor Hunt House leachfield. According to VYNPC personnel monitoring wells located in the septic system leachfields are utilized to evaluate groundwater impact of the septic leachate. The monitoring wells located in the South Field are utilized to evaluate groundwater impact of septic sludge applications. Monitoring wells located in the North Field were used to evaluate geological trends and the ability of the area to except septic sludge.

Soil staining was observed in the vicinity of the Main and Spare Main Transformers. The likely source of the soil staining was from leaking transformer components. The Main Transformer appeared to have a current leak due to the absorbent pads observed beneath the structure. The staining observed beneath the Spare Main Transformer appeared to be weathered and no current leaking was observed.

3.2.7 - Storm Water

An extensive storm water drainage system is in place at the subject property, including drainage from both paved and unpaved areas of the property. The following discussion presents an overview of these systems, designated by the area of the property that is serviced. Both the VYNPC Hazardous Waste and SPCC Program documents (PP7503 and OP2106)(Appendix B) and NPDES Permit documents (Appendix E) provide details of the storm water drainage systems.

3.2.7.1 - Southeast System

A small system comprised of one catch basin leading to an outfall to the Connecticut River is located to the south of the East Cooling Tower, and drains runoff from paved and unpaved portions of that area of the property. Due to unseasonable dry conditions, the formation, collection and discharge of runoff was not observed during the period of this ESA (Appendix A, Section 2, Photo # 30).

3.2.7.2 - South System

This portion of the storm water drainage system is located both inside and outside the Protected Area, and has a separate outfall to the Connecticut River located inside the plant cooling water discharge structure. Areas of the property that drain to this system include the driveways entering the employee parking lot and adjacent to the ELF; the grassed area to the northwest of the West Cooling Tower; and the northeast, east, and southern paved portions of the Protected Area (including the vicinity of the RAD Waste Building, COB, the AOG building, and the South Warehouse).

An oil/water separator (MH-C) is located at the northern end of the drain system, and is equipped with a safety valve that is normally closed. On May 8, 2001, ECS observed no measurable oil in MH-C. A second oil/water separator (MH-B) is located to the west of the AOG building; this separator is connected directly to a sump located inside the containment berm for the 75,000 gallon Main Fuel Oil AST. This manhole was not gauged by ECS during site reconnaissance. Manhole MH-B is equipped with a safety valve that has been permanently closed, effectively closing the connection to the South system outfall to the Connecticut River. A second isolation valve is located on the system at Manhole #45, immediately upstream of the discharge outfall pipe leading to the cooling water discharge structure (Appendix A, Section 2, Photo #'s 31 & 34).

3.2.7.3 - North System

This portion of the storm water drainage system is located both inside and outside the Protected Area, and has a separate outfall to the Connecticut River that is located at the east of the off-gas discharge stack. Areas of the property that drain to this system include the employee parking lots to the west of the power station, the northwest and western paved areas of the Protected Area (including the vicinity of the North Warehouse, Start-up Transformers, Main

Transformer, and Auxiliary Transformer), and a curtain drain around the western and southern perimeter of the 345Kv Switchyard.

The Start-up, Main, and Auxiliary Transformers are located within bermed concrete containment vaults that are drained to an oil/water separator (MH-A). This separator is equipped with a safety valve that is normally in a closed position to prevent any accumulation of oil from entering the storm water system. On May 8, 2001, ECS measured approximately 1.5 inches of oil in MH-A. A second isolation valve is located on the system at Manhole #44, immediately upstream of the discharge outfall pipe. VYNPC personnel indicated that past testing of accumulated oil inside the containment vault of the Main Transformer has shown the presence of PCBs at concentrations of up to 41 parts per million (ppm) (Appendix A, Section 2, Photo #'s 29, 32, & 33).

3.2.7.4 - Switchyards

Both the 345Kv and 115Kv Switchyards are constructed on gravel beds that are drained to perimeter curtain drains. The north and east side of the 345Kv Switchyard drains (via manholes MH-I, MH-32, MH-33, and V-Yard-12) to a separate outfall located at the Connecticut River bank, north of the North System outfall. The 115Kv Switchyard is drained to two separate outfalls which discharge to the west bank of the Connecticut River, north of the 345Kv Switchyard outfall (Appendix A, Section 2, Photo # 2; Section 3, Photo # 10).

3.2.7.5 - Drainage Ditches

A drainage ditch exists within the area of the sonotubes. An open flowing channel originates from a 24-inch diameter pipe that daylights north of the 115 KV Switchyard. The channel flows east and beneath the perimeter access road along the eastern fence line and discharges to a hold tank before exiting down an embankment to the west bank of the Connecticut River. The drainage ditch is heavily vegetated. The source of the water is unknown (Appendix A, Section 2, Photo #'s 18, 20, 21, 35, & 36).

3.2.8 - Aboveground/Underground Storage Tanks (AST/USTs)

A total of four USTs and eleven ASTs were observed within the Owner Controlled Area and the Protected Area of the subject property (Appendix A, Section 1, Photo #'s 1, 2, & 5). The four USTs include the following:

- one 1,000 gallon gasoline double-walled fiberglass UST located northeast of the South Warehouse building;
- one 550 gallon diesel double-walled fiberglass UST located northeast of the South Warehouse building;
- one 550 gallon diesel double-walled fiberglass UST located adjacent to the John Deere diesel emergency generator building; and
- one 3,000 gallon #2 fuel oil double-walled fiberglass UST located west of the PSB.

The 1,000 gallon gasoline and the 550 gallon diesel USTs are utilized for the refueling of vehicles (herein referred to as the Gas/Diesel UST Area). The 550 gallon diesel located near the John Deere diesel building is utilized for operating the small John Deere emergency generator (herein referred to as the John Deere Diesel UST Area). The 1,000 gallon gasoline UST and the two 550 diesel USTs were installed in

1997. The 3,000 gallon #2 fuel oil tank is an unregulated UST utilized for heating the PSB, and was installed in 1998.

The most recent Veeder-Root leak detection monitoring reports (April 2001) for the John Deere UST and the Gasoline/Diesel USTs indicated all three USTs passed leak detection. The Veeder-Root leak detection monitoring report June 2, 2001 for the PSB fuel oil UST indicated the UST passed the gross leak detection test. Copies of these reports, along with the current registrations for the regulated diesel and gasoline USTs, are included in Appendix F.

The eighteen ASTs observed include the following: one 75,000 gallon diesel fuel AST located immediately south of the Advanced Off-Gas (AOG) building; one 15,000 gallon nitrogen AST located east of the reactor building; one 11,000 gallon lube oil AST located in the lube oil pump room of the turbine building; two 800 gallon diesel generator day ASTs located in the turbine building; two 275 gallon diesel generator lube oil ASTs located in the diesel generator rooms; one 500 gallon waste oil AST located in the CAB; one 500 gallon waste oil AST located in the North Warehouse; one House Heating Boiler 12,000 gallon #2 fuel oil AST located immediately west of the turbine building; one diesel fire pump 350 gallon diesel AST located in the intake structure; one mobile 500 gallon mobile diesel AST located adjacent to the gasoline and diesel USTs when not in use; one 1,230 gallon Sulfuric Acid AST located adjacent to the intake structure; one 5,000 gallon Sodium Hypochlorite AST located adjacent to the intake structure; one 2,900 gallon Sodium Bromide AST located adjacent to the intake structure; one 150 gallon Ethylene Glycol AST located on the roof of the AOG building; and, four radiological waste holding ASTs located east of Reactor Building (Appendix A, Section 2, Photo #'s 2, 3, 4, 6, 7, 8, 9, 10 & 15).

All ASTs on-site have secondary contaminant including but not limited to double-walled construction, concrete berms and floor drains connected to oil/water separators. No petroleum staining was visually observed in the areas containing ASTs.

A copy of the VYNPC's Hazardous Waste Program (PP7503) dated March 2, 2000 which provides full detail of the facilities hazardous materials use and storage procedures is included as Appendix B. All UST/AST locations are indicated on the Oil/Hazardous Materials map included in Appendix B. Photographs are included as Appendix A.

3.2.9 - Transformers & Breakers

A total of eleven transformers and three breakers were observed in the Owner Controlled Area and the Protected Area of the subject property. The eleven transformers include the Main transformer, two Start-up transformers, the Auxiliary transformer, the Spare Main transformer, the Auto transformer, the Vernon Tie transformer, two Cooling Tower transformers, the COB transformer and the PSB transformer. The three breakers include the Keene line breaker, the Bus line breaker and the Coolidge line breaker.

The Main, Start-up and Auxiliary transformers are located immediately adjacent to the Turbine Building. According to VYNPC personnel, these three transformers are located within concrete containment vaults, that are connected to the North Storm Drain system via manhole MH-A (Appendix A, Section 3, Photo #'s 3 - 6).

The Spare Main transformer is located east of the 345 Kv Switchyard, in a gravel covered area of the property. The Auto transformer is located on concrete pad within the fenced area of the 345 Kv Switchyard. The Vernon Tie transformer is located on concrete pad west of the cooling towers. The two

Cooling Tower transformers are located on concrete pads, north of each respective cooling tower. The COB transformer is located on a concrete pad north of the COB. The PSB transformer is located west of the PSB on a concrete pad (Appendix A, Section 3, Photo #'s 1, 2, 7, 9, & 10 - 14). The three breakers on concrete pads within the 115 Kv Switchyard (Appendix A, Section 2, Photo # 10).

A total of six transformers are located inside the Turbine building. The six transformers include the T-6 Sample Panel area transformer, the T-7 MUD system transformer, T-8 Switchgear Room transformer, T-9 Switchgear Room transformer, T-10 Standard Air Receivers Transformer, and the Generator Neutral Grounding transformer. All transformers located within the Turbine Building were surrounded by secondary containment berms. No visual evidence of leakage was observed (Appendix A, Section 3, Photo #'s 8 & 10).

Soil staining was observed on the gravel adjacent to the both Main transformer and Spare Main Transformers. No other areas of soil staining were visually observed at the remaining transformers or breakers.

Based upon the age of the power station, transformers located on the subject property may have previously contained PCB dielectric fluid. According to VYNPC personnel all transformers at the subject property currently contain non-PCB dielectric fluid.

A copy of the VYNPC's Hazardous Waste Program (PP7503) dated March 2, 2000 which provides full detail of the facilities hazardous materials use and storage procedures is included as Appendix B. All transformer and breaker locations are indicated on the Oil/Hazardous Materials map included in Appendix B.

3.2.10 - Preferential Migration Pathways

The six septic systems located in the Owner Controlled Area of the subject property are potential preferential migration pathways. They include: the Main septic; the New Warehouse septic; the COB septic; the PSB septic; the Governor Hunt House septic; and Gatehouse #1 septic. According to VYNPC personnel no other waste other than sanitary wastewater and the laboratory wastes are discharged to the septic systems.

The Main septic system, which includes four leachfields and one 9,450 gallon septic tank, is located north of the Protected Area of the subject property adjacent to the 345 Kv Switchyard. The Main septic system services the main complex of buildings on the subject property (Appendix A, Section 2, Photo # 3).

The New Warehouse septic system, which includes one leachfield and one 3,000 gallon septic tank, is located south of the Protected Area adjacent to the spray pond. The New Warehouse system services the lavatories in the east portion of the new warehouse (Appendix A, Section 2, Photo # 4).

The COB septic system, which includes one leachfield and one 5,000 gallon septic tank, is located south of the Protected Area adjacent to the spray pond. The COB system services the COB and other lavatory facilities on the southend of the plant (Appendix A, Section 2, Photo # 4).

The PSB septic system, which includes one 3,000 gallon septic tank and two leachfields, is located south of the PSB. The Governor Hunt House septic system, which includes one 1,000 gallon septic tank and two leachfields, is located east of the building. The Governor Hunt House septic system

services the Governor Hunt House/Visitor Center. The Gatehouse #1 septic system, which includes one 1,000 gallon septic tank and one leachfield, is located east of Gatehouse #1. The Gatehouse #1 system services only Gatehouse #1 (Appendix A, Section 2, Photo #'s 2 & 42).

The individual septic tanks for the COB, New Warehouse, and Main systems are pumped on a regular basis. The pumped sludge is temporary held in the COB Holding Tank until it is spread on the South Field under the Land Application Permit. The COB Holding Tank is located adjacent to the ELF building, and was full at the time of the ESA reconnaissance by ECS (Figure 3).

Copies of the August 2000 VYNPC Indirect Discharge Permit (IDP #ID-9-0036) issued by VTDEC and the VYNPC's routine procedure (RP 4615) dated December 27, 2000 outlining the septic discharge terms and conditions are included as Appendix D. A map indicating the locations of all the septic tanks and respective leachfields is included in Appendix D.

3.2.11 – Additional Areas containing Hazardous Materials

Additional areas observed to contain hazardous material include the following: two 250 gallon diesel generator lube oil sumps and the hydraulic oil gate-operating systems at both the river intake and discharge structures.

A copy of the VYNPC's Hazardous Waste Program (PP7503) dated March 2, 2000 which provides full detail of the facilities hazardous materials use and storage procedures is included as Appendix B.

3.2.12 – Former Wood Burning Area

According the VYNPC employees a former wood burning area is located northwest of the 345 Kv Switchyard between the two railroad spurs. Ash was observed in the grass section of the area. There was no visual evidence of the any current usage (Appendix A, Section 2, Photo # 8). No other information on this area was available.

3.2.13 - Dredged River Sediment

During the ECS property reconnaissance, several rows of encapsulated sediments were observed in the area south of the North Field. The encapsulation material is referred to by VYNPC as "sonotubes" (Appendix A, Section 2, Photo #'s 19, 22, & 23). The sediments were accumulated during the dredging of river bottom sediments at the cooling water intake structure. This dredging work was permitted by both the U.S. Army Corp. of Engineers (Permit # 199702302) and the Vermont Department of Environmental Conservation (Case # SA-1-0379) in October 1997. A copy of the permit information is included as Appendix G.

A sampling program (20 core samples) of sediment from the intake structure, conducted in 1997 prior to the dredging project, identified Cs-137 that could possibly been related to plant activities. Concentrations ranged from 86 to 119 picocuries per kilogram (pCi/Kg). A second study of sediment collected 4.3 kilometers upriver of the power station at a distance considered beyond influence by VYNPC, identified similar concentrations of Cs-137. Of 31 samples collected, Cs-137 concentrations were found to range from 95 to 366 pCi/Kg. VYNPC concluded that the Cs-137 concentrations detected in sediments at the intake structure were most likely not related to plant activities

3.2.14 - Drinking Water Supply Wells

There are current four bedrock water supply wells that are utilized for three potable water supply systems at the subject property. These are designated as follows:

System ID	Supply Wells	Source ID#	Total Depth	Production Rate
Main	West	#283	555'	50 gpm
WSID8332	Southwest	#253	500'	6 gpm
COB WSID20559	COB	#214	362'	12 gpm
NEOB WSID20738	NEOB	#6642	500'	30 gpm

Pursuant to VT DEC Water Supply Rule, the source wells are tested quarterly for coliform bacteria. Due to the presence of chlorinated hydrocarbons in the groundwater pumped by the COB well, this system is equipped with an activated carbon filtration system. The COB filtration system is maintained and monitored for efficiency by VYNPC, with results of monitoring reported to VTDEC on a quarterly basis. Refer to Appendix H for copies of the Water Supply Permits. The location of the four supply wells are shown on the Site Plan (Figure 3).

4.0 SUBJECT PROPERTY HISTORICAL USE

The following sections provide an overview of the findings of the historical research conducted for the subject property. This information was obtained by reviewing readily available public documents at municipal and state agencies as indicated.

4.1 – AERIAL PHOTOGRAPHS

Tow aerial photographs dated 1989 and 1992 show the subject property as it presently exists, with the exception of the PSB which was occupied starting in 1998. The next most recent aerial photograph dated 1976 shows the subject property as it existed post-construction. The earliest aerial on file with the Vermont Mapping Program is dated 1962. This map shows the area of the subject property to be farmland. A comparison of the 1976 and 1992 maps revealed the construction of several buildings within the Protected Area during that period. Aerial photographs are included as Appendix I.

4.2 – USGS TOPOGRAPHICAL QUADRANGLE MAP

The Brattleboro, Vermont USGS Topographical Quadrangle Map, dated 1984, shows the subject property buildings. The map shows the surrounding area as it presently exists (Figure 1).

4.3 – MUNICIPAL INQUIRIES

Available records were reviewed at the Vernon Lister's Office. Municipal records that were reviewed included the subject property tax cards (Appendix J) and tax map (Figure 2).

4.4 – HISTORIC STREET AND BUSINESS DIRECTORIES

There were no available Historic Street Directories for Vernon.

4.5 – SANBORN FIRE INSURANCE MAPS

There were no available Sanborn Fire Insurance Maps for Vernon due to its relatively rural land usage.

5.0 ADJACENT PROPERTY RECONNAISSANCE

5.1 - INTERVIEWS

No interviews were conducted with adjacent property owners

5.2 - ADJACENT PROPERTY RECONNAISSANCE

A limited reconnaissance of properties abutting the subject property was conducted on May 21, 2001, which consisted of a visual inspection of readily accessible portions of nearby properties. Nearby properties were not accessed, and were viewed from those areas observable from the street or from the subject property. The properties abutting the subject property are as follows:

- North: Miller Farm Property
- East: Connecticut River
- South: Connecticut River
- Southwest: USGen New England, Inc.
- West: Private Residences, Governor Hunt Road

Photographs of abutting properties are included in Appendix A, Section 2, Photo #'s 41, 43, 44, & 45).

5.2.1 - Chemical Storage Areas

No chemical storage areas were observed on any abutting property.

5.2.2 - Solid Waste

No evidence of solid waste disposal other than dumpsters was observed on abutting properties.

5.2.3 - Evidence of Dumping

There was no evidence of illegal or illicit waste dumping activities on the properties proximal to the subject property.

5.2.4 - Use of Fill Material

No evidence of fill material was observed on abutting properties.

5.2.5 - Soil or Groundwater Contamination

No evidence of soil or groundwater contamination was observed during the reconnaissance of the adjacent properties.

5.2.6 - Storm Water

There was no observed evidence indicating significant Recognized Environmental Conditions to the subject property resulting from storm water runoff from adjacent properties.

5.2.7 - ASTs/USTs

There was no observed evidence indicating significant Recognized Environmental Conditions to the subject property resulting from existing ASTs/USTs on adjacent properties.

5.2.8 - Transformers

No transformers were observed on abutting properties.

5.2.9 - Subsurface Pathways

Privately-owned septic systems can serve as potential subsurface pathways of contaminant migration. Contaminant migration via groundwater in the area of privately-owned septic systems if not considered to pose a risk to the subject property based on the residential land usage that dominates upgradient areas and the presence of septic systems well above the groundwater table at the abutting properties.

6.0 ADJACENT PROPERTIES HISTORICAL REVIEW

The following sections provide an overview of the findings of the historical research conducted for properties proximal to the subject property. This information was obtained by reviewing readily available public documents at municipal and state agencies, as indicated.

6.1 - USGS TOPOGRAPHICAL MAP

The Brattleboro, Vermont USGS Topographical Quadrangle Map, dated 1984, noted several small buildings and large amounts of open space in the area surrounding the subject property.

6.2 - AERIAL PHOTOGRAPHS

The subject area land usage has been residential or agricultural since at least 1962 based on a review of aerial photographs.

6.3 - MUNICIPAL INQUIRIES

Available records were reviewed at the Vernon Lister's Office on May 17, and May 23, 2001. Municipal records that were reviewed identified no environmental concerns related to the properties adjacent to the subject property. Information reviewed at the Vernon Clerk's Office indicated that properties in the area of the subject property area were predominately residential in nature with the Vernon Elementary School and the Vernon Town Offices located within a 1500 foot radius of the VYNPC Restricted Area. According to Vernon Town records, properties located within 500 feet of the subject property are supplied by private drinking water wells and serviced by private septic systems.

7.0 ENVIRONMENTAL RECORDS REVIEW

7.1 - REGULATORY AGENCY LIST REVIEW

ECS conducted record file research at the VTDEC Waste Management Division in Waterbury on April 20, 2001. In addition, current environmental databases were accessed by ECS via a FirstSearch™ database search performed by FirstSearch Technology Corporation. Databases accessed for review for the subject property and abutting properties under ASTM guidelines included NPL, CERCLIS, FINDS, ERNS, TRIS, RCRA Generators list, State Sites, leaking underground storage tank (LUST) list, Vermont List of Hazardous Waste Generators, and State Spills List. The following sections detail information discovered as a result of this research.

7.1.1 - Federal Databases (US EPA

The National Priority List (NPL) identifies the facilities classified under Superfund that are eligible for federal cleanup assistance. These properties are believed to pose a significant threat to the public health and the environment and warrant remedial action under Superfund. The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list identified facilities that are under review for inclusion in the Superfund program. CERCLIS sites designated "no further remedial action planned:" have been removed from the list.

The subject property is not listed on any federal database. There were no properties found on the NPL or CERCLIS list within 1.0 mile of the subject property.

The Emergency Response Notification System (ERNS) is an EPA database of emergency response actions that is updated quarterly. Twelve (12) ERNS actions occurred at the subject property according to the FirstSearch Report. A Summary of ERNS Actions at the Subject Property is provided in the following table. None of the actions summarized below are considered to be significant.

Date of Spill	Product Released	Media Affected	Actions Taken
9/14/90	10 gallons of lubricating oil	Land – concrete	Over filled tank truck during transfer – cleaned w/ sorbent pads
2/12/91	Unknown volume of chemical wastes via corroded drain line	Land – soil	Samples collected and analyzed – containing various caustics and acids
12/11/91	2 gallons #2 fuel oil	Land – black top	Fuel truck fitting leak during transfer to storage tank – used absorbent to pick up spill and soil was excavated and drummed as hazardous waste
6/24/92	1 ml of Mercury	Other – Cement pad	Broken switch – mercury removed from pad
2/6/93	1 gallon non-radioactive mineral oil	Land – stone	Cold weather cracked detectors causing release – moved detectors indoors & drained material into drums and collected spilled material off stone surface
1/18/94	10 gallons of diesel fuel	Land – 20 ft x 20 ft soil	Oil transfer line leak during truck filling – used sorbents and removed soil and snow
5/13/94	1 gallon #2 fuel oil	Land	Fuel release during transfer from tank – sorbents used

Date of Spill	Product Released	Media Affected	Actions Taken
7/27/94	Unknown volume of Hydraulic oil	Land	Hydraulic line failure on tractor- sorbent used – state notified
7/26/95	Compressor oil	Land	Air conditioning unit failure – leak contained with sorbents
1/15/96	Unknown volume of Hydraulic oil – reported as 0 gallons	Land and Water – CT River	Leak on hydraulic gate unit – secured leak and placed sorbent pads
6/24/96	Sodium Hypochlorite Unknown volume	Circulation water system and CT River	Gasket failure on flange – no radiation involved – actions unknown
11/25/97	Hydraulic Oil	Water – CT River	Hydraulic pump broke during dredging of intake canal – boom deployed & leak stopped

The FirstSearch™ Report for the subject property is provided in Appendix K.

7.1.2 - State Databases (VT DEC)

ASTs/USTs

The VTDEC maintains a list of permitted and non-permitted USTs and a list of removed ASTs/USTs for the state. Additionally, the DEC maintains a database of information pertaining to the release of petroleum and/or hazardous materials from these tanks and from other sources.

The VTDEC files listed the following four USTs at the subject property:

- 550-gallon fiberglass reinforced plastic #2 fuel oil UST with spill and overfill protection;
- 550-gallon fiberglass reinforced plastic gasoline UST with spill and overfill protection;
- 1,000-gallon fiberglass reinforced plastic diesel UST with spill and overfill protection; and
- 3,000-gallon fiberglass reinforced plastic #2 fuel oil UST with spill and overfill protection.

The VTDEC listed the following six UST removals that occurred at the site:

- 5,000 gallon #2 fuel oil UST removed in 1994;
- 500 gallon diesel UST removed in 1998;
- 2,000 gallon gasoline UST removed in 1988;
- 510 gallon diesel UST removed in 1997;
- 1,000 gallon gasoline UST removed in 1997; and,
- 550 gallon diesel UST removed in 1997.

The above information was repeated in information provided by the FirstSearch Report. A Closure Report for the three USTs removed in 1997 is included in Appendix F. No further information on the 1988, 1994, or 1998 removals was available.

RCRA Generators

The list of Vermont Hazardous Waste Generators was created by the Vermont Hazardous Waste Management Regulations, Section 7-303, to document and track the use of hazardous materials during all stages of generation, use and disposal. The subject property is listed on the RCRA Generator's list as a large quantity generator. The subject property's Generator ID number is VTD045011533 and contact is Dwight Hensel.

Spills

Nineteen spills were listed with the VTDEC for the subject property between 1990 and 2000. All spills were voluntarily cleaned-up and require no further action. There were no properties within 500 feet of the subject property named on the Spills list reviewed. A complete list of spills reported for the subject property is presented in the FirstSearch™ electronic database report, and a copy of the VTDEC Spills Database for the town of Vernon are included as Appendix K.

Active State-Listed Sites

The VTDEC listed the subject property and the abutting Former Edson Gulf property on the active Sites List. A copy of the VTDEC Hazardous Sites List dated April 6, 2001 is included as Appendix K.

VYNPC (SMS# 992617) During 1994 a 5,000 gallon #2 fuel oil UST within the Protected Area the subject property adjacent to the turbine building was removed. During the spring of 1999, groundwater monitoring wells were installed in the vicinity of the 5,000 gallon UST as part of an environmental assessment for the site. Groundwater samples collected during the initial environmental assessment from the groundwater monitoring wells contained volatile organic Compounds (VOCs) that exceeded VTDEC Primary Groundwater Quality Standards (PGQS). An additional five (5) groundwater monitoring wells were installed at the subject property during additional investigations. Free phase #2 fuel oil was encountered in monitoring wells MW-1, -8 and –9. The Site Investigation Report completed by SVE Associates in November 1999 recommended free product recovery and natural attenuation with quarterly groundwater monitoring as a remedial alternative. Quarterly groundwater monitoring commenced in December 1999. ECS completed the quarterly report for September to December 2000 dated January 31, 2001. Upon review of the January 2001 report, VTDEC reduced to groundwater sampling frequency to an annual schedule.

Sample collection and analysis of groundwater from the COB bedrock water supply well is part of the above noted response actions. The well was last sampled on February 22, 2001 from pre and post consumption locations. The post-filtration site is at a point of consumption referred to as the first floor lunchroom. No contaminants were detected above method detection limits in the post filtration sample. The pre-filtration sample contained 1.3 ug/l of 1,1 Dichloroethene and 1.4 ug/l of 1,1 Dichloroethane, which are below the VT Primary Groundwater Quality Standards (PGQS) of 7.0 ug/l and 70 ug/l, respectively.

Documents pertaining to this DEC Site (#99-2617) are included as Appendix L.

Former Edson's Gulf (SMS# 931485) The Richard Edson property (Map 36, Lot 22) abuts the subject property to the south of the entrance road from Governor Hunt Road. The Edson property is currently the location of two residences and the former Edson's Gulf gasoline service station.

On October 17, 1990, a 1,000 gallon and a 2,000 gallon gasoline UST were removed from the property. The USTs were installed around 1966-67 during the construction of the gasoline service station. Upon removal of the USTs petroleum hydrocarbon contamination was detected in the soils in the vicinity of the former pump island and UST area. An environmental site investigation completed during December 1993 by ENSA of Brattleboro, VT reported groundwater and drinking water at the Edson residence and the drinking water at the adjacent residence to the south (Map 36, Lot 23) contained petroleum hydrocarbon contamination. A soil vapor extraction (SVE) system was installed on December 22, 1994 to remediate gasoline contaminated vadose zone soils in the vicinity of the former pump island and UST area. On October 6, 1997, the catalytic oxidizer that had been incinerating Volatile Organic Compounds (VOCs) recovered by the SVE system was replaced with two carbon canisters in series. On August 3, 1999, the SVE system was permanently shut down, and on November 23, 1999, the SVE lines and two monitoring wells were removed.

Semi-annual groundwater monitoring is ongoing at this location due to the continued presence of low level gasoline related VOCs above VT PGQS. A copy of the June 2000 Semi-Annual Report for the Former Edson's Gulf site, completed by ECS for the VTDEC, is included as Appendix N.

7.2 - VYNPC Records Review

Pursuant to the requirements of 10CFR50.75(g), VYNPC maintains records regarding documented radiological contamination that has been detected at the subject property. Under the power station decommissioning requirements of NRC Permit # DPR-28 for the operation of the power station, all environmental conditions related to radiological concerns are maintained within the 50.75(g) file by VYNPC. A matrix of documented site conditions with respect to radiological contamination is included in Appendix N, including two reference site plans.

ECS's review of this contamination matrix indicated that all radiological incidents were well documented, and included significant assessment activities to evaluate residual radiological activity. Two incident areas were listed for which limited data existed for provide complete characterization of potential radiological activities.

A location between the East and West Cooling Towers referred to as "Area B-2", was identified as the location of temporary storage of silt removed from the cooling towers, prior to on-site spreading. According to the contamination matrix, minimal activity was expected with regards to the silt, however no radiological quantification of this area had been completed. In addition, Area B-2 had also been a location of temporary storage of construction debris and soil generated from work inside the Protected Area of the property.

A location west of the 115Kv Switchyard, referred to as "Area B-5", was identified as containing unspecified materials exhibiting low-level radiological activities in 1999. VYNPC records also indicated that radiological activity was detected in asbestos waste found near this area of the property. A report documenting the discovery of the asbestos waste (Report #84-09) is included in Appendix N.

8.0 PHASE I CONCLUSIONS AND RECOMMENDATIONS

8.1 - SUMMARY OF PHASE I FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

ECS completed a Phase I Environmental Site Assessment of the Vermont Yankee Nuclear Power Corporation property located at 320 Governor Hunt Road, Vernon, Vermont. This assessment included background research into the subject property history, specifically with respect to petroleum and/or hazardous materials use, storage, and disposal, an inspection of the site, and a review of available state and federal environmental agency files regarding the subject and surrounding properties, a reconnaissance of the subject property and abutting properties, and a review of readily available files and records provided by VYNPC, and interviews with VYNPC personnel. The assessment focused on the potential release of petroleum and/or hazardous materials to soil, groundwater and surface water and is not intended as a compliance audit particularly concerning the operation of the nuclear power facility, and handling and storage of radioactive materials. The presence of hazardous materials in use as building materials, such as asbestos, lead paint, urea formaldehyde or radon was also not investigated in this report.

Based upon the information obtained as part of the Phase I ESA, ECS identified seven (7) areas of Recognized Environmental Conditions (RECs) of concern that require further inquiry, including subsurface investigations. The RECs are listed below, and then discussed separately with regards to the recommended scope of work for each under the Phase II section of this report. Reference is made to the Site Plans, Figures 3 and 4, for the locations of these areas.

1. Subject property Septic Systems (6)
2. Owner Controlled Areas (North Field, South Field, Area "B-2", Area "B-5")
3. Former/Current Underground Storage Tanks (USTs)
4. Former Wood Burning Area
5. Current water supply wells (4)
6. Primary and Secondary Transformers
7. Subject property Storm Water Drainage System (North and South)

9.0 PHASE II SCOPE OF WORK

9.1 - INTRODUCTION

Outlined below is a summary of the scope of work used for the completion of the Phase II ESA. Listed by identified REC, the recommended investigations, number of borings/wells that were installed and/or sampled, and analytical parameters tested for by matrix are discussed. All investigative activities were completed following a Health and Safety Plan developed specifically for this project.

9.2 - INVESTIGATIVE SCOPE OF WORK

9.20 - Septic Systems

Six septic systems are currently in use at the subject property (Main, COB, New Warehouse, Visitor Center, Gatehouse 1, and the PSB).

Of the six systems at the subject property, the Main, Construction Office Building (COB), and New Warehouse systems are directly associated with operations at or near the Protected Area of the power station. The use of the New Warehouse for the storage of hazardous materials and the presence of waste oil in the vicinity of the COB building present additional RECs. In addition, the use of the COB Holding Tank for temporary storage of septic sludge that is periodically pumped from the Main, COB, and New Warehouse septic tanks also presents a REC.

Historic data has shown the presence of radionuclides in septic sludge from all systems except for the PSB, Visitor Center and Gatehouse 1 systems. Given the relatively recent construction and the administrative nature of these buildings, these septic systems are not considered to be RECs, and were therefore not evaluated.

In order to assess the potential risk for subsurface introduction of contaminants via septic discharges and storage of septic sludge, ECS collected septic waste and effluent samples from the three systems, and soil samples from beneath each leach field and adjacent to the COB Holding Tank via Earthprobe™ borings. Groundwater quality was assessed through the collection of groundwater samples using existing monitoring wells, and from one new well installed adjacent to the COB Holding Tank. Outlined below are the numbers of samples collected from each area, with the analytical parameters used for each media.

- **Septic Waste/Effluent:** Both influent waste and effluent leachate samples from each septic tank were collected from each system (2 @ Main, 2 @ COB, 2 @ New Warehouse) for a total of 6 samples. The following analytical parameters were used:

    - Volatile organic compounds (VOCs) by EPA Method 8260B
    - Total Petroleum Hydrocarbons (TPH) by Modified EPA Method 8100M
    - Polychlorinated biphenyls (PCBs) by EPA Method 8082
    - Total Priority Pollutant (PP13) Metals
    - Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3).

- Gross Alpha & Beta

Soil: Soil samples were collected from each leach bed (4 @ Main, 2 @ COB, 4 @ New Warehouse) and from adjacent to the COB Holding Tanks (2 samples) for a total of 12 samples. The following analytical parameters were used:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M
- Total PP13 Metals
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3).

Groundwater: Groundwater samples were collected from each area, using available monitoring wells. A total of 14 groundwater samples were proposed (10 @ Main, 3 @ COB/New Warehouse, 1 @ COB Holding Tank). The following analytical parameters were used:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M
- Dissolved PP13 Metals
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3).
- Gross Alpha & Beta

9.21 - Owner Controlled Areas

A total of four (4) REC areas were identified within the Owner Controlled Area at the subject property. These four areas are presented below with an outline of the environmental concerns of each.

North Field: This is a permitted septic sludge land application area. Although sludge application to this area has not taken place, VYNPC documents indicated that low level radionuclides have been detected in soil or debris near this area. In addition, observations made by ECS during field reconnaissance have shown that debris piles exist near this area. A rusted drum, "sonotubes" containing dredged river sediment, and mounded areas vegetated with young saplings were observed in the vicinity of the North Field.

South Field: This is a permitted septic sludge land application area. Records indicate that all land application of septic sludge has taken place in the South Field. VYNPC documents indicate that low level radionuclides have been detected in septic sludge. Observations made during field reconnaissance have shown that debris piles exist in this area. In addition, mounded areas overgrown with larger shrubs and trees were observed near the South Field.

Area B-2: The temporary storage of sediment collected from the cooling towers has taken place near the east side of the West Cooling Tower. This area is listed on the "Site Contamination Matrix" as part of the 50.75(g) decommissioning file (Appendix N).

Area B-5: This area is where radiological activity in soil has been reported (Appendix N). It is located to the west of the 115Kv Switchyard, south of the North Field.

ECS collected both soil and groundwater samples from each area. Soil samples were collected from Area B-2 and Area B-5, selected areas in the vicinity of the North Field, and in or adjacent to the South Field. These samples were collected either by hand borings or where appropriate using Earthprobe™ direct-push soil sampling methods. Groundwater quality was assessed through the collection of groundwater samples using existing monitoring wells. In addition, ECS installed one monitoring well south of the North Field. Outlined below are the number of samples collected from each area, with the analytical parameters completed for each media.

Soil: Soil samples were collected from each area as follows: South Field (8 by Earthprobe); North Field (5 by Earthprobe, 1 by rotary hollow stem drill rig); Area B-5 (2 by Earthprobe); Area B-2 (2 by hand boring), for a total of 18 samples. The following analytical parameters were completed:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M
- Total PP13 Metals
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)

Groundwater: Groundwater samples were collected from each area using available monitoring wells and the two ECS-installed wells. A total of 15 groundwater samples were collected (7 existing wells and 1 new well in the North Field; and 7 existing wells in the South Field). A proposed well east of the western cooling tower in the B-2 temporary sediment storage area was not installed due to auger refusal above the water table. The following analytical parameters were completed:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M
- Dissolved PP13 Metals
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)
- Gross Alpha & Beta

9.22 - Current and Former USTs

ECS identified four USTs that are currently located at the subject property. These include the 550 gallon diesel, 1,000 gallon gasoline, and 550 gallon John Deere diesel located within the Protected Area of the power station, and the 3,000 gallon fuel oil UST located adjacent to the PSB. The 3,000 gallon PSB UST is less than 3 years old and has recently passed leak detection tests. No further inquire was therefore recommended for this UST. In addition, a former 1,000 gallon waste oil UST was located beneath the current position of the skid-mounted transfer AST. In order to assess the potential for historic releases and/or overfill spillage,

subsurface investigations were proposed in the vicinity of the John Deere (JD) diesel UST, the gasoline/diesel (GD) USTs, and the former waste-oil (WO) UST locations.

In addition, the former House Heating Oil UST area is under a regulated groundwater monitoring program by the VT DEC. There are currently nine groundwater monitoring wells in place in this area of the subject property.

To assess subsurface soil and groundwater conditions with respect to the former and current USTs, ECS advanced soil borings for the collection of soil samples. Boring locations were installed as close as was practical, given the presence of subsurface utilities and/or traffic restrictions imposed by VYNPC. If soil contamination was indicated through field screening, groundwater monitoring wells were installed for the collection of groundwater samples for laboratory confirmatory analyses.

Soil and Groundwater: A total of two soil borings were installed adjacent to both the John Deere diesel UST and the Gasoline/Diesel UST locations, and one boring was installed adjacent to the former Waste Oil UST location. Based upon the indication of VOC vapors in soils near the former Waste Oil UST and the current Gasoline/Diesel USTs, monitoring wells were installed. The following analytical parameters were used for both soil and groundwater in these UST areas:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M

With respect to the former House Heating Oil UST area, groundwater samples were collected from nine existing monitoring wells for VOC and TPH analyses, and from one wells for the following radiological parameters:

- Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)
- Gross Alpha & Beta

9.23 - Former Wood Burning Area

This area is located to the northwest of the 345Kv Switchyard, and was used for the historical burning of various wastes including construction debris. Based upon the undocumented nature of the materials that may have been burned in this area, ECS recommended that both soil and groundwater analyses be performed. One boring was advanced using a rotary auger drill rig, which will allow for split-spoon soil sampling and installation of a 2" ID PVC monitoring well for groundwater sample collection. An additional hand boring was completed for collection of a shallow soil sample.

Soil: Soil samples from the auger boring were screened at 2-foot intervals for the presence of VOC vapors, using a PID. Based upon the results of field screening, one sample from the boring was selected for laboratory analysis. A total of two soil samples were collected for the following laboratory analyses:

- VOCs by EPA Method 8260B

- TPH by Modified EPA Method 8100M
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270
- Total PP13 Metals
- Polychlorinated biphenyls (PCBs) by EPA Method 8082
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)

Groundwater: One groundwater monitoring well was installed. The following analytical parameters are recommended for groundwater:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M
- Dissolved PP13 Metals
- PCBs by EPA Method 8082
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)
- Gross Alpha & Beta

9.24 - Primary and Secondary Transformers

Eleven primary or secondary transformers are located outside the main buildings of the power station. In order to evaluate any environmental impact resulting from transformer oil leakage or spillage, ECS collected shallow soil samples adjacent to concrete containment structures or transformer pads.

The collection of composite soil samples from hand borings was completed for the following transformers located outside the Protected Area of the power station: #14 Auto Transformer (345Kv Switchyard); #18 Cooling Tower Transformers (2); #23 Vernon Tie Transformer; and #35 Spare Main Transformer. A total of 5 samples (4 composite and 1 grab) were collected for analysis of PCBs by EPA Method 8082.

Assessment of potential impacts from transformers located within the Protected Area of the power station was made separately, through the collection of waste samples from the storm water drainage system, as these transformers are all located on pavement or within containment structures that drain to oil/water separators. A discussion of the assessment for these transformers is presented below.

9.25 - Storm Water Drainage Systems

Both the North and South storm drain systems were identified as RECs which warranted further assessment. Three additional storm water outfalls are associated with the switchyards located to the north of the subject property power station buildings. Two of these outfalls were observed during site reconnaissance of the 115Kv Switchyard, and a third outfall is associated with a drainage system located along the northern edge of the 345Kv Switchyard (Manholes MH-I, MH-32, MH-33).

In order to evaluate potential releases to the storm drain systems and drainage ditch south of the North Field, ECS collected wastewater and oil samples from the two oil/water separators associated with the North and South drain systems (MH-A and MH-C, respectively), and wastewater, sediment, and/or surface water samples from identified drain systems and the drainage ditch near the sonotube silt storage area. Sample points were chosen as close to discharge outfalls as possible. Analyses for sediment, soil, and water samples included some or all of the following:

- VOCs by EPA Method 8260B
- TPH by Modified EPA Method 8100M
- PAHs by EPA Method 8270
- Total PP13 Metals
- PCBs by EPA Method 8082
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)
- Gross Alpha & Beta (water only)

9.26 - Current water supply wells

Four groundwater supply wells are presently in place at the subject property, for the supply of potable water through three supply systems. These include the COB Well System, the Main System (Southwest Well and West Well), and the NEOB Well System. The COB Well is currently treated for the presence of chlorinated solvents, prior to use. Given the confirmed presence of plant-related contaminants in the COB Well, and the potential for contamination (including radionuclides) to be introduced into the underlying bedrock aquifer, ECS collected water samples for laboratory analysis from each of the supply systems. In the case of the Southwest and West wells, these are connected into a combined supply, and therefore were sampled as a composite (Main System) sample. In order to collect samples that are most representative of groundwater conditions, sampling points as close to the well head and/or pressure tanks as possible were used, with assurance that all samples were collected prior to entry into any treatment systems. The following analyses were used for the three drinking water systems:

- VOCs by EPA Method 524.2
- TPH by Modified EPA Method 8100M
- Total PP13 Metals
- PCBs by EPA Method 8082
- Radiological Parameters by Gamma Scan (BE-7, K-40, MN-54, CO-58, FE-59, CO-60, ZN-65, ZR-95, RU-103, RU-106, I-131, CS-134, CS-137, BA-140, CE-141, CE-144, RA-226, TH-228, H-3)
- Gross Alpha & Beta

10.0 FIELD INVESTIGATIONS

The Phase II Scope of Work initiated for the subject property involved a program of soil sampling, septic waste and effluent sampling, sediment and surface water sampling, storm water system waste-water sampling, and groundwater sampling using both existing and newly installed monitoring wells and groundwater supply wells. These sampling methods were employed for the various identified RECs, as presented in Section 9.0 of this report.

The following discussion presents the methodologies used for each of the sampling techniques completed at the subject property. Reference is made to ECS Standard Operating Procedures (SOPs) that pertain to each of the sampling methods discussed.

10.1 - SUBSURFACE UTILITY CLEARANCE

In addition to utilizing the DIGSAFE service for the locating of subsurface utilities in and around the subject property, ECS conferred with VYNPC personnel for the clearance of all proposed boring locations. In addition, all areas with the Protected Area as well as in Areas B-2 and B-5 were surveyed for utilities using ground penetrating radar (GPR). On May 8 and 9, 2001, a GPR survey was completed by Geophysical Applications, Inc. of Foxborough, MA under the direction of ECS personnel. A copy of the GPR survey report is included in Appendix O.

No utilities or subsurface obstructions were detected in the area of ECS proposed borings adjacent to either the John Deere diesel UST or former Waste Oil UST locations, and the proposed boring locations were subsequently approved by VYNPC personnel. Evidence of a utility conduit was detected approximately 8 - 10 feet east of the Gasoline/Diesel UST locations, and beneath the ECS-proposed boring locations for this area. This was confirmed by VYNPC personnel as an electrical conduit leading to the Cooling Towers. Under the direction of VYNPC personnel, the two proposed boring locations were repositioned away from the UST locations and to the east of the conduit, approximately 10 - 12 feet from the edge of the UST pad. No evidence of subsurface utilities was detected in the area of the proposed boring location for Area B-2, immediately east of the West Cooling Tower. However, under the direction of the VYNPC, this proposed location was repositioned further east along the central access road way between the East and West Cooling Towers.

No utilities or subsurface obstructions were detected in any of the remaining proposed drilling locations, and all were subsequently approved by VYNPC personnel.

10.2 - SOIL BORING METHODOLOGIES

10.2.1 - Hollow-stem Auger and Split-Spoon

A total of seven borings were advanced using hollow-stem auger rotary drilling methods at the subject property between May 7 and May 11, 2001 by ECS. These included 2 borings adjacent to the John Deere diesel UST (JD-B1, JD-B2), 2 borings adjacent to the Gasoline/Diesel USTs (GD-B1, GB-B2), 1 boring adjacent to the former Waste-Oil UST (WO-B1), 1 boring east of Area B-2 (B2-B1), 1 boring south of the North Field area (NF-B1), and 1 boring in the Former Wood Burning Area (BA-B1). This method was employed in those areas of the property where

monitoring well installations were proposed, using 4.25-inch inside diameter (ID) augers (ECS SOP#'s 1.00, 5.10). Soil samples were collected using split-spoon samplers, with a maximum sampling interval of 5-feet. For drilling locations within the Protected Area of the subject property, drill cuttings were used to backfill borings, with any residual cuttings temporarily placed into 55-gallon drums for later on-site disposal by VYNPC personnel. In other areas, residual cuttings were spread on the ground surface, away from the boring location.

Standard penetration test blow-counts were recorded during split-spoon sampling, and soil descriptions interpreted by an ECS geologist were recorded on the boring logs (Appendix P).

10.2.2 - Direct-Push Earthprobe™

A total of 25 borings were advanced on the property between May 8 and May 11, 2001 by ECS, using an EARTHPROBE™ direct-push core sampling rig (ECS SOP#'s 1.00, 5.30). These included the following:

- 10 borings within the three septic system leach fields (Main EP-1 through Main EP-4, COB EP-1 & EP-2, Ware EP-1 through EP-4);
- 8 borings in the South Field (SF-EP-1 through -EP-3 within the permitted application area, and SF-EP-4 through -EP-8 within debris piles);
- 1 boring in Area B-2 (B2-EP-1);
- 2 borings in Area B-5 (B5-EP-1 and B5-EP-2);
- 5 borings along the southern edge of the North Field (NF-EP-1, -EP-3, & -EP-4 within debris piles; NF-EP-4 adjacent to buried drum; and Sonotube within the stockpiled river silt); and
- 2 borings in the vicinity of the COB Holding Tank (COB-1 and COB-2).

Subsurface samples were collected at 4-foot intervals using a 1.5-inch ID sampling tool equipped with a polyethylene liner. The depths of these borings ranged from 4 feet for the South Field, North Field, Area B-5, and the COB leachfield, 6 feet for the Main and New Warehouse leachfield, and 12 feet for the COB holding tank area. Soil descriptions interpreted by an ECS geologist were recorded on the boring logs (Appendix P).

10.2.3 - Hand Borings

A total 29 hand borings were advanced on the property between May 7 and May 21, 2001 by ECS, using a combination of shovels, hand-augers, and trowels for the collection of shallow (0 - 3 feet bgs) soil or sediment samples. These included 2 hand borings to a depth of 24 inches in Area B-2 (B2-HB-1 and -HB-2), and 1 hand boring to a depth of 24 inches in the Former Burn Area (BA-HB-1).

Composite samples were collected from the perimeter of the five main or secondary transformers, comprised of individual samples from 4 hand borings to a 6-inch depth adjacent to each side of the transformer. These samples were designated as follows: #14 Auto, #18 Cooling Tower/W, #18 Cooling Tower/E, #23 Vernon Tie, and #35 Spare Main. The four perimeter grab samples were collected from different distances from each transformer pad, based upon access constraints. For the #14 Auto samples, these were collected within 10 feet of the transformer. For the #18 Cooling Tower/W and /E samples, they were collected within 3 to 7 feet of the transformers. For the #23 Vernon Tie samples, they were collected within 3 to 6 feet of the transformer. For the #35 Spare Main samples, they were collected 15 feet from the transformer.

One hand boring of stained soil was collected 15 feet from the #35 Spare Main transformer at a depth of 6 inches (Stained Soil), and 5 hand borings or grab soil/sediment samples to depths of 6 inches from the subject property storm water system (NF-SED-1, 115Kv-DIS-N, 115Kv-DIS-S, 115Kv-DIS-N2, and 115Kv-DIS-S2).

10.3 - Qualitative Screening and Laboratory Analysis of Soil Samples

Soil samples collected from soil borings and hand borings were examined and logged by the ECS field technician for soil characteristics, moisture content, and the presence of an odor or sheen indicative of contamination. In the case of split spoon samples, these were collected for field screening over a 2-foot interval, at a sampling frequency of 5 feet or less. Earthprobe™ direct-push samples were collected continuously over a 4-foot interval, which were then divided into two-foot increments for field screening. Hand boring or shallow soil and sediment samples were collected as grab samples from the bottom of boring. Representative portions of each sample were placed in Ziploc™ bags for field screening for the presence of volatile organic compound (VOC) vapors in headspace according to ECS SOP# 5.00. Each sample was screened with a Photovac Model 2020 photoionization detector (PID) equipped with a 10.7 eV lamp (referenced to a benzene-equivalent standard). The probe of the instrument was inserted into the bag for VOC vapor screening in the headspace of the bag. The PID has a typical detection limit of 0.2 parts per million by volume (ppmv). The results of PID screening completed on all soil samples are indicated on the Soil Boring Logs, Appendix P.

For borings completed by hollow-stem auger or Earthprobe™, the selection of soil samples for laboratory analysis was based primarily on the results of the PID field screening for VOC vapors, in conjunction with any visual or olfactory evidence of contamination. If PID readings above background were indicated, the sample interval exhibiting the highest VOC vapor concentration was selected for laboratory analyses. If no evidence of contamination was observed--either by VOCs from PID screening or from visual or olfactory observations--then the samples from the bottom of each boring were selected for laboratory analysis. The specific sample interval selected from each boring for laboratory analyses was recorded on the boring log (Appendix P)

For soil samples collected by hand auger or shovel/trowel, the samples were typically collected as a vertical composite of shallow soil, between the ground surface and a maximum depth of 3 feet below grade, and submitted for laboratory analysis independent of PID readings.

10.4 - Monitoring Well Installations

Between May 9 and May 10, 2001, ECS installed five groundwater monitoring wells at various locations across the subject property. Two of the wells were installed inside the Protected Area, adjacent to the Gasoline/Diesel USTs (GD-B2) and the former Waste Oil UST (WO-B1). Three additional wells were installed in the Owner Operated Area of the subject property, in the region south of the North Field (NF-1), within the Former Burn Area (BA-1), and adjacent to the COB Septic Holding Tank (COB-1). An attempt was made to install a monitoring well near Area B-2; however several attempts at advancing augers were met with refusal at depths of 7 to 11 feet below grade above the water table (Figure 3).

All wells were constructed using 10-foot sections of 2-inch ID, 0.010-inch slotted, schedule 40 PVC well screen attached with flush-threaded joints to 2-inch ID schedule 40 PVC riser pipe. The screened intervals of the monitoring wells were positioned to intersect the water table observed at the time of drilling. The boring annulus surrounding the screened interval of each well was backfilled with clean filter sand to a depth of approximately 1 to 2 feet above the screened interval. A bentonite clay seal, approximately one-

half to one foot thick, was emplaced above the sand pack. The remaining boring annulus surrounding the PVC riser was filled with native soil cuttings to 2 feet bgs. A protective, water-tight casing was then installed in cement at the surface to protect the well. Refer to Appendix P for copies of the boring logs.

Following installation, each well was developed to improve the hydraulic connection between the well and the surrounding aquifer materials and to assure that representative groundwater samples were collected for laboratory analysis. Well development was performed using a combination of surging and bailing techniques, in which water in the well bore is alternately surged and bailed, drawing fine-grained material into the well casing from the sand pack, where is was then removed by bailing.

10.5 - Survey of Sampling Points

A survey of the newly installed monitoring wells and sampling points (soil, sediment, surface water) was conducted by representatives of Southern Vermont Engineering, Inc. (SVE), under subcontract to ECS. Sampling points and monitoring well locations were surveyed for horizontal location. Additionally, the PVC and protective casing of each new monitoring well was surveyed for vertical location (elevation), referenced to the rim of a previously surveyed monitoring well. All vertical elevations were tied to a United States Geological Survey (USGS) bench mark previously established at the property by SVE. All horizontal locations were rounded to the nearest 1 foot and all vertical locations were rounded to the nearest 0.01 foot.

10.6 - Groundwater Level Gauging and Sample Collection

On May 4, 2001, ECS completed a round of water level measurements in existing wells located across the subject property. These measurements were referenced to both the PVC well casing and the rim of the protective stand pipe or casing, following ECS SOP# 9.00. This information was collected for the development of a property-wide water table elevation contour map.

Between April 26 and May 11, a total of 41 groundwater samples were collected from both existing and new monitoring wells. Wells associated with the Former #2 Fuel Oil UST area are depicted on Figure 4. All other wells are shown on Figure 3. The wells sampled and the area of the property from which they are located were designated as follows:

Former #2 Heating Oil UST:	MW-1 through MW-9
South Field:	SF-UP1 (aka 201), SF-UP2 (aka 202), SF-1, SF-2, SF-3, SF-DN1 (aka 203), and SF-DN2 (aka 204)
Main Septic System:	1102, 1101, 1301R, 1302, 1302R, 1303, 1201, 1203, 1204
COB & Warehouse Septic System:	3301, 3302, 3401, 2101
North Field:	VY02C, VY02A, 103 (aka 103-S), 102, VY01A, VY01B, 101
New Wells:	WO-1, GD-1, NF-1, BA-1, COB-1

Several monitoring wells were dry on the sampling dates (see Groundwater Sampling Logs, Appendix Q).

All groundwater samples were collected by representatives of ECS following ECS SOPs# 4.00, 8.00, and 11.00, according to the proposed analytical parameters outlined in Section 9.0 of this report.

Based upon water level measurements taken on May 4, and using existing well completion records on total well depths, the volume of standing water in each well was calculated and three (3) to five (5) well volumes of groundwater were purged from each well or until the well was bailed dry using a disposable polyethylene bailers suspended with virgin nylon rope. In the case of wells constructed of PVC with an ID of less than 2-inches, purging was competed using either a peristaltic pump or a Waterra™ check valve; both of these methods use disposable polyethylene tubing.

At the time of collection, a portion of the sample from each monitoring well was tested on-site for temperature, pH, and specific conductance, and to permit observation of pertinent characteristics such as the presence of odor or sheen. These observations are recorded on the Groundwater Sampling Logs (Appendix Q).

10.7 - Septic Waste and Leachate Sampling

On May 6, 2001, ECS collected samples of both septic wastes entering (designated as SepWaste), and septic leachate (designated as SepLeach) exiting each septic tanks associated with the COB, New Warehouse, and Main septic systems. Waste samples were collected either from access manholes located immediately upstream of each septic tank, or directly from the inlet end of the tank. Leachate samples were collected from the pumping chambers located between the septic tanks and distribution manifolds of each system. Samples were collected using disposable polyethylene bailers suspended with virgin nylon rope.

10.8 - Storm Drain System Wastewater Sampling

On May 8, 2001, ECS collected wastewater and oil samples from the two oil/water separators associated with the North and South drain systems (MH-A and MH-C, respectively). Due to the presence of oil in MH-A, a sample of the oil was also collected. This sample was designated as O/W-West (located on the west side of the Administration Building). The wastewater samples from MH-C were designated as O/W-North (located on the north side of the Rad Waste Building). No sediments were present during the sampling of the separators at the time of sampling.

On May 11, 2001, effluent wastewater samples were collected from the North and South systems from manhole access points located immediately upstream of each of the main outfalls (MH-44 and MH-14, respectively). These samples were designated as NOF-WW-1 (North outfall from manhole MH-44) and SOF-WW-1 (South outfall from manhole MH-14). No sediments were present during the sampling of the outfalls at the time of sampling. Although there was no precipitation occurring on this sampling date, nor had there been any during previous week, water was observed flowing in both outfall locations. A correlation of manhole invert elevations to groundwater elevations measured on May 4, 2001 in these areas of the property was used to determine that groundwater infiltration was the probable source of the observed water flow.

Also on May 11, a sediment (designated NF-SED-1) and surface water sample (NF-SURFWA-1) were collected from the drainage ditch located to the south of the North Field. There was no flow observed in this drainage ditch at the time of sampling (Figure 3).

On May 14, 2001, two sediment samples were collected from the storm water drain sumps located in the 115Kv Switchyard (designated 115Kv-DIS-N and 115Kv-DIS-S) On May 17, 2001, two soil samples were collected from beneath the stormwater outfalls connected to this drain system (designated 115Kv-DIS-N2 and 115Kv-DIS-S2). There was no flow of water in this drainage system at the time of sampling.

On May 22, 2001, a precipitation storm event allowed for the collection of storm drain wastewater from the North and South storm water drainage systems, as well as the drain system at the 345Kv Switchyard. Samples were collected as follows: North system from Manhole MH-12A (designated MH-12A); South system from Manhole MH-14 (designated MH-14); and from the 345Kv Switchyard from ManholeV-Yard-12 (designated V-Yard-12).

All wastewater samples were collected as grab samples from manholes using disposable polyethylene bailers and virgin nylon rope. Sediment or soil samples were collected using a shovel and/or towel, from depths ranging between 6 and 24 inches.

10.9 - QUALITY ASSURANCE/QUALITY CONTROL

10.9.1 - Decontamination of Sampling Equipment

ECS utilized disposable polyethylene bailers and nylon rope for the collection of liquid samples from monitoring wells, septic systems, and storm drain systems. The use of these disposable sampling tools prevented the need for any decontamination of equipment between sampling points. ECS personnel donned disposal Nitrile™ protective gloves for the collection of all samples; these gloves were changed between sampling points to avoid potential cross-contamination.

All non-disposable sampling equipment was decontaminated between sampling points. This included electronic water level indicators, split-spoon samplers, Earthprobe sampling spoons, hand bucket augers, shovels, trowels, and sediment dredges. All decontamination of sampling equipment was performed according to ECS SOP# 10.00, using the following procedure:

1) Soap and water wash
2) Potable water rinse
3) 10% methanol rinse
4) Deionized water rinse
5) 1% Nitric Acid rinse
6) Deionized water rinse

10.9.2 - Quality Control (QC) Sampling

Field Duplicates. One of every twenty samples (or less) was accompanied by a duplicate sample per matrix. Field duplicates for water samples were collected by filling the primary and duplicate sampling containers in an alternate fashion. Soil or sediment samples submitted for VOC analysis were collected as collocated grab samples and were not homogenized or split. All other duplicate soil or sediment samples were prepared by homogenizing the sample and preparing two identical sample aliquots for analysis. Analysis of duplicate samples will determine the precision of the field sampling techniques.

Trip Blanks. The submission of trip blanks monitors whether contamination is introduced with the preservation, handling, and shipping of samples. Trip blanks consisted of deionized water contained in 40-ml Teflon septum vials preserved with hydrochloric acid to a pH of less than 2. The blanks were prepared by ECS and shipped to the site in the sample-pack coolers. Trip blanks were prepared in advance to the sampling event. Trip blanks prepared in advance of the sampling event were preserved and did not precede the sampling event by more than 24 hours. One trip blank was submitted per cooler for each day of volatile samples collection and shipment. These blanks accompanied the samplers during the sampling

process and were returned to laboratory with the sample shipment, to serve as a QC check on container cleanliness, external contamination, and the analytical method.

11.0 RESULTS - ORGANIC & INORGANIC ANALYSES -

Laboratory reports of analyses for samples collected as part of the Phase II ESA are included for reference in Appendix S. Reference is made to Figures 3 and 4 for the location of identified RECs and sampling points.

11.1 - RESULTS OF LABORATORY ANALYSES

11.1.1 - Main Septic System

11.1.1.1 - Wastewater

Two wastewater samples collected from the septic system (Sep Wast-Main and Sep Leach-Main) were analyzed for VOCs, TPH, Total PP-13, PCBs, Gamma Spec, Gross Alpha and Beta and Tritium.

For sample Sep Wast-Main, concentrations of TPH (22 milligrams per liter (mg/L)) and metals Total Copper (0.0432 mg/L) and Total Zinc (0.297 mg/L) were reported. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". "Other oil" includes lubricating, and cutting oil, silicon oil and weathered petroleum products. No concentrations of VOCs or PCBs were detected above Minimum Detection Limits (MDLs) in this sample.

For sample Sep Leach-Main, concentrations of Carbon disulfide (5.9 micrograms per liter (µg/L)), Toluene (1.6 µg/L), TPH (9.1 mg/L), Total Copper (0.0132 mg/L), and Total Zinc (0.635 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of PCBs were detected above MDLs in this sample.

11.1.1.2 - Soil

Four soil samples collected from beneath the Main Septic System leachfields (Main-EP-1 through Main-EP-4) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium.

Total metals were reported in each of the samples as follows: Sample Main-EP-1 contained concentrations of Chromium (4.20 milligrams per kilogram (mg/Kg)), Copper (6.61 mg/Kg), Lead (2.13 mg/Kg), Nickel (2.96 mg/Kg) and Zinc (9.65 mg/Kg); sample Main-EP-2 contained concentrations of Chromium (3.21 mg/Kg), Copper (4.11 mg/Kg), Nickel (2.58 mg/Kg) and Zinc (10.4 mg/Kg); sample Main-EP-3 contained concentrations of Chromium (14.0 mg/Kg), Copper (15.9 mg/Kg), Lead (3.49 mg/Kg), Nickel (15.0 mg/Kg) and Zinc (28.8 mg/Kg); and sample Main-EP-4 contained concentrations of Chromium (13.3 mg/Kg), Copper (12.3 mg/Kg), Lead (2.20 mg/Kg), Nickel (13.6 mg/Kg) and Zinc (27.7 mg/Kg).

Sample Main-EP-3 contained concentrations of TPH (73 mg/Kg); the TPH constituents could not be identified, with the closest TPH fingerprint match indicated as #2 fuel oil.

No concentrations of VOCs or TPH were detected above MDLs in any of the samples.

11.1.1.3 - Groundwater

Nine groundwater samples collected from Main septic system vicinity (1102, 1101 1301R, 1302, 1302R, 1303, 1201, 1203, and 1204) were analyzed for VOCs, TPH, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for samples 1102, 1302, 1203, and 1204 indicated no concentrations of method analytes above MDLs.

For the sample from 1101, concentrations of TPH (0.55 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or Dissolved PP-13 Metals were detected above MDLs.

Dissolved Zinc concentrations were reported for samples from the following wells as follows: Well 1301R (0.108 mg/L), Well 1302R (0.0355 mg/L), Well 1303 (0.144 mg/L), Well 1201 (0.133 mg/L). No concentrations of VOCs or TPH were detected above MDLs in any of these samples.

11.1.2 - New Warehouse Septic System

11.1.2.1 - Wastewater

Two wastewater samples collected from the septic system (Sep Wast-Ware and Sep Leach-Ware) were analyzed for VOCs, TPH, Total PP-13, PCBs, Gamma Spec, Gross Alpha and Beta and Tritium.

For sample Sep Wast-Ware, concentrations of TPH (16 mg/L), Total Copper (0.0379 mg/L), Total Nickel (0.0076 mg/L), and Total Zinc (0.311 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or PCBs were detected above MDLs.

For sample Sep Leach-Ware, concentrations of TPH (38 mg/L), Total Cadmium (0.0081 mg/L), Total Chromium (0.0122 mg/L), Total Copper (0.212 mg/L), Total Lead (0.0328 mg/L), Total Nickel (0.0288 mg/L), and Total Zinc (1.53 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or PCBs were detected above MDLs.

11.1.2.2 - Soil

Four soil samples collected from beneath the New Warehouse Septic Leachfield (Ware-EP-1 through Ware-EP-4) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium.

Concentrations of total metals were reported in each of these samples as follows: For sample Ware-EP-1, concentrations of Chromium (10.9 mg/Kg), Copper (18.7 mg/Kg), Lead (5.16 mg/Kg), Nickel (11.6 mg/Kg) and Zinc (28.0 mg/Kg) were reported. For sample Ware-EP-2, concentrations of Chromium (12.2 mg/Kg), Copper (12.9 mg/Kg), Lead (1.48 mg/Kg), Nickel (13.6 mg/Kg) and Zinc (28.5 mg/Kg) were detected. For sample Ware-EP-3, concentrations of Chromium (8.84 mg/Kg), Copper (14.3 mg/Kg), Lead (3.83 mg/Kg), Nickel (10.8 mg/Kg) and Zinc (26.6 mg/Kg) were reported. For sample Ware-EP-4, concentrations of Chromium (16.5 mg/Kg), Copper (16.2 mg/Kg), Lead (4.27 mg/Kg), Nickel (17.1 mg/Kg) and Zinc (37.1 mg/Kg)

were reported. No concentrations of VOCs or TPH were detected above MDLs for any of these samples.

11.1.2.3 - Groundwater

Two groundwater samples collected from New Warehouse septic system vicinity (3301 and 3302) were analyzed for VOCs, TPH, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for sample 3302 indicated no concentrations of method analytes above MDLs.

For the sample from well 3301, concentrations of TPH (0.84 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or Dissolved PP-13 Metals were detected above MDLs.

11.1.3 - COB Septic System

11.1.3.1 - Wastewater

Two wastewater samples collected from the septic system (Sep Wast-COB and Sep Leach-COB) were analyzed for VOCs, TPH, Total PP-13, PCBs, Gamma Spec, Gross Alpha and Beta and Tritium.

For sample Sep Wast-COB, concentrations of Naphthalene (15 µg/L), TPH (49 mg/L), Total Copper (0.0262 mg/L), and Total Zinc (0.145 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of PCBs were detected above MDLs.

For sample Sep Leach-COB, concentrations of TPH (15 mg/L), Total Copper (0.0253 mg/L), and Total Zinc (0.189 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or PCBs were detected above MDLs.

11.1.3.2 - Soil

Four soil samples collected in the COB Septic System vicinity (COB-EP-1, COB-EP-2, COB Tank-EP-1, and COB Tank-EP-2) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium.

Concentrations of total metals were reported as follows for each of these samples. For sample COB-EP-1, concentrations of Chromium (10.3 mg/Kg), Copper (18.9 mg/Kg), Lead (4.08 mg/Kg), Nickel (10.8 mg/Kg) and Zinc (28.8 mg/Kg) were reported. For sample COB-EP-2, concentrations of Chromium (14.3 mg/Kg), Copper (19.9 mg/Kg), Lead (4.83 mg/Kg), Nickel (11.5 mg/Kg) and Zinc (35.0 mg/Kg) were detected. For sample COB Tank-EP-1, concentrations of Chromium (13.5 mg/Kg), Copper (11.6 mg/Kg), Lead (3.36 mg/Kg), Nickel (13.5 mg/Kg) and Zinc (28.3 mg/Kg) were reported. For sample COB Tank-EP-2, concentrations of Chromium (12.5 mg/Kg), Copper (13.1 mg/Kg), Lead (2.94 mg/Kg), Nickel (12.8 mg/Kg) and Zinc (25.5 mg/Kg) were reported. No concentrations of VOCs or TPH were detected in any of these samples above MDLs.

11.1.3.3 - Groundwater

Three groundwater samples collected from COB septic system vicinity (3401, 2101 and COB-1) were analyzed for VOCs, TPH, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for samples 3401 and 2101 indicated no concentrations of method analytes above MDLs.

For the sample from well COB-1, concentrations of Methyl-tert-butyl ether (MTBE) (1.1 µg/L) and TPH (2.0 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of Dissolved PP-13 Metals were detected above MDLs.

11.1.2 - North Field & Vicinity

11.1.2.1 - Soil

Six soil samples collected in the Northfield (NF-EP-1 through NF-EP-4, Sonotube, Northfield-MW-1) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium. No concentrations of VOCs were detected above MDLs in any of these six samples.

Total metals concentrations were reported in the six samnples as follows: sample NF-EP-1 contained Cadmium (0.982 mg/Kg), Chromium (20.9 mg/Kg), Copper (22.1 mg/Kg), Lead (19.3 mg/Kg), Nickel (21.2 mg/Kg), and Zinc (45.9 mg/Kg); sample NF-EP-2 contained Chromium (13.8 mg/Kg), Copper (11.1 mg/Kg), Lead (16.3 mg/Kg), Nickel (10.8 mg/Kg) and Zinc (53.2 mg/Kg); sample NF-EP-3 contained Cadmium (0.568 mg/Kg), Chromium (14.2 mg/Kg), Copper (15.5 mg/Kg), Lead (16.0 mg/Kg), Nickel (14.4 mg/Kg) and Zinc (48.0 mg/Kg); sample NF-EP-4 contained Cadmium (0.491 mg/Kg), Chromium (15.5 mg/Kg), Copper (14.9 mg/Kg), Lead (11.8 mg/Kg), Nickel (13.3 mg/Kg) and Zinc (38.7 mg/Kg); sample "Sonotube" contained Cadmium (1.28 mg/Kg), Chromium (32.6 mg/Kg), Copper (29.7 mg/Kg), Lead (26.5 mg/Kg), Nickel (28.0 mg/Kg) and Zinc (79.5 mg/Kg); and sample Northfield-MW-1 contained Cadmium (0.703 mg/Kg), Chromium (21.7 mg/Kg), Copper (23.2 mg/Kg), Lead (4.34 mg/Kg), Nickel (23.7 mg/Kg) and Zinc (52.2 mg/Kg).

TPH concentrations were reported in four of the samples as follows: sample NF-EP-1 contained TPH at 43 mg/Kg; sample NF-EP-2 contained TPH at 46 mg/Kg; sample NF-EP-4 contained TPH at 410 mg/Kg; and sample "Sonotube" contained TPH at 81 mg/Kg. In all cases, the TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil".

11.1.2.2 - Sediments

One sediment sample collected from the drainage ditch located near the sonotube silt storage area (NF-SED-1) was analyzed for VOCs, TPH, PAHs, PCBs, Total PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium.

For sample NF-SED-1, concentrations of Total Chromium (14.7 mg/Kg), Total Copper (16.6 mg/Kg), Total Lead (8.32 mg/Kg), Total Nickel (12.7 mg/Kg) and Total Zinc (237 mg/Kg) were detected. No concentrations of VOCs, TPH, PAHs or PCBs were detected above the MDLs.

11.1.2.3 - Surface Water

One surface water sample collected from the drainage ditch located near the sonotube silt storage area (NF-SURFWA-1) was analyzed for VOCs, TPH, PAHs, PCBs, Total PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium.

For sample NF-SURFWA-1, concentrations of Total Zinc (0.108 mg/L) were detected. No concentrations of VOCs, TPH, PAHs or PCBs were detected above the MDLs.

11.1.2.4 - Groundwater

Nine groundwater samples collected from the Northfield vicinity (VY01C, VY02A, 103, 102, VY01A, VY01B, 101, and NF-1) were analyzed for VOCs, TPH, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for samples VY01C, VY02A, 103, 102, VY01A, VY01B and NF-1 indicated no concentrations of method analytes MDLs were detected.

For the sample from well 101, concentrations of TPH (3.0 mg/L) were detected. TPH constituents could not be identified with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or Dissolved PP-13 Metals were detected above MDLs.

11.1.3 - Area B-5

11.1.3.1 - Soil

Two soil samples collected from Area B-5 (B5-EP-1 and B5-EP-2) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium.

For sample B5-EP-1, concentrations of Total Cadmium (0.545 mg/Kg), Total Chromium (11.7 mg/Kg), Total Copper (10.1 mg/Kg), Total Lead (11.1 mg/Kg), Total Nickel (12.3 mg/Kg) and Total Zinc (27.8 mg/Kg) were detected. No concentrations of VOCs or TPH were detected above MDLs.

For sample B5-EP-2, concentrations of Total Cadmium (0.665 mg/Kg), Total Chromium (14.0 mg/Kg), Total Copper (12.4 mg/Kg), Total Lead (12.9 mg/Kg), Total Nickel (15.7 mg/Kg) and Total Zinc (37.1 mg/Kg) were detected. No concentrations of VOCs or TPH were detected above MDLs.

11.1.4 - Area B-2

11.1.4.1 - Soil

Two soil samples collected from Area B-2 (B-2-HB-1 and B-2-HB-2) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium.

For sample B-2-HB-1, concentrations of TPH (67 mg/Kg) and the total metals Cadmium (0.780 mg/Kg), Chromium (14.8 mg/Kg), Copper (17.5 mg/Kg), Lead (16.6 mg/Kg), Nickel (14.7 mg/Kg), and Zinc (83.1 mg/Kg) were reported. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs were detected above MDLs.

For sample B-2-HB-2, concentrations of TPH (100 mg/Kg) and the total metals Arsenic (3.61 mg/Kg), Cadmium (0.685 mg/Kg), Chromium (11.1 mg/Kg), Copper (27.7 mg/Kg), Lead (14.7 mg/Kg), Nickel (15.8 mg/Kg) and Zinc (52.6 mg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as motor oil. No concentrations of VOCs were detected above MDLs.

11.1.5 - South Field

11.1.5.1-Soil

Eight soil samples collected in the Southfield (SF-EP-1 through SF-EP-8) were analyzed for VOCs, TPH, Total PP-13 Metals, Gamma Spec and Tritium.

For sample SF-EP-1, concentrations of Total Chromium (12.6 mg/Kg), Total Copper (13.5 mg/Kg), Total Lead (10.9 mg/Kg), Total Nickel (14.3 mg/Kg), and Total Zinc (27.7 mg/Kg) were detected. No concentrations of VOCs or TPH were detected above MDLs.

For sample SF-EP-2, concentrations of Total Chromium (7.62 mg/Kg), Total Copper (8.32 mg/Kg), Total Lead (8.61 mg/Kg), Total Nickel (9.26 mg/Kg), and Total Zinc (16.9 mg/Kg), were detected. No concentrations of VOCs or TPH were detected above MDLs.

For sample SF-EP-3, concentrations of Total Cadmium (0.526 mg/Kg), Total Chromium (12.8 mg/Kg), Total Copper (19.0 mg/Kg), Total Lead (9.47 mg/Kg), Total Nickel (14.0 mg/Kg), and Total Zinc (31.2 mg/Kg) were detected. No concentrations of VOCs or TPH were detected above MDLs.

For sample SF-EP-4, concentrations of TPH (64 mg/Kg), Total Cadmium (0.762 mg/Kg), Total Chromium (16.5 mg/Kg), Total Copper (17.3 mg/Kg), Total Lead (21.6 mg/Kg), Total Nickel (13.9 mg/Kg), and Total Zinc (76.8 mg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs were detected above MDLs.

For sample SF-EP-5, concentrations of TPH (230 mg/Kg), Total Chromium (4.29 mg/Kg), Total Copper (8.94 mg/Kg), Total Lead (10.4 mg/Kg), Total Nickel (4.71 mg/Kg), and Total Zinc (18.9 mg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs were detected above MDLs.

For sample SF-EP-6, concentrations of TPH (39 mg/Kg), Total Cadmium (0.475 mg/Kg), Total Chromium (12.2 mg/Kg), Total Copper (13.7 mg/Kg), Total Lead (11.1 mg/Kg), Total Nickel (14.9 mg/Kg), and Total Zinc (31.6 mg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs were detected above MDLs.

For sample SF-EP-7, concentrations of Total Cadmium (0.483 mg/Kg), Total Chromium (9.77 mg/Kg), Total Copper (14.8 mg/Kg), Total Lead (11.6 mg/Kg), Total Nickel (11.8 mg/Kg), and Total Zinc (30.8 mg/Kg) were detected. No concentrations of VOCs or TPH were detected above MDLs.

For sample SF-EP-8, concentrations of TPH (120 mg/Kg), Total Chromium (5.64 mg/Kg), Total Copper (8.35 mg/Kg), Total Lead (6.66 mg/Kg), Total Nickel (12.4 mg/Kg), and Total Zinc (16.4 mg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs were detected above MDLs.

11.1.5.1-Groundwater

Seven groundwater samples collected from the vicinity Southfield (SF-UP-1, -2, SF-1, -2, -3, SF-DN-1, and –2) were analyzed for VOCs, TPH, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for samples SF-UP-1, -2, SF-1, -2, -3 indicated no concentrations of method analytes MDLs were detected.

For the sample from well SF-DN-1, concentrations of Soluble Zinc were reported at 0.301 mg/L. No concentrations of VOCs or TPH were detected above MDLs. For sample SF-DN-2, concentrations of Soluble Zinc were reported at 0.184 mg/L. No concentrations of VOCs or TPH were detected above MDLs.

11.1.6 - John Deere Diesel UST

11.1.6.1-Soil

Two soil samples collected from the John Deere Diesel UST vicinity (JD-B1-South and JD-B2) were analyzed for VOCs and TPH. The results of the analyses for sample JD-B2 indicated no concentrations of method analytes MDLs were detected.

For sample JD-B1-South, concentrations of TPH (34 mg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as #2 fuel oil. No concentrations of VOCs were detected above MDLs.

11.1.7 - Gasoline/Diesel USTs

11.1.7.1 - Soil

Two soil samples collected from the Gasoline/Diesel USTs vicinity (GD-B1 and GD-B2) were analyzed for VOCs and TPH. The results of the analyses for samples GD-B1 and GD-B2 indicated no concentrations of method analytes MDLs were detected.

11.1.7.2 - Groundwater

One groundwater sample collected from the Gasoline/Diesel UST vicinity (GD-1) was analyzed for VOCs and TPH.

For the sample from well GD-1, concentrations of 1,2,4-Trimethylbenzene (1.4 µg/L) were detected. No concentrations of TPH were detected above MDLs.

11.1.8 - Former Waste Oil UST

11.1.8.1- Soil

One soil sample collected from the Former Waste Oil UST vicinity (WO-B1) was analyzed for VOCs, TPH, PAHs, PCBs, and Total PP-13 Metals.

For sample WO-B1, concentrations of Total Beryllium (0.601 mg/Kg), Total Cadmium (0.981 mg/Kg), Total Chromium (19.2 mg/Kg), Total Copper (18.5 mg/Kg), Total Lead (21.4 mg/Kg), Total Nickel (18.7 mg/Kg) and Total Zinc (53.0 mg/Kg) were detected. No concentrations of VOCs, TPH, PAHs, or PCBs were detected above MDLs.

11.1.8.2 - Groundwater

One groundwater sample collected from the Former Waste Oil UST vicinity (WO-1) was analyzed for VOCs, TPH, PAHs, PCBs, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium.

For sample WO-1, concentrations of TPH (0.65 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs, PAHs, PCBs or Dissolved PP-13 Metals were detected above MDLs.

11.1.9 – Former #2 Fuel Oil UST

11.1.9.1 - Groundwater

Nine groundwater samples collected from the area of the former #2 fuel oil UST (MW-1 through MW-9) were analyzed for VOCs, TPH, PCBs, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for samples MW-4 and –5 indicated no concentrations of method analytes above MDLs were detected for VOCs, TPH and PCBs.

Groundwater collected from monitoring well MW-1 contained VOC concentrations of n-Butylbenzene (10 µg/L), sec-Butylbenzene (7.7 µg/L), Ethylbenzene (27 µg/L), Isopropylbenzene (12 µg/L), 4-Isopropyltoluene (6.3 µg/L), Naphthalene (310 µg/L), n-Propylbenzene (14 µg/L), 1,2,4-Trimethylbenzene (130 µg/L), 1,3,5-Trimethylbenzene (43 µg/L), and Total Xylenes (9.6 µg/L). Concentrations of TPH (23 mg/L) were detected in groundwater collected from MW-1. TPH constituents were identified as #2 fuel oil. No concentrations of PCBs were detected above MDLs.

Groundwater collected from monitoring well MW-2 contained concentrations of Tetrachloroethene (PCE)(24 µg/L). No concentrations of TPH or PCBs were detected above MDLs.

Groundwater collected from monitoring well MW-3 contained concentrations of TPH (0.90 mg/L). TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or PCBs were detected above MDLs.

Groundwater collected from monitoring well MW-6 contained VOC concentrations of sec-Butylbenzene (2.3 µg/L), Isopropylbenzene (4.6 µg/L), Naphthalene (120 µg/L), n-Propylbenzene (4.3 µg/L), 1,2,4-Trimethylbenzene (65 µg/L), 1,3,5-Trimethylbenzene (5.4 µg/L), and Total Xylenes (3.1 µg/L). Concentrations of TPH (3.5 mg/L) were detected in groundwater collected from MW-1. TPH constituents were identified as #2 fuel oil. No concentrations of PCBs were detected above MDLs.

Groundwater collected from monitoring well MW-7 contained concentrations of PCE (5.6 µg/L) and Trichloroethene (TCE)(4.3 µg/L). No concentrations of TPH or PCBs were detected above MDLs.

Groundwater collected from monitoring well MW-8 contained concentrations of TPH (3.5 mg/L). TPH constituents were identified as #2 fuel oil. No concentrations of PCBs were detected above MDLs.

Groundwater collected from monitoring well MW-9 contained VOC concentrations of n-Butylbenzene (6.2 µg/L), Ethylbenzene (38 µg/L), Isopropylbenzene (15 µg/L), Naphthalene (310 µg/L), n-Propylbenzene (21 µg/L), 1,2,4-Trimethylbenzene (200 µg/L), 1,3,5-Trimethylbenzene (51 µg/L), and Total Xylenes (33 µg/L). Concentrations of TPH (22 mg/L) were detected in groundwater collected from MW-1. TPH constituents were identified as #2 fuel oil. No concentrations of PCBs were detected above MDLs.

11.1.10 - Former Wood Burning Area

11.1.10.1 - Soil

Two soil samples collected from the Former Burn Area vicinity (BA-HB-1 and BA-MW-1) were analyzed for VOCs, TPH, PAHs, PCBs and Total PP-13 Metals.

For sample BA-HB-1, concentrations of Naphthalene (130 micrograms per kilogram (µg/Kg)), Total Arsenic (17.6 mg/Kg), Total Cadmium (1.07 mg/Kg), Total Chromium (33.0 mg/Kg), Total Copper (50.7 mg/Kg), Total Lead (37.3 mg/Kg), Total Nickel (22.6 mg/Kg) and Total Zinc (451 mg/Kg) were reported. No concentrations of TPH, PAHs or PCBs were detected above MDLs.

For sample BA-MW-1, concentrations of Total Cadmium (2.12 mg/Kg), Total Chromium (62.9 mg/Kg), Total Copper (50.7 mg/Kg), Total Lead (27.5 mg/Kg), Total Nickel (45.7 mg/Kg) and Total Zinc (103 mg/Kg) were detected. No concentrations of VOCs, TPH, PAHs, or PCBs were detected above MDLs.

11.1.10.2 - Groundwater

One groundwater sample collected from the Former Burn Area vicinity (BA-1) was analyzed for VOCs, TPH, PAHs, PCBs, Dissolved PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. The results of the analyses for the sample from well BA-1 indicated no concentrations of method analytes above MDLs.

11.1.11 - Primary and Secondary Transformers

11.1.11.1 - Soil

Five composite and one discrete soil samples collected from the areas adjacent to the following transformers: the #14 Auto; the #18 west Cooling Tower; the #18 east Cooling Tower; the #23 Vernon Tie; and, the #35 Spare Main were analyzed for PCBs. The one discrete sample (Stain Soil) submitted for laboratory analysis of PCBs was collected from the stained soil area adjacent to the Spare Transformer. The results of the analyses for samples #14 Auto, #18 Cooling Tower (W), #18 Cooling Tower (E), #23 Vernon Tie, and Stain Soil indicated no concentrations of method analytes above method detection limits (MDLs) were detected.

For sample #35 Spare Main, concentrations of PCB-1260 were reported at 200 µg/Kg in soil.

11.1.12 - Storm Water Drainage Systems (North & South)

11.1.12.1 - Oil/Water Separators (wastewater)

Two oil/water separators (O/W-West(MH-A) and O/W-North(MH-C)) were analyzed for VOCs, TPH, PAHs, PCBs, Total PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. Free-phase LNAPL was collected from O/W-West for analysis of TPH and PCBs.

For sample O/W-West, concentrations of TPH (1,100 mg/L), PCB-1260 (7.1 µg/L), Total Copper (0.0075 mg/L) and Total Zinc (0.0282 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of VOCs or PAHs were detected above MDLs.

For sample O/W-Product, concentrations of TPH (1,000,000 mg/Kg) and PCB-1260 (11,600 µg/Kg) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil".

For sample O/W-North, concentrations of Total Zinc (0.0166 mg/L) were detected. No concentrations of VOCs, TPH, PAHs or PCBs were detected above MDLs.

11.1.12.2 - North Outfall (wastewater)

Two wastewater samples collected from the North Outfall area (NOF-WW-1 and MH-12A) were analyzed for VOCs, TPH, PAHs, PCBs, Total PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. Sample MH-12A was submitted for analysis of TPH and PCBs only.

For sample NOF-WW-1, concentrations of Total Copper (0.0057 mg/L) and Total Zinc (0.0307 mg/L) were detected. No concentrations of VOCs, TPH, PAHs or PCBs were detected above the MDLs.

For sample MH-12A, concentrations of TPH (1.2 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of PCBs were detected above MDLs.

11.1.12.3 - South Outfall (wastewater)

Two wastewater samples collected from the South Outfall area (SOF-WW-1 and MH-14) were analyzed for VOCs, TPH, PAHs, PCBs, Total PP-13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium. Sample MH-44 was submitted for analysis of TPH and PCBs only.

For sample SOF-WW-1, concentrations of Total Zinc (0.0755 mg/L) were detected. No concentrations of VOCs, TPH, PAHs or PCBs were detected above the MDLs.

For sample MH-14, concentrations of TPH (11 mg/L) were detected. TPH constituents could not be identified, with the closest TPH fingerprint match indicated as "other oil". No concentrations of PCBs were detected above MDLs.

11.1.12.4 - 115Kv Switchyard drain (soil)

For soil samples collected from the 115Kv Switchyard outfall of the curtain drainage system (115Kv-Dis-S2, 115Kv-Dis-N2, 115Kv-Dis-N, and 115Kv-Dis-S) were analyzed for TPH and PCBs.

Concentrations of TPH tentatively identified as "other oil" were detected in each of the samples as follows: sample 115Kv-Dis-S2 (260 mg/Kg); sample 115Kv-Dis-N2 (160 mg/Kg); sample 115Kv-Dis-S (87 mg/Kg). A TPH concentration tentatively identified as #2 fuel oil was reported for sample 115Kv-Dis-N (250 mg/Kg). No concentrations of PCBs were detected above MDLs in any of these samples.

11.1.12.5 - 345Kv Switchyard drain (wastewater)

One wastewater sample collected from the 345Kv Switchyard curtain drainage system (V-Yard-12) was analyzed for TPH and PCBs. The results of the analyses for sample V-Yard-12 indicated no concentrations of method analytes above MDLs.

11.1.13 - Drinking Water Supply Wells

Three drinking water samples (COB Well, NEOB Well, and Main System) were analyzed for VOCs, TPH, and Total PP13 Metals, Gamma Spec, Gross Alpha and Beta and Tritium.

For the COB well drinking water sample, concentrations of 1,1-Dichloroethane (1,1-DCA)(1.7 µg/L), 1,1-Dichloroethene (1,1-DCE)(2.3 µg/L), Total Copper (0.0320 mg/L), Total Lead (0.0146 mg/L) and Total Zinc (0.0118 mg/L) were detected. No TPH concentrations were detected above the MDLs in drinking water collected from the COB well.

For the NEOB well drinking water sample, concentrations of Total Copper (0.0187 mg/L) were detected. For the Main drinking water sample, concentrations of Total Copper (0.108 mg/L), Total Lead (0.103 mg/L), and Total Zinc (0.0372 mg/L). No concentrations of TPH or VOCs were detected above the MDLs in drinking water collected from the either the NEOB Well or the Main System.

12.0 RESULTS - RADIOLOGICAL ANALYSES

Laboratory reports of radiological analyses for samples collected as part of the Phase II ESA are included for reference in Appendix S. Reference is made to Figure 3 for the location of most sampling points. Sample locations not shown on this site plan (e.g. storm drain man holes, 115KV switchyard outfalls and septic system waste samples) have been previously discussed. The results of radiological analyses completed on samples collected during the Phase II ESA are summarized in Table 1.

The evaluation of radiological results was based on a comparison of Alpha and Beta screening data to actions levels established by the Federal EPA for groundwater. Gross Alpha and Beta analyses were not performed on soil or sediment samples. Data below the action levels for Gross Alpha radiation (5 and 15 picocuries per liter, or pCi/L) and Gross Beta radiation (50 pCi/L) were not considered to be significant. Data exceeding action levels were evaluated through a review of Gamma spectrometric analytical results and comparing the results to available maximum contaminant levels (MCLs) for drinking water (in pCi/L) and available Ingestion and Groundwater Leaching soil screening levels (SSLs reported in pCi/g) established by the Federal EPA. Gamma spectrometric data for individual radionuclides are reported based upon comparison to the lower limit of detection (LLD), and are considered not detected if the activity is below the LLD value.

Reporting levels presented in 10 CFR 20 are also relied upon in evaluating the levels of radionuclides detected in effluent and storm sewer samples (pCi/L). These values are used to indicate levels were no further remediation is required due to the absence of exposure risk.

Tritium results, which were generated separately via distillation and scintillation methods, were evaluated by comparing data to the LLD for each sample result. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. The drinking water MCL for Tritium, 20,000 pCi/L, was used for comparative purposes. EPA Ingestion and Groundwater Leaching SSLs for Tritium are 8,580 pCi/g and 80 pCi/g - assuming a dilution/attenuation factor (DAF) of 20, respectively. Reporting levels presented in 10 CFR 20 are also relied upon in evaluating Tritium levels detected in effluent (10^6 pCi/L) and storm sewer (10^5 pCi/L) samples. These values are used to indicate levels were no further remediation is required due to the absence of exposure risk.

12.1 - RESULTS OF LABORATORY ANALYSES

12.1.1 - Main Septic System

12.1.1.1 - Wastewater

Two wastewater samples were collected from the Main septic system (Sep Wast-Main and Sep Leach-Main). Gross Alpha and Beta radiation results were well below the respective action levels.

The LLD for Tritium in these samples was 0.71 picocuries per gram (pCi/g). Tritium was below the LLD in the Sep Wast-Main sample and detected at 0.92 pCi/g in the Sep Leach-Main sample.

12.1.1.2 - Soil

Four soil samples were collected from beneath the Main Septic System leachfields (Main-EP-1 through Main-EP-4). The Gamma spec revealed low levels of Radium-226 (^{226}Ra), Lead-214 (^{214}Pb), Lead-212 (^{212}Pb), Lead-210 (^{210}Pb), Actinium-228 (^{228}Ac), Bismuth-212 (^{212}Bi), Bismuth-214 (^{214}Bi) and Thalium-208 (^{208}Tl) ranging from 0.21 pCi/g (Thalium-228) to 1.6 pCi/g (Radium-226). EPA ingestion and groundwater leaching SSLs for Radium-226 are 1.09 pCi/g and 0.32 pCi/g - assuming a dilution/attenuation factor (DAF) of 20, respectively. Lead and Bismuth are typical daughter products produced from the decay of Radon, and are naturally occurring Radioactive isotopes of the Thorium decay chain. Radium and Actinium are also naturally occurring radionuclides.

The most abundant radionuclide detected in these samples was Potassium-40 (^{40}K), with levels ranging from 12.75 pCi/g to 18.39 pCi/g. Potassium-40 is also a very abundant naturally occurring isotope with background levels as high as 30 pCi/g being reported in soil. The Ingestion SSL for Potassium-40 is 12.8 pCi/g.

Two radionuclides not considered to originate from natural sources and have been associated with VYNPC operations are Cobalt-60 (^{60}Co) and Cesium-137 (^{137}Cs). These isotopes were detected in the soil sample labeled Main EP-1, which was collected from the 0-6 foot depth range. The Cobalt-60 and Cesium-137 levels detected were 0.08 pCi/g and 0.09 pCi/g, respectively. The spectrum peaks for these isotopes upon inspection were of poor shape but nonetheless present. The data may be artifacts of analysis. This sample was rescanned for a 12-hour period to confirm these results. Preliminary results issued by RSA Laboratory on June 4, 2001 indicated a Cesium-137 level of 0.062 pCi/g. Cobalt-60 was not detected at an LLD of 0.013 pCi/g.

The Ingestion and Groundwater Leaching SSL's for Cobalt-60 and Cesium-137 are 19.7 and 0.6 pCi/g, and 18.3 pCi/g and 4.1 pCi/g, respectively. According to a report prepared by Duke Engineering & Services of Bolton, MA, dated March 31, 1999, background Cesium-137 levels in soil samples collected at control locations in the Brattleboro region ranged from 0.073 pCi/g to 0.271 pCi/g, with a mean concentration of 0.15 pCi/g. The Cesium-137 level detected in the Main EP-1 soil sample was well below the average value in soil as determined for the subject area during the 1999 study.

The Tritium values were all non-detect with LLD values ranging from 40.96 pCi/g to 45.44 pCi/g.

12.1.1.3 - Groundwater

Nine groundwater samples were collected from the vicinity of the Main septic system area (1102, 1101 1301R, 1302, 1302R, 1303, 1201, 1203, and 1204). Gross Alpha and Beta radiation results were well below the respective action levels except for Gross Alpha radiation detected in samples 1102 (23.95 pCi/L) and 1101 (53.84 pCi/L).

No nuclides were detected in the Gamma spec results for the above groundwater samples. The absence of Radium-226 in the Gamma spec suggests that the source of Gross Alpha radiation is most likely Uranium-238 (^{238}U) or Uranium-234 (^{234}U), particularly in samples collected from wells 1102 and 1101 where Gross Alpha results exceeded the 15 pCi/L action level. Uranium is a naturally occurring nuclide often present in groundwater due to its natural occurrence in rock and

its higher water solubility. Uranium-235 was not detected in the gamma spectrum results for the well samples. The remaining two Uranium isotopes are considered to be the main contributors to the Gross Alpha radiation detected. These isomers are not reported on the gamma spectrum since they require separate chemical separation methods to be detected. The proposed drinking water standard for Uranium is 20 pCi/L.

The Lower Limit of Detection (LLD) for Tritium was 719 pCi/L for the groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater samples collected from monitoring wells located in the Main Septic System area. Therefore, the low level of Tritium detected in the Sep Leach-Main wastewater sample is not considered to pose a risk to groundwater, which is located approximately 26-30 feet below ground surface in the area of the Main Septic System.

12.1.2 - New Warehouse Septic System

12.1.2.1 - Wastewater

Two wastewater samples were collected from this septic system (Sep Wast-Ware and Sep Leach-Ware). Gross Alpha and Beta radiation results were well below the respective action levels.

The LLD for Tritium in these samples was 0.71 pCi/g. Tritium was below the LLD in the wastewater samples collected from the New Warehouse septic system.

12.1.2.2 - Soil

Four soil samples were collected from beneath the New Warehouse Septic Leachfield (Ware-EP-1 through Ware-EP-4). The Gamma spec revealed low levels of Radium-226, Lead-214, Lead-212, Actinium-228, Bismuth-212, Bismuth-214 and Thallium-208 ranging from 0.29 pCi/g (Thallium-208) to 1.85 pCi/g (Radium-226). The soil results were very similar to those from the Main Septic System. The data evaluations presented for those results apply to these sample results.

As was the case for the main Septic System soil samples, Potassium-40 was the most abundant radionuclide detected in the samples collected from the New Warehouse Septic System, with similar levels ranging from 13.25 pCi/g to 16.26 pCi/g. No other radionuclides were detected in these samples above the LLDs.

Tritium values were all non-detect with LLD values ranging from 40.42 pCi/g to 49.01 pCi/g.

12.1.2.3 - Groundwater

Two groundwater samples were collected from the New Warehouse septic system vicinity (3301 and 3302). Gross Alpha and Beta radiation results were well below the respective action levels.

No nuclides were detected in the Gamma spec results for the above groundwater samples, above the LLDs.

The LLD for Tritium was 719 pCi/L for the groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater samples collected from monitoring wells located in the New Warehouse Septic System area. Depth to groundwater was approximately 29 feet below ground surface in the wells sampled.

12.1.3 - COB Septic System

12.1.3.1 - Wastewater

Two wastewater samples were collected from the COB septic system (Sep Wast-COB and Sep Leach-COB). Gross Alpha and Beta radiation results were not considered to be significant.

No nuclides were detected in the Gamma spec results for the wastewater samples, except for a trace amount of Lead-212 (0.01 pCi/L).

The LLD for Tritium in these samples was 0.71 pCi/g. Tritium was below the LLD in the Sep Wast-COB sample and detected at 0.99 pCi/g in the Sep Leach-COB sample.

12.1.3.2 - Soil

Four soil samples were collected in the vicinity of the COB Septic System (COB-EP-1, COB-EP-2, COB Tank-EP-1, and COB Tank-EP-2). The Gamma spec revealed low levels of Radium-226, Lead-214, Lead-212, Lead-210, Actinium-228, Bismuth-212, Bismuth-214 and Thallium-208 ranging from 0.24 pCi/g (Thallium-208) to 1.62 pCi/g (Radium-226). The soil results were very similar to those from the other septic systems except for the presence of two additional radionuclides, Radium-224 and Thorium-228 (^{228}Th), which were detected at 1.14 to 1.29 pCi/g of Radium-224 at three of the four borings, and 5.98 pCi/g of Thorium at the boring labeled COB-Tank-EP-1. Background levels of these isotopes have been reported to range from 0.7 to 4.7 pCi/g. Radium-224 and Thorium-228 are naturally occurring radioactive materials part of the Thorium decay chain.

As was the case for the main Septic System soil samples, Potassium-40 was the most abundant radionuclide detected in the samples collected from the COB Septic System, with similar levels ranging from 13.15 pCi/g to 16.47 pCi/g. No other radionuclides were detected in these samples above the LLDs.

Tritium values were all either non-detect or below the LLDs, which ranged from 39.14 pCi/g to 44.67 pCi/g.

12.1.3.3 - Groundwater

Three groundwater samples were collected from the vicinity of the COB septic system (3401, 2101 and COB-1). Gross Alpha and Beta radiation results were well below the respective action levels.

No nuclides were detected in the Gamma spec results for the above groundwater samples above the LLDs.

The Lower Limit of Detection (LLD) for Tritium was 719 pCi/L for the above groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater samples collected from monitoring wells located in the COB Septic System area. Depth to groundwater ranged from approximately 17 feet to 31 feet below ground surface in the wells sampled.

12.1.4 - North Field & Vicinity

12.1.4.1 - Soil

Six soil samples were collected north of the VYNPC operations area (NF-EP-1 through NF-EP-4, Sonotube, and Northfield-MW-1). This portion of the subject property was referred to as the North Field. The NF-EP samples were collected by Earthprobe at the 0-4 foot depth interval. North Field MW-1 represents the soil sample collected at the groundwater table interface (25-27 foot depth range) during the installation of a monitoring well. A sample of previously excavated river sediment was collected from the stockpiled material located in the elongated sacks referred to as sonotubes located north of the 115 KV switchyard.

The Gamma spec revealed low levels of Radium-226, Radium-224, Lead-214, Lead-212, Actinium-228, Bismuth-214, Bismuth-212, Thallium-208, and Thorium-228 ranging from 0.29 pCi/g (Thallium-208) to 3.62 pCi/g (Thorium-228). The soil results were very similar to those from the septic systems except for the presence of Protactinium-234 (^{234m}Pa), which was detected at concentrations ranging from 3.29 pCi/g (NF-EP-1) to 4.02 pCi/g (NF-EP-4). Protactinium-234 is a naturally occurring radioactive material that is part of the Uranium decay chain. The m designation indicates that the radionuclide exists in a meta-stable state, which readily decays to Uranium-234. This radionuclide has a very high minimum detection activity (MDA) which assists laboratories in deciphering background radiation.

Cesium-137 was detected in five of six soil samples collected in the North Field area, ranging from 0.09 pCi/g (NF-EP-2) to 0.16 pCi/g (NF-EP-3). The Sonotube river sediment sample contained 0.15 pCi/g of Cesium-137. As discussed previously, the average background level for Cesium-137 of 0.15 pCi/g was reported by Duke Engineering & Services of Bolton, MA in their March 31, 1999 report. The Ingestion and Groundwater Leaching SSL's for Cesium-137 are 18.3 pCi/g and 4.1 pCi/g, respectively.

Cobalt-60 was detected at 0.03 pCi/g at NF-EP-1.

As seen with the septic system soil samples, Potassium-40 was the most abundant radionuclide detected in the samples collected from the North Field, with similar levels ranging from 12.49 pCi/g to 19.09 pCi/g in surficial samples. The sample collected from the 25-27 foot depth range contained slightly higher levels at 23.65 pCi/g. No other radionuclides were detected in these samples.

Tritium values were all non-detect with LLD values ranging from 38.96 pCi/g to 46.18 pCi/g.

12.1.4.2 - Sediments

One sediment sample was collected from the drainage ditch located downgradient of the sonotube storage area (NF-SED-1). This sample was collected approximately 6 inches below the drainage ditch channel and was composed of silt and partially decomposed organic matter.

The Gamma spec revealed low levels of Radium-226, Lead-214, Lead-212, Actinium-228, Bismuth-214, Bismuth-212, and Thallium-208 ranging from 0.38 pCi/g (Thallium-208) to 1.27 pCi/g (Radium-226). The soil results were very similar to those from the septic systems and North Field samples but overall contained less radionuclides. Cesium-137 was detected at 0.08 pCi/g in the sediment sample at a concentration similar to that detected in one soil sample collected at the Main septic system (0.09 pCi/g). As discussed previously, the average background level for Cesium-137 of 0.15 pCi/g was reported by Duke Engineering & Services of Bolton, MA in their March 31, 1999 report.

As seen with the septic system and North Field soil samples, Potassium-40 was the most abundant radionuclide detected (12 pCi/g). No other nuclides were detected in the sample above the LLDs.

Tritium was not detected with a sample LLD value of 38.33 pCi/g.

12.1.4.3 - Surface Water

One surface water sample was collected from the drainage ditch in the immediate vicinity of the sediment sample noted above (NF-SURFWA-1). Gross Alpha and Beta radiation results were well below the respective action levels.

No nuclides were detected in the Gamma spec results for the surface water sample above the LLDs.

The LLD for Tritium was 719 pCi/L for the surface water sample. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD of this sample.

12.1.4.4 - Groundwater

Nine groundwater samples were collected from the North Field vicinity (VY02C, VY02A, 103, 102, VY01A, VY01B, 101, and NF-1). Gross Alpha and Beta radiation results were well below the respective action levels except for Gross Alpha radiation detected in sample VY01A (67.15 pCi/L).

No nuclides were detected in the Gamma spec results for the above groundwater samples above the LLDs. The absence of Radium-226 in the Gamma spec suggests that the source of Gross Alpha radiation is most likely Uranium-238 (^{238}U) or Uranium-234 (^{234}U), particularly in the sample collected from well VY01A where Gross Alpha results exceeded the 15 pCi/L action level. Uranium is a common component of deep bedrock wells due to its natural occurrence in rock and higher water solubility. The maximum depth of this well is also approximately 104 feet bgs, which further supports the presence of Uranium isotopes. Uranium-235 was not detected in the gamma spectrum results for the well samples. The remaining two Uranium isotopes are considered to be the main contributors to the Gross Alpha radiation detected. These isomers are

not reported on the gamma spectrum since they require separate chemical separation methods to be detected. The proposed drinking water standard for Uranium is 20 pCi/L.

The Lower Limit of Detection (LLD) for Tritium was 719 pCi/L for the groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater samples collected from monitoring wells located in the North Field area.

12.1.5 - Area B-5

12.1.5.1 - Soil

Two soil samples were collected from Area B-5 (B5-EP-1 and B5-EP-2). The Gamma spec revealed low levels of Protactinium-234m, Radium-226, Radium-224, Lead-214, Lead-212, Actinium-228, Bismuth-214, Bismuth-212, Thallium-208, and Thorium-228 ranging from 0.29 pCi/g (Thallium-208) to 4.96 pCi/g (Thorium-228). The soil results were very similar to those from the North Field borings except for the presence of Thorium-234, which was detected at 1.66 pCi/g at B5-EP-1. The peak for Thorium-234 was poor in shape upon inspection of the spectrum but nonetheless was a reported value. Thorium-234 is a naturally occurring radioactive material that is part of the Uranium decay chain. A background level of 1.1 pCi/g has been reported for this radionuclide.

As seen with all soil samples, Potassium-40 was the most abundant radionuclide detected in the samples collected from area B-5, with similar levels ranging from 15.62 pCi/g to 16.01 pCi/g in samples collected from the 0-4 foot depth range. No other radionuclides were detected in these samples above the LLDs.

Tritium values were all non-detect with an LLD value of 42.13 pCi/g.

12.1.6 - Area B-2

12.1.6.1 - Soil

Two soil samples were collected from Area B-2 (B-2-HB-1 and B-2-HB-2). The Gamma spec revealed low levels of Radium-226, Radium-224, Lead-214, Lead-212, Actinium-228, Bismuth-214, Bismuth-212, Thallium-208, and Thorium-228 ranging from 0.31 pCi/g (Thallium-208) to 4.66 pCi/g (Thorium-228). The soil results were very similar to samples collected from area B-5 borings, except that Protactinium-234 was not detected in samples collected from area B-2.

As seen with all soil samples, Potassium-40 was the most abundant radionuclide detected in the samples collected from area B-2, with similar levels ranging from 15 pCi/g to 15.84 pCi/g in samples collected via hand borings from the 0-4 foot depth range. No other radionuclides were detected in these samples above the LLDs.

Tritium values were all non-detect with LLD values ranging from 43.38 pCi/g to 46.75 pCi/g.

12.1.7 - South Field

12.1.7.1- Soil

Eight soil samples were collected in the Southfield (SF-EP-1 through SF-EP-8) via Earthprobe at the 0-4 foot depth range. The Gamma spec revealed low levels of Protactinium-234, Radium-226, Radium-224, Lead-214, Lead-212, Actinium-228, Bismuth-214, Bismuth-212, and Thallium-208, ranging from 0.24 pCi/g (Thallium-208) to 7.09 pCi/g (Protactinium-234m). The soil results were very similar to those from the North Field borings (also collected at the 0-4 foot depth range) except for the absence of Thorium-228, which was the dominant radionuclide presence in the North Field samples, and the presence of Thorium-234 in two of the eight samples, ranging from 0.87 pCi/g to 1.29 pCi/g. Thorium-234 was also detected in one sample collected from area B-5 at a slightly higher concentration of 1.66 pCi/g.

Cesium-137 was detected in three of the eight soil boring samples collected at the 0-4 foot depth ranges at concentrations ranging from 0.05 pCi/g to 0.07 pCi/g. As discussed previously, the average background level for Cesium-137 of 0.15 pCi/g was reported by Duke Engineering & Services of Bolton, MA in their March 31, 1999 report.

As seen with all soil samples collected thus far, Potassium-40 was the most abundant radionuclide detected in the samples collected from the South Field, with similar levels ranging from 10.77 pCi/g to 14.51 pCi/g. No other radionuclides were detected in the soil samples collected from the South Field Earthprobe samples above the LLDs.

Tritium was detected above the LLD values in soil samples collected from five of the eight soil borings. The LLD values for the eight soil samples ranged from 39.95 pCi/g to 53.73 pCi/g. Tritium concentrations ranged from 68.75 pCi/g (SF-EP-7) to 407.26 pCi/g (SF-EP-2). Ingestion and Groundwater Leaching SSLs are 8,580 pCi/g and 80 pCi/g, respectively.

12.1.7.1- Groundwater

Seven groundwater samples were collected from the vicinity of the South Field (SF-UP-1 and 2, SF-1, 2 and 3, SF-DN-1, and 2). Gross Alpha and Beta radiation results were well below their respective action levels.

No nuclides were detected in the Gamma spec results for the above groundwater samples except for minor levels of Bismuth-214 in SF-UP-1 (12.45 pCi/L) – maximum well depth of 34 feet below ground surface and SF-UP-2 (22.05) – maximum well depth of 22 feet below ground surface.

The LLD for Tritium was 719 pCi/L for the groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater samples collected from monitoring wells located in the South Field area. The detection of Tritium in soil samples collected at the 0-4 foot depth range is not considered to be significant based on the absence of Tritium in groundwater samples above the LLD.

12.1.8 - Former Waste Oil UST

12.1.8.1- Groundwater

One groundwater sample was collected from the vicinity of the Former Waste Oil UST (WO-1). Gross Alpha and Beta radiation results were well below their respective action levels. No nuclides were detected in the Gamma spec results above the LLDs.

The LLD for Tritium was 719 pCi/L for the groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater sample collected from monitoring well WO-1.

12.1.9 – Former #2 Fuel Oil UST

12.1.9.1- Groundwater

Nine groundwater samples were collected from the area of the Former #2 Fuel Oil UST (MW-1 through MW-7, MW-9 and MW-6 -5/11/01). Refer to Figure 4 for an enlarged site plan of the Former UST area for monitoring well locations.

The groundwater samples were inadvertently delivered, by laboratory courier, to the State of Connecticut laboratory. Prearranged filtration of samples did not occur prior to acidification, as was performed for all groundwater samples analyzed by RSA Laboratories, Inc. The State of Connecticut laboratory analytical data are submitted as a worse case scenario since suspended material in the well samples served as an additional source of radiation. Due to access limitation to these wells during the plant outage operations, only one well was resampled (MW-6), and submitted for laboratory analysis following filtration and acidification procedures.

Gross Alpha and Beta radiation results were well below the respective action levels except for Gross Alpha radiation detected in three of the nine samples (MW-6, 7 and 9), which ranged from 18.02 pCi/L to 25.23 pCi/L. Trace levels of Radium-226 were noted by the State of Connecticut Laboratory for all samples analyzed. Potassium-40 was present in all samples analyzed. Potassium-40 is also a very abundant naturally occurring isotope. No values were provided for Radium-226 or Potassium-40.

Gross Alpha and Beta radiation results for the MW-6 sample (5/11/01) that was filtered prior to acidification were well below the respective action levels. It is highly likely that the Gross Alpha and Beta radiation results for the unfiltered samples (MW-6, 7 and 9) were due to the suspended solids present in the hand bailed samples. Nuclides were not detected in the Gamma spec results for the filtered MW-6 groundwater sample.

Tritium was detected in all the groundwater samples analyzed by the State of Connecticut laboratory at levels ranging from 49 pCi/L (MW-3) to 1,849 pCi/l (MW-9). The unfiltered MW-6 sample contained 327 pCi/L, while the filtered sample contained 432.43 pCi/L. The higher levels of Tritium detected in MW-1 (1,673 pCi/L) and MW-9 may reflect greater amounts of suspended solids associated with these samples than were found in the samples with lower Tritium levels. The EPA MCL for Tritium in drinking water is 20,000 pCi/L.

12.1.10 - Former Wood Burning Area

12.1.10.1 – Soil

Two soil samples were collected in the location identified as the Burn Area at two feet bgs (BA-HB-1) and at the 10-12 foot depth range at the groundwater table interface during the installation of monitoring well BA-1 (BA-MW-1). The Gamma spec revealed low levels of Protactinium-234, Radium-224, Lead-214, Lead-212, Actinium-228, Bismuth-214, Bismuth-212, and Thallium-208, ranging from 0.34 pCi/g (Thallium-208) to 10.28 pCi/g (Protactinium-234m). The soil results were very similar to those from the North Field borings (collected at the 0-4 foot depth range), except for the absence of Radium-226.

Cesium-137 was detected at the 2-foot depth sample (BA-HB-1) at 0.17 pCi/g. As discussed previously, the average background level for Cesium-137 of 0.15 pCi/g was reported by Duke Engineering & Services of Bolton, MA in their March 31, 1999 report.

As seen with all soil samples collected thus far, Potassium-40 was the most abundant radionuclide detected in the samples collected from the Burn Area, with similar levels ranging from 15.68 pCi/g to 17.55 pCi/g. No other radionuclides were detected in the soil samples collected from the Burn Area samples above the LLDs.

Tritium was not detected above the LLD values for the samples analyzed, which ranged from 39.69 pCi/g to 46.19 pCi/g.

12.1.10.2 - Groundwater

One groundwater sample was collected from the Former Burn Area (BA-1). Gross Alpha and Beta radiation results were well below their respective action levels. No nuclides were detected in the Gamma spec results.

The LLD for Tritium was 719 pCi/L for the groundwater samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the groundwater sample collected from monitoring well BA-1.

12.1.11 - Storm Water Drainage Systems (North & South)

12.1.11.1 - Oil/Water Separators

Samples were collected from the oil/water separators O/W-West (MH-A) and O/W-North (MH-C). Gross Alpha and Beta radiation results were well below their respective action levels. No nuclides were detected in the Gamma spec results above the LLDs.

The LLD for Tritium was 719 pCi/L for the oil/water separator samples. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the oil/water separator samples.

12.1.11.2 - North Outfall

One wastewater sample was collected from the North Outfall area (NOF-WW-1). This sample was collected from a manhole via hand bailing. Gross Alpha and Beta radiation results were well below their respective action levels. No nuclides were detected in the Gamma spec results.

The LLD for Tritium was 719 pCi/L for the North Outfall sample. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the North Outfall sample.

12.1.11.3 - South Outfall

One wastewater sample was collected from the South Outfall area (SOF-WW-1). This sample was collected from a manhole via hand bailing. Gross Alpha and Beta radiation results were well below their respective action levels. No nuclides were detected in the Gamma spec results except for Protactinium-234m (343.31 pCi/L). The peak for this nuclide was of poor shape when the spectrum was inspected, but nonetheless was a reportable value.

The LLD for Tritium was 719 pCi/L for the South Outfall sample. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was not detected above the LLD in the South Outfall sample.

12.1.12 - Drinking Water Supply Wells

Drinking water samples were collected from the COB Well, NEOB Well, and Main System. Gross Alpha and Beta radiation results indicated the presence of radiation in excess of the 5 pCi/L action level for all samples and above the 15 pCi/L action level for the NEOB and Main System samples.

The absence of Radium-226 indicates that the source of Gross Alpha radiation is most likely Uranium (U-238, U234, and U-235), particularly in samples collected from the NEOB well and Main System samples where Gross Alpha results range from 15.66 to 16.09 pCi/L. Uranium is a common component of deep bedrock wells due to both its natural occurrence in rock and higher water solubility. Uranium-235 was not detected in the gamma spectrum results for the well samples. The remaining two isotopes are considered to be the main contributors to the Gross Alpha radiation detected. These isomers are not reported on the gamma spectrum since they require separate chemical separation methods to be detected. The proposed drinking water standard for Uranium is 20 pCi/L. Since the Gross Alpha results are less than this value, the potential levels of Uranium-238 and Uranium-234 are expected to be below the proposed federal drinking water standard.

VYNPC data from 1999 for the analysis of NEOB well and Main System samples indicated the the presence of Uranium-234 and Uranium-238, ranging from 9.0 pCi/L to 10.42 pCi/L and 5.05 pCi/L to 7.48 pCi/L, respectively. In addition, Radon levels were reported at 1,841 pCi/L for the NEOB well sample, and 3,840 pCi/L for the Main System sample. The Radon values are below the MCL of 4,000 pCi/L currently proposed by the USEPA for community water supplies.

Lead-214 was detected in the COB well and Main System samples at 189.9 pCi/L and 135.81 pCi/L, respectively. Bismuth-214 was detected in all well samples, ranging from 124.94 pCi/L (Main Well) to 246.81 pCi/L (NEOB Well). Lead-214 and Bismuth-214 are naturally occurring radioactive

materials and are daughter products in the Radon decay chain. They are not considered to generate enough Alpha radiation to contribute to the Gross Alpha results detected.

Gross Beta radiation levels were reported at well below the action level of 50 pCi/L. These results support the absence of Radium-228, a Beta radiation emitter, above the 5pCi/L drinking water MCL.

No other nuclides were detected in the Gamma spec results above the LLDs.

The LLD for Tritium was 709 pCi/L for the drinking water samples collected. Values below the LLD are not considered to be significant due to the level of uncertainty associated with results below this value. Tritium was detected at 759 pCi/L in the sample collected from the COB well. While the certainty in this value was greater that the other samples, this level of Tritium is 26 times less than the drinking water MCL of 20,000 pCi/L.

13.0 PHASE II CONCLUSIONS AND RECOMMENDATIONS

13.1 - CONCLUSIONS

The seven (7) areas of Recognized Environmental Conditions (RECs) of concern identified following completion of the Phase I ESA were as following:

1. Subject property Septic Systems (6)
2. Owner Controlled Areas (North Field, South Field, Area "B-2", Area "B-5")
3. Former/Current Underground Storage Tanks (USTs)
4. Former Wood Burning Area
5. Current water supply wells (4)
6. Primary and Secondary Transformers
7. Subject property Storm Water Drainage System (North and South)

Subsurface investigations were completed to address each of the RECs, through a program of soil borings (both auger and direct-push), monitoring well installations, and the collection of soil, sediment, septic waste, septic effluent, wastewater, sludge/oil, and surface water samples. Field screening analyses for the presence of VOCs were completed in current or former UST areas. Laboratory analyses were completed based upon suspected contaminants of concern, for VOCs, TPH, PAH, PCBs, and both total and dissolved PP13 metals. Radiological analyses were completed for Gross Alpha and Beta activity, and for selected radioisotopes using Gamma Spectrometry, including Tritium.

A total of 46 soil samples, 6 septic waste samples, 34 groundwater samples, 7 storm drainage wastewater samples, 1 sediment, 1 surface water, and 1 oil sample were collected during the Phase II ESA.

In order to evaluate concentrations of VOCs, TPH, PAH, PCBs, metals, and radiological parameters that were reported in samples above method detection limits, ECS has made comparisons to both state and federal standards. According to policy established by the VTDEC, evaluation of risk to human health and the environment posed by releases of oil or hazardous materials can be accomplished using standard EPA and Vermont Department of Health approaches. Specifically, the VTDEC relies upon Primary Groundwater Quality Standard (PGQS) published in the Vermont Groundwater Rule. For specific soil standards, the VTDEC relies on values published by EPA Region III as Risk-Based Concentrations (RBC), as well as the Massachusetts Contingency Plan (MCP) Method 1 standards published by the Massachusetts Department of Environmental Protection (MADEP).

Volatile Organic Compounds (VOCs)

One septic waste sample collected from the COB system had naphthalene reported at 15 µg/L. No VOCs were reported in groundwater samples collected from adjacent to the COB septic system.

Concentrations of VOCs were detected in groundwater above minimum detection limits (MDLs), in samples from the COB Holding tank area, the Gasoline/Diesel UST area, and both the Former #2 Fuel Oil UST area and the COB Supply Well (VTDEC Site # 99-2617).

The COB-1 groundwater sample contained Methyl-tert-butyl-ether at 1.1 µg/L, which is below the 40 µg/L PGQS established by VTDEC. The GD-1 groundwater sample contained 1,2,4-Trimethylbenzene at 1.4 µg/L, which is below the 70 µg/L PGQS established by VTDEC.

Several VOCs were reported in the groundwater samples collected from the Former #2 Fuel Oil UST area. The following VOCs were detected at concentrations above PGQS established by VTDEC: Naphthalene ranging from 120 µg/L to 310 µg/L (PGQS = 20 µg/L); 1,2,4-Trimethylbenzene ranging from 65 µg/L to 200 µg/L (PGQS = 5 µg/L); 1,3,5- Trimethylbenzene ranging from 5.4 µg/L to 51 µg/L (PGQS = 4 µg/L); and Tetrachloroethylene at 24 µg/L (PGQS = 5 µg/L). Two VOCs were reported in the sample from the COB Supply Well. The concentrations reported for 1,1-DCA (1.7 µg/L) and 1,1-DCE (2.3 µg/L) were both below the respective PGQS of 70 µg/L and 7 µg/L. ECS evaluated the potential for vertical migration of chlorinated solvents through the collection of a grab groundwater sample from deep well MW-3 (total depth = 108 feet). The analysis of this sample did not show the presence of any VOCs above MDLs.

The VOCs detected at the Former #2 Fuel Oil UST area have been previously documented and are being monitored under VTDEC Site #99-2617. No other VOCs were detected in groundwater above PGQS.

Total Petroleum Hydrocarbons (TPH)

Concentrations of TPH were reported in soil at concentrations above MDLs, in samples collected from the Main Septic System, the vicinity of the North Field, Area B-2, the vicinity of the South Field, the John Deere UST area, and the 115Kv Switchyard drainage area. Concentrations of TPH were reported above MDLs in one soil sample from the Main Septic System (Main-EP-3) at 73 mg/Kg. TPH concentrations were detected in four soil samples from the vicinity of the North Field (NF-EP-1, -EP-2, -EP-3, and Sonotube), ranging from 43 mg/Kg to 410 mg/Kg. Concentrations of TPH were reported in the two samples from Area B-2 (B-2-HB-1, -HB-2) at 67 mg/Kg and 100 mg/Kg, respectively. Four soil samples from the vicinity of the South Field (SF-EP-4, -EP-5, -EP-6, and -EP-8) had reported TPH concentrations ranging from 39 mg/Kg to 230 mg/Kg. One soil sample collected from the John Deere UST area contained a TPH concentration of 34 mg/Kg. Four soil samples collected from the drainage system at the 115Kv Switchyard contained TPH concentrations ranging from 87 mg/Kg to 250 mg/Kg. All of these concentrations are below the 1,000 mg/Kg soil guideline utilized for TPH by VT DEC.

Concentrations of TPH were reported above MDLs in septic waste samples collected from all three systems, ranging from 16 to 49 mg/L, and in leachate samples ranging from 9.1 to 38 mg/L. In addition, TPH concentrations were reported in groundwater samples collected from the vicinity of all three systems, ranging from 0.55 to 2.0 mg/L. The groundwater TPH concentration of 2.0 mg/L (COB-1) is in excess of the 1.0 mg/L groundwater guideline utilized for TPH by VTDEC.

In addition, concentrations of TPH were reported in groundwater samples collected from the North Field (well 101 @ 3.0 mg/L), the former Waste Oil UST area (well WO-1 @ 0.65 mg/L), and in the region of the Former #2 Fuel Oil UST area (ranging from 3.5 mg/L to 22 mg/L). The VTDEC groundwater guideline of 1.0 mg/L is exceeded by the concentrations reported in well 101.

Concentrations of TPH were detected in wastewater samples collected from the Storm Drain System, including sample O/W-West @ 1,100 mg/L (collected from oil/water separator MH-A), MH-

12A @ 1.2 mg/L,and MH-14 @ 11 mg/L. The sample from MH-A was collected from beneath a lens of floating oil, and therefore may not be representative of completely dissolved petroleum constituents. In addition, this oil/water separator is reported to be valved closed from all downstream discharge points of the North Drain System. The samples from MH-12A and MH-14 are considered to be dissolved petroleum. In general, the wastewater in the storm drain system would be expected to contain petroleum hydrocarbons generated from surface runoff of paved roadways and parking lots. The current NPDES permit for the power station does not require analysis of stormwater for TPH.

Given the low concentrations of TPH detected in groundwater, and the expected dilution of the TPH concentrations reported in the wastewater samples upon ultimate discharge to the river, no adverse environmental impacts would be expected.

Polynuclear Aromatic Hydrocarbons (PAH)

One soil sample collected from the Former Wood Burning Area contained Naphthalene at 130 µg/Kg. Comparison to the US EPA Region III RBC Standard for direct contact/industrial soil ($4.1x10^7$ µg/Kg) and the MCP Method 1 S-3/GW-1 Standard (4,000 µg/Kg) does not indicate that this concentration would pose a significant risk to direct contact, considering the industrial use of the property. The US EPA Region III RBC Standard for soil-to-groundwater Soil Screening Levels (SSLs) for naphthalene is $7.7 x10^{-3}$ mg/Kg (or 7.7 µg/Kg), indicating the potential for leaching of Naphthalene to groundwater exists. However, analyses of groundwater from well BA-1 did not indicate the presence of any PAHs above MDLs.

Polychlorinated Biphenyls (PCBs)

PCBs were detected in three samples collected from the subject property. The oil sample collected from manhole MH-A (sample O/W-Product) associated with the North Storm Drain System contained a PCB Arochlor-1260 concentration of 11,600 µg/Kg (11.6 mg/Kg). The wastewater sample from this same location (sample O/W-West) contained PCB Arochlor-1260 at 7.1 µg/L.

The concentration of PCB detected in the oil present in the MH-A oil/water separator is less than the 50 mg/Kg threshold defining PCB-containing dielectric fluid by the USEPA. However, dissolved concentrations of PCBs present in the water of this separator poses a risk for the introduction of PCBs to groundwater (PGQS of 0.5 µg/L) and into the storm drain system, should a discharge to the Connecticut River occur. The reported detection of PCBs in oil that is contained within the concrete containment vault beneath the Main Transformer, and the fact that this vault drains to MH-A, indicates that the Main Transformer containment vault is the probable source of the PCB-containing oil.

The composite soil sample collected from the Spare Main Transformer contained PCB Arochlor-1260 at 200 ug/Kg (0.2 mg/Kg). The reported concentration of 200 µg/Kg is below the USEPA Region III RBC direct contact standard for industrial soil (2,900 µg/Kg).

Metals

In general, detectable concentrations of total metals were reported in all soil and sediment samples collected from the subject property. In addition, dissolved metal concentrations were reported in septic waste and effluent samples, and in groundwater samples. A comparison of all reported total or dissolved metals concentrations has been made to standards established by the VT DEC, and published by EPA Region III or the MADEP. No metals were detected at concentrations that exceed any standards reviewed. All metals concentrations detected in soils or groundwater collected from the subject property are considered to be consistent with expected background concentrations.

Radiological Parameters

Radiological results are summarized below in tabular form for each sample location to evaluate the distribution of the Gross Alpha/Beta, Tritium and Gamma Spec results per sample matrix across the VYNPC property. Data have been rounded off and are reported in pCi/g or pCi/L.

Location	Soil	Sediment	Wastewater (septic)	Stormwater	Surface water	G. water	Drinking water
Main Septic System							
Gross Alpha	NT		<LLD			24-54	
Gross Beta	NT		<LLD			<LLD	
Tritium	<LLD		0.92			<LLD	
Gamma Spec	0.21-1.6		<LLD			<LLD	
Potassium-40	13-18					<LLD	
Cesium-137	0.09					<LLD	
Cobalt-60	0.08					<LLD	
New Warehouse Septic System							
Gross Alpha	NT		<LLD			<LLD	
Gross Beta	NT		<LLD			<LLD	
Tritium	<LLD		<LLD			<LLD	
Gamma Spec	0.29-1.85		<LLD			<LLD	
Potassium-40	13-16						
Cesium-137							
Cobalt-60							
COB Septic System							
Gross Alpha	NT		8.75			<LLD	
Gross Beta	NT		<LLD			<LLD	
Tritium	<LLD		0.99			<LLD	
Gamma Spec	0.24-5.98		0.01 (Pb)			<LLD	
Potassium-40	13-16						
Cesium-137							
Cobalt-60							
Storm Water Drainage Systems Including O/W Separators							
Gross Alpha				<LLD			
Gross Beta				<LLD			
Tritium				<LLD			
Gamma Spec				343 Pa south outfall			
Potassium-40							
Cesium-137							
Cobalt-60							

Location	Soil	Sediment	Wastewater (septic)	Stormwater	Surface water	G. water	Drinking water
North Field, Drainage Ditch Surface Water and Groundwater							
Gross Alpha	NT				<LLD	67	
Gross Beta	NT				<LLD	<LLD	
Tritium	<LLD				<LLD	<LLD	
Gamma Spec	0.29-4.02				<LLD	<LLD	
Potassium-40	12-19						
Cesium-137	0.09-0.16						
Cobalt-60	0.03						
Drainage Ditch (NF-SED-1) and Sonotube Sediment Samples							
Gross Alpha		NT					
Gross Beta		NT					
Tritium		<LLD					
Gamma Spec		0.36-2.21					
Potassium-40		12-19					
Cesium-137		0.08-0.15					
Cobalt-60							
Former Wood Burning Area							
Gross Alpha	NT						
Gross Beta	NT						
Tritium	<LLD						
Gamma Spec	0.34-10.28						
Potassium-40	16-18						
Cesium-137	0.17						
Cobalt-60							
Area B-5							
Gross Alpha	NT						
Gross Beta	NT						
Tritium	<LLD						
Gamma Spec	0.29-4.96						
Potassium-40	16						
Cesium-137							
Cobalt-60							
Area B-2							
Gross Alpha	NT						
Gross Beta	NT						
Tritium	<LLD						
Gamma Spec	0.31-4.66						
Potassium-40	15-16						
Cesium-137							
Cobalt-60							
South Field							
Gross Alpha	NT					<LLD	
Gross Beta	NT					<LLD	
Tritium	69-407					<LLD	
Gamma Spec	0.24-7.09					12-22 (Bi)	
Potassium-40	11-15					<LLD	
Cesium-137	0.05-0.07						
Cobalt-60							

Location	Soil	Sediment	Wastewater (septic)	Stormwater	Surface water	G. water	Drinking water
Former Waste Oil UST							
Gross Alpha						<LLD	
Gross Beta						<LLD	
Tritium						<LLD	
Gamma Spec						<LLD	
Potassium-40							
Cesium-137							
Cobalt-60							
Former #2 Fuel Oil UST							
Gross Alpha						18-25 (unfiltered) <LLD (filtered)	
Gross Beta						<LLD	
Tritium						49-1849 MW6= 327 (unfiltered) MW6= 432 (filtered)	
Gamma Spec						<LLD	
Potassium-40							
Cesium-137							
Cobalt-60							
Drinking Water Supply Wells							
Gross Alpha							5-16
Gross Beta							<LLD
Tritium							759
Gamma Spec							190-135 (Lead) 125-247 (Bismuth)
Potassium-40							
Cesium-137							
Cobalt-60							

ECS provides the following conclusions based on the radiological testing conducted at the VYNPC property:

8. Gross Alpha scanning revealed radiation above action levels for the Radium (5 pCi/L) or Uranium (15 pCi/L) radionuclides in groundwater collected at the Main Septic System area, North Field area, and the three drinking water wells. Gamma spec analysis did not detect Radium-226 or Uranium-235 radionuclides above the 5 pCi/L or the proposed 20 pCi/L MCLs established by the Federal EPA. The two additional Uranium radionuclides (^{235}U and ^{238}U) are not analyzed by the gamma spec due to special chemical separation methods required for these isotopes. VYNPC data collected in 1999 indicated the presence of Uranium-238 in both the Main System (5.05 pCi/L to 7.48 pCi/L) and the NEOB well (6.17 pCi/L to 6.8 pCi/L). The Gross Alpha radiation detected in these samples is likely due to these naturally occurring radioactive materials;

9. Gross Beta radiation was not detected in any of the samples tested above the lower limit of detection (LLD);

10. low concentrations of Thorium, Proactinium, Radium, Lead, Bismuth, Actinium, and Thalium ranging from 0.21-7.09 pCi/g were relatively consistently detected in soil across the VYNPC property. There was no obvious trend in the detection of these radionuclides which are all naturally occurring radioactive daughter products involved in the Uranium, Thorium and Actinium decay chains. Potassium-40 was the most abundant radionuclide consistently detected in soil with concentrations ranging from approximately 11-18 pCi/g. This range is considered to be well within the background levels for this naturally occurring radioactive material;

11. Proactinium-234m was detected in a storm water sample at 343 pCi/L. This level is not considered to be of concern based on the monthly average concentration of 300,000 pCi/L allowed by the NRC according to 10 CFR 20 Table 2;

12. Cesium-137 was detected in soil samples collected from the Main Septic System area (0.09 pCi/g), soil borings advanced in the North Field (0.09-0.16 pCi/g), sediment samples collected from the drainage ditch (0.15 pCi/g) and sonotubes (0.08 pCi/g), soil boring from the Wood Burning Area (0.17 pCi/g) and South Field soil borings (0.05-0.07 pCi/g). An average background level for Cesium-137 of 0.15 pCi/g was reported by Duke Engineering & Services of Bolton, MA in their report dated March 31, 1999 for the subject area. The Ingestion and Groundwater Leaching SSLs established by EPA for Cesium are 18.3 pCi/g and 4.1 pCi/g respectively. The concentrations of Ce-137 detected at the site are considered to be consistent with the background level Duke Engineering & Services determined for the subject area;

13. trace levels of Cobalt-60 were detected in a soil sample collected from the Main Septic System area (0.08 pCi/g) and a soil boring sample from the North Field (0.03 pCi/g). To confirm the presence of this radionuclide, which is associated with the VYNPC operations, the samples are being retested at longer scanning times;

14. Tritium was not detected in groundwater samples above the LLDs except for two samples (MW-1 and 9) located in the Protected Area, and the COB Well drinking water sample. Samples from MW-1 and MW-9 were inadvertently acidified and not filtered, resulting in the introduction of suspended solids as a secondary source of Tritium. For each sample, the Tritium concentrations were well below the MCL of 20,000 pCi/L established by the Federal EPA for drinking water;

15. Tritium was not detected in soil, sediment or wastewater (reported as solids) samples above the LLDs except for soil samples collected in the south field, where septic sludge is permitted to be spread. Tritium levels ranged from 69-407 pCi/g. The Ingestion and Groundwater Leaching SSLs established by the EPA are 8,580 pCi/g and 80 pCi/g, respectively. The detection of Tritium in soil samples collected at the 0-4 foot depth range is considered to be the result of historical septic sludge application by VYNPC. The levels are not considered to be significant based on the EPA SSLs and the absence of Tritium above LLDs in groundwater; and

16. the absence of man-made radioactive materials other than Cobalt-60 and Cesium-137 in the samples tested during this investigation indicates that a release of radioactive material has not occurred to soil, sediments, surface water, groundwater or septic system waste materials in the areas investigated.

13.2 - RECOMMENDATIONS - ORGANIC CONTAMINANTS -

Based upon the conclusions made above regarding the presence of TPH, VOCs, and PCBs at the subject property, ECS has made the following recommendations regarding the need for further evaluation or action:

- the presence of TPH at 2.0 mg/L in the groundwater sample collected from well COB-1 and 3.0 mg/L in the sample from well 101 has been determined to be in excess of the PGQS of 1.0 mg/L. However, with the fact that these wells are located within close proximity to the Connecticut River and that no drinking water supply wells are located downgradient of this area of the subject property, ECS is of the opinion that any further assessment of this area is not warranted. However, due to the exceedance of the PGQS guideline, the data should be reported to the VTDEC;

- several VOCs and TPH were identified in groundwater in the vicinity of the Former #2 Fuel Oil UST area. Because this area of the subject property is currently listed as a Disposal Site with the VTDEC (SMS Site # 99-2617), the release of both petroleum and chlorinated solvents to soil and groundwater appears to be adequately addressed through the ongoing monitoring program. ECS therefore is not recommending any additional evaluation of this area. However, this data should be reported to the VTDEC under separate cover, referencing SMS Site # 99-2617;

- the presence of dissolved PCB concentrations in wastewater within the North Storm Drain system warrants further action. Specifically, the oil and PCBs appear to be accumulating in the MH-A oil/water separator through drainage from the Main Transformer containment vault. In order to prevent any discharge of the PCBs or oil to soil, groundwater, or the storm drain system, ECS recommends that the Main and Start-up Transformer vaults be more fully evaluated for current oil levels and PCB content, and a program established to flush the containment vaults to remove any residual oil. In addition, VYNPC may consider permanently closing off MH-A from the downstream side of the North Storm Drain system, to prevent any accidental releases of oil.

13.3 - RECOMMENDATIONS - RADIOLOGICAL PARAMETERS

ECS makes the following recommendations regarding the radioactive material testing results:

- sample collection from monitoring wells 1101 and 1102 (Main Septic System) and analysis of Uranium and Radium radionuclides to determine source of Gross Alpha radiation levels of 23.95 to 53.84 pCi/L, which exceed the proposed Uranium MCL of 20 pCi/L and the Radium MCL of 5 pCi/L; and

- evaluate the potential storage capacity of the South Field for septic waste by characterizing the vertical extent and degree of Tritium in soil through subsurface investigations. Samples should be collected at 4-foot intervals until groundwater is encountered in areas exhibiting elevated Tritium concentrations.

14.00 LIMITATIONS

The findings and conclusions documented in this report have been prepared for the specific application to this project and have been developed in a manner consistent with that level of care and skill exercised by members of the environmental science profession currently practicing under similar conditions in the area. No warranty, expressed or implied, is made.

The conclusions and recommendations of this assessment are derived from visual observation of the conditions on the subject property at the time of the assessment including a review of historical and regulatory agency files available during the period of assessment, and data acquired from subsurface investigations completed during the assessment period. ECS did not evaluate the subject property for the presence of asbestos-containing materials, lead-based paint, urea formaldehyde foam insulation or radon. The above stated conclusions are limited accordingly.

15.0 REFERENCES

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