STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Joint Petition of Entergy Nuclear Indian Point 2, LLC; Entergy Nuclear Indian Point 3, LLC; and Nuclear Asset Management Company, LLC for a Declaratory Ruling Disclaiming Jurisdiction Over or Abstaining from Review of the Proposed Transfers or, in the Alternative, an Order Approving the Proposed Transfers Pursuant to Section 70 of the New York Public Service Law	Case 19-E-0730

REPLY COMMENTS OF JOINT PETITIONERS IN RESPONSE TO COMMISSION JANUARY 17, 2020 NOTICE SEEKING COMMENTS

Exhibit 2

Historical Site Assessment

Historical Site Assessment for Indian Point Energy Center

Technical Support Document (TSD) No. 19-002 Rev 02

Prepared by

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RSCS
Radiation Safety & Control Services

Historical Site Assessment for Indian Point Energy Center

Technical Support Document No. 19-002 Rev 02

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1 Executive Summary

To assist in decommissioning planning for the Indian Point Energy Center (IPEC or the site), this Historical Site Assessment (HSA) documents a comprehensive investigation that first identifies, and then evaluates and classifies on a preliminary basis, historical records and information pertaining to circumstances or events that may have resulted in radiological or non-radiological contamination during the operating history of the station, which has been owned by Entergy Nuclear Indian Point 3, LLC since 2000 (Unit 3) and by Entergy Nuclear Indian Point 2, LLC since 2001 (Units 1 & 2), (together, "Entergy"). The goal of this approach is to facilitate effective review of site conditions in a principled manner.

Our overall strategy in developing the HSA has been to thoroughly review and evaluate the existing documentation at IPEC and to build upon that body of work to fully describe and document the radiological and non-radiological status of the site. We have identified radiological and non-radiological areas of concern, identified data gaps and recommended additional investigation and characterization activities needed to support the development of other decommissioning documents including Derived Concentration Guideline Levels (DCGLs) and the License Termination Plan (LTP).

We have used the same general approach (incorporating lessons learned) that we have implemented in the successful performance of HSAs at other facilities. This approach includes reviewing work performed to date, reviewing site records and data, interviewing personnel, inspecting the principal systems structures and components (SSCs) of the station, developing a site conceptual model, determining areas of concern, and evaluating and organizing all collected information in a structured fashion.

For the purposes of this report, the term "site" refers to the industrial portion of the Entergy owned property. In addition, this HSA identifies areas of the station or SSCs where there is a credible basis for significant or actionable contamination. In some cases, there is no definitive information to indicate that these areas or SSCs have been contaminated. Rather, the identified areas or SSCs may be listed simply because of the materials used or stored there and the corresponding possibility that radiological or other contaminants may have been released from them to the adjacent environment.

We have used the guidance provided in NUREG-1757 Vol. 2 "Consolidated Decommissioning Guidance" and NUREG-1575 Rev 1 "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) to develop a detailed HSA. All areas and SSCs have been given a preliminary classification based on available survey data, knowledge of historical site operations, and results of employee interviews. The classification of an area or SSC or subsection of an area or SSC may be revised between now and the time of site closure or license termination when additional characterization data become available.

Historical information was reviewed and compiled into this HSA to identify areas where contamination existed, remains, or has the potential to exist. This information was primarily derived from the following sources (the full list of information sources is listed in Appendix A):

- interviews of long-tenured employees knowledgeable of site operations;
- records from the New York State Department of Environmental Conservation (NYS DEC);
- IPEC incident files (CRs, RORs, DERs, LERs, etc.);
- IPEC special survey and operational radiological survey records;
- engineering reports of environmental assessments and subsurface investigations at IPEC;
- the IPEC file maintained in compliance with federal regulation 10 CFR 50.75(g)
- the IPEC Offsite Dose Calculation Manual (ODCM);
- the IPEC Final Safety Analysis Reports (FSAR);
- the IP 2 Spill Prevention, Control and Countermeasures (SPCC) Plan, August 2017;
- the IP 3 Spill Prevention, Control and Countermeasures (SPCC) Plan, August 2017;
- the IPEC Annual Radioactive Effluent Release Reports; and
- the IPEC Annual Radiological Environmental Operating Reports

No ongoing releases of radiological or non-radiological contamination at the station are known to exist. Historical releases at the station have been managed in accordance with applicable radiological and non-radiological regulations. When leaks or spills occurred, they were immediately remediated by removal of the accessible contaminated material until sampling results indicated that the material was not detectable, remained at background levels, or they were otherwise contained in place, e.g. to minimize mobility. Nevertheless, it is possible that in some locations inaccessible contamination may remain. To that end, one of the purposes of this document is to identify potential data gaps to be addressed during the decommissioning effort, which we do by providing, on a preliminary basis, suggested investigation strategies, in sections denoted "Recommended Future Investigation Activities".

The information developed by this HSA indicates that the areas and SSCs with a high probability of requiring remediation (Class 1) are located within Radiologically Controlled Areas (RCA). Migration of surface contamination from the RCA appears to be limited as has been determined from frequent site surveys conducted inside the Protected Area (PA).

In some instances, identified contaminated radiological areas or SSCs may have been the result of spills, leaks, or accumulation over time of low levels of radioactive material that were released from the facility at levels lower than those that could be detected by real-time monitoring methods employed at the station which at the time were state-of-the-art and comparable to methods used throughout the nuclear industry.

For example, IPEC has implemented guidance contained in NEI 07-07, the Industry Groundwater Protection Initiative (GPI) [1]. The objective of IPEC's Groundwater Protection Program is to identify, monitor and quantify the nature and extent of radiological contamination that may exist in site groundwater. In effect the IPEC program predates NEI 07-07 as it was initiated in response to an apparent release of tritium to the subsurface which was discovered in August 2005 during construction activities at Unit 2 associated with the Independent Spent Fuel Storage Installation Project.

A comprehensive investigation of this incident of groundwater contamination was subsequently expanded to include areas of the site where credible potential sources of leakage might exist and encompassed all three reactor units. The investigation determined that groundwater beneath the station flows westward to discharge in the Hudson River within the boundaries of the IPEC site. Much of the flow is within the Inwood Marble, a fractured carbonate rock that underlies the station. Both the Unit 1 and Unit 2 spent fuel pools were sources of radiological contamination that enters the Hudson River along an approximately 150-foot length of shoreline between the Intake Structures of the two units. Where they enter the river the concentrations of the contaminants are a small fraction of the limits permitted by the station's operating licenses and present no risk to public health, safety or the environment.

Long term employees with historical knowledge of station operations were interviewed regarding the plant operating history in December of 2018 and January of 2019. The intent of the employee interviews was to capture the institutional knowledge of those familiar with plant operation and construction. As detailed below in our conclusions, based on those interviews, there do not appear to be any undocumented incidents of significant contamination at the station. Further, none of the identified impacted areas or SSCs is an imminent threat to human health or the environment.

2 Glossary of Key Terms

AC: Alternating Current.

ACM: Asbestos Containing Material.

AEC: Atomic Energy Commission.

Ag: Silver.

ALARA: As Low As Is Reasonably Achievable.

Am: Americium.

ANI: American Nuclear Insurers.

AOC: Area of Concern.

AORs: Abnormal Occurrence Reports.

AST: Aboveground Storage Tank.

BAB: Boric Acid Building

bgs: Below Ground Surface.

Ce: Cerium.

CETNA: Core Exit Thermocouple Nozzle Assembly.

CFS: Cubic Feet per Second.

Ci: Curie.

Cm: Curium.

cm^2: Square Centimeters.

Co: Cobalt.

CPM: Counts Per Minute.

CR: Condition Report.

Cs: Cesium.

CSB: Chemical Systems Building (Unit 1)

CSM: Conceptual Site Model.

CTMT: Containment Building

CST: Condensate Storage Tank.

DAW: Dry Active Waste.

DCGLs: Derived Concentration Guideline Levels.

DE: Diatomaceous Earth.

DER: Deviation Event Report.

DMRs: Discharge Monitoring Reports.

DPM: Disintegrations Per Minute.

DQOs: Data Quality Objectives.

EDG: Emergency Diesel Generator.

Entergy: Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC.

EPA: Environmental Protection Agency.

EPRI: Electric Power Research Institute.

Eu: Europium.

Fe: Iron.

FSAR: Final Safety Analysis Report.

FSB: Fuel Storage Building

FSS: Final Status Survey.

gm: Gram.

GPI: Groundwater Protection Initiative.

GSB: Generation Support Building

H-3: Tritium.

HP: Health Physics.

hp: Horsepower.

HPCI: High Pressure Coolant Injection.

HSA: Historical Site Assessment.

HTD: Hard to Detect.

I&C: Instrument and Control.

I: Iodine.

ICW: Inside Containment Wall.

IL: Investigation Level.

IPEC: Indian Point Energy Center

IRA: Immediate Response Action.

ISFSI: Independent Spent Fuel Storage Installation.

ISOCS: In-Situ Object Counting System.

kg: Kilogram.

KVA: Kilovolt Amps.

LER: Licensee Event Report.

LLD: Lower Limit of Detection.

LSA: Low Specific Activity.

LTMP: Long Term Monitoring Plan.

LTP: License Termination Plan.

MARSSIM: Multi-Agency Radiation Survey and Site Investigation Manual, NUREG-1575.

MCL: Maximum Contaminant Level.

MDA: Minimum Detectable Activity.

mg: Milligram.

MGD: Gallons Per Day.

MNA: Monitored Natural Attenuation.

MOB: Maintenance Outage Building (Unit 2)

mph: Miles per Hour.

mrem: Millirem.

mrem/yr: Millirem per Year.

msl: Mean Sea Level.

MTF: Maintenance Training Facility.

MW: Megawatt.

MWe: MegaWatts electrical.

MWt: MegaWatts thermal.

Nb: Niobium.

NCD: North Curtain Drain

NEI: Nuclear Energy Institute.

Ni: Nickel.

NOAA: National Oceanic and Atmospheric Administration.

NPDES: National Pollutant Discharge Elimination System

NR: Prefix denoting Non-Radiological classifications.

NRC: Nuclear Regulatory Commission.

NSB: Nuclear Services Building (Unit 1)

NYSDEC: New York State Department of Environmental Conservation

O_2: Oxygen.

OCW: Outside Containment Wall.

ODCM: Off-site Dose Calculation Manual.

OSB: Outage Support Building

PA: Protected Area.

PAB: Primary Auxiliary Building.

PASNY: Power Authority of the State of New York

PCB: Polychlorinated Biphenyl.

pCi: PicoCurie.

ppm: Parts per Million.

Pu: Plutonium.

PWR: Pressurized Water Reactor

PWST: Primary Water Storage Tank.

RAM: Radioactive Material.

RCA: Radiologically Controlled Area.

RCP: Reactor Coolant Pump.

RCRA: Resource Conservation and Recovery Act.

REMP: Radiological Environmental Monitoring Program.

RFI: RCRA Facility Investigation.

RMSA: Radioactive Material Storage Area

ROCs: Radionuclides of Concern.

ROR: Radiological Occurrence Report.

RP: Radiation Protection.

RS: Radiological Survey.

RSLs: Federal Regional Screening Levels.

RW: Radioactive Waste, Radwaste.

RWST: Refueling Water Storage Tank.

SAFSTOR: Safe Storage.

SAS: Secondary Alarm Station

Sb: Antimony.

SCD: South Curtain Drain

SFD: Sphere Foundation Drain

SFP: Spent Fuel Pool

SG: Steam Generator.

Sn: Tin.

SPCC: Spill Prevention, Control and Countermeasures.

Sr: Strontium.

SSCs: Systems, Structures, or Components.

TB: Turbine Building.

TC: Training Center.

TID: Technical Information Document.

TRU: Transuranic.

TSC: Technical Support Center.

USAR: Updated Safety Analysis Report.

USGS: United States Geological Survey

UST: Underground Storage Tank.

VC: Vapor Containment

V&V: Verification and Validation.

WBC: Whole Body Counter

WHT: Waste Holdup Tank

Xfmr: Transformer

Zr: Zirconium.

μCi: MicroCurie.

3 Introduction

IPEC is comprised of three electricity generating units, namely Unit 1, Unit 2, and Unit 3. Units 1 and 2 were purchased by Entergy in August 2001 from Consolidated Edison (Con Ed), whereas Entergy purchased Unit 3 in November 2000 from the Power Authority of the State of New York (PASNY). The IPEC site consists of approximately 239 acres of land on the east bank of the Hudson River at Indian Point, Village of Buchanan in upper Westchester County, New York. The site is about 24 miles north of the New York City boundary line. The nearest city is Peekskill, 2.5 miles northeast of Indian Point.

Unit 1 is a closed-cycle four-loop pressurized water reactor, designed by Babcock and Wilcox. Con Edison was the principal contractor and had responsibility for the construction, testing, and initial startup of Unit 1 in 1962. Unit 1 received a construction permit in 1956. A Provisional Operating License (DPR-5) was issued in 1962. Unit 1 operated at a maximum steady state power level of 615 thermal megawatts and a net electric generating capacity of 265 MWe. Unit 1 was shut down on October 31, 1974, when a variance granted to Con Edison from the AEC's interim acceptance criteria for emergency core cooling systems expired. The reactor was defueled in January 1976.

Additional milestones related to the operational history of Unit 1 are as follows:

- US Nuclear Regulatory Commission (NRC) approved SAFSTOR on January 25, 1996
- NRC approved transfer of ownership from Consolidated Edison to Entergy Nuclear Indian Point 2, LLC on August 27, 2001.

Unit 2 is a single-unit pressurized water reactor (PWR) supplied by Westinghouse Electric Corporation. The rated gross electric output of the plant is approximately 1,028 megawatts-electrical (MWe) when operating at approximately 3,216 megawatts-thermal (MWt). The nuclear steam supply system consists of a pressurized water reactor, Reactor Coolant System, and associated auxiliary fluid systems. The Reactor Coolant System is arranged as four closed reactor coolant loops, each containing a reactor coolant pump and a steam generator, connected in parallel. An electrically heated pressurizer is connected to the loop associated with Steam Generator 24.

A brief history of the major milestones related to the operational history of Unit 2 is as follows:

- License issued to Consolidated Edison to operate Unit 2 on September 28, 1973.
- Commercial power operations commenced on August 1, 1974
- NRC approved transfer of ownership from Consolidated Edison to Entergy Nuclear Indian Point 2 (ENIP2), LLC on August 27, 2001.
- NRC approved license amendment to allow core power increase to 3,216 MWt on October 27, 2004.
- Entergy announced, in January 2017, that it will permanently shut down Indian Point Unit 2 on April 30, 2020.
- NRC license renewal to extend operation until April 30, 2024 was issued on September 17, 2018.

Unit 3 is a single-unit pressurized water reactor supplied by Westinghouse Electric Corporation. The rated gross electric output of the plant is approximately 1,041 megawatts-electrical (MWe) when operating at approximately 3,216 megawatts-thermal (MWt). The nuclear steam supply system consists of a pressurized water reactor, Reactor Coolant System, and associated auxiliary fluid systems. The Reactor Coolant System is arranged as four closed reactor coolant loops, each containing a reactor coolant pump and a steam generator connected in parallel. An electrically heated pressurizer is connected to the loop associated with Steam Generator 34.

A brief history of the major milestones related to the operational history of Unit 3 is as follows:

- License issued to Consolidated Edison to operate Unit 3 on December 12, 1975
- Commercial power operations commenced on August 30, 1976
- NRC approved transfer of ownership from Consolidate Edison to Power Authority of the State of New York on December 24, 1975.
- NRC approved transfer of ownership from Power Authority of the State of New York to Entergy Nuclear Indian Point 3, LLC on November 21, 2000.
- NRC approved license amendment to allow core power increase to 3,216 MWt on March 24, 2005.
- Entergy announced, in January 2017, that it will permanently shut down Indian Point Unit 3 on April 30, 2021.
- NRC license renewal to extend operation until April 30, 2025 was issued on September 17, 2018.

As detailed above, the purpose of this HSA is to identify and catalog existing information describing operational occurrences at IPEC that may have resulted in either radiological or non-radiological contamination. The scope of the HSA encompasses the site history from the beginning of site construction to March 15, 2019.

The HSA provides an assessment of the likelihood of contaminant migration, information useful for scoping and characterization surveys, and initial classifications of areas of interest as to whether they are impacted or non-impacted. The classification process is guided by MARSSIM [2] and applicable law, where relevant.

The information developed by this HSA preliminarily results in two tiers of progressive classification.

The first step is to designate "impacted" areas of the site, under the presumption that the period of operation and oversight has produced records and site-specific information sufficient to identify potentially impacted areas. Impacted classifications are made where there is credible information indicating the potential for contamination which requires further assessment. If insufficient data are available to confirm a classification of "Non-Impacted", the SSC or area has been classified conservatively as "Impacted - Class 3" until sufficient characterization data are obtained to support a classification of "Non-Impacted." [2].

The second step is to further delineate significance of the potential contamination, where possible, for those SSCs or areas designated as impacted. To do so, all impacted areas are classified as Class 1, Class 2 or Class 3, to indicate the degree to which impact may have occurred based on known information.

More specifically, these secondary classifications are subjective and reflect professional judgement based upon the available information. They are determined in accordance with guidance provided in NUREG-1575, Rev. 1, "Multi-Agency Radiological Survey and Site Investigation Manual" (MARSSIM) [2]. Class 1 SSCs or areas have the greatest potential for contamination to exceed applicable release criteria, which have yet to be determined but are assumed to be similar to the screening values provided in NUREG-1757, Vol. 2, "Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria", for purposes of this Report. This ensures, therefore, that to be adequately characterized, a Class 1 SSC or area must receive greater scrutiny than a Class 2 or Class 3 SSC or area. Where there is credible, but not definitive, information about contamination, we have employed a default Class 3 classification [2].

Decommissioning is expected to address co-located radiological and non-radiological materials. Nonetheless, to facilitate review of SSCs or areas that may have been impacted with non-radiological contaminants in a consistent manner that accounts for the likely coincident remediation, the same approach described in MARSSIM for radiological contaminants has been applied to non-radiological materials, with the addition of a fourth "Impacted" classification designated as "Isolated". Isolated SSCs or areas are contained within buildings or structures. These SSCs or areas are shielded from processes such as precipitation, wind, runoff, infiltration and seepage that would otherwise distribute non-radiological contaminants to the natural environment. There is the potential that structural elements or building materials within these isolated SSCs or areas may have been impacted by release of contaminants within them but the risk of contamination of the natural environment from such incidents is negligible. The Isolated classification is applied solely to non-radiological contamination because the hazards unique to radiological contamination exist whether or not the contamination is isolated.

For the non-radiological classifications, MARSSIM's Derived Concentration Guideline Levels (DCGLs), which are the site-specific radiological criteria for release of an area for unrestricted use, are replaced by applicable non-radiological criteria, e.g. the New York State Department of Environmental Conservation (NYSDEC) Water Quality Standards for Surface Waters and Groundwater [3], NYSDEC Soil Cleanup Objectives [4], federal maximum contaminant levels (MCLs) [5], or federal regional screening levels (RSLs) [6]. The Non-Radiological classifications are denoted by assigning an "NR" prefix, but as noted above the co-location of materials means that decommissioning will likely resolve the non-radiological materials.

Historic releases at the station have been managed in accordance with applicable radiological and non-radiological regulations. The NR classification is assigned to areas or SSCs where (1) materials are used or stored in relatively large volume, and (2) conditions are such that such historic use has a reasonable potential to contaminate media that could require remediation at the time of decommissioning. Thus, this assignment should not be equated to known contamination requiring action under applicable law. See also Section 5.1.1 for a discussion of NR impacted classification.

The purpose of this assessment is to assist in decommissioning planning for the station. Given that the current decommissioning strategy has not been declared for Units 2 and 3 (Unit 1 is Safe Storage (SAFSTOR) option), there may be a lengthy period between the time of completion of this HSA and initiation of decommissioning activities.

Because decommissioning is a lengthy and iterative process, information in the HSA should be evaluated with respect to the impact of the elapsed time since the preparation of the HSA (due to radioactive decay or natural attenuation) on the intended use of the information.

The physical characteristics of the IPEC site and its vicinity are described in Section 4. The method for preparing an HSA and completing the MARSSIM investigation process is discussed in Section 5. The assessment findings are presented in Section 6 and are subdivided into information pertaining specifically to each unit and to areas or SSCs common to two or more units. Each unit (or common) is further subdivided by non-radiological and radiological impacts. The conclusions are presented in Section 7 of this report. Classification summary tables are presented in Appendices B and C.

4 Property Identification

The Indian Point Energy Center is located on approximately 239 acres of land on the east bank of the Hudson River at Indian Point, Village of Buchanan, in northern Westchester County, New York. The site is about 24 miles north of the New York City boundary line. The nearest city is Peekskill, 2.5 miles northeast of Indian Point. Figure 1 shows the location of the IPEC site and Figure 2 shows the IPEC parcel boundaries.

The principal structures at IPEC consist of three Containments (CTMT), Fuel Handling/Storage, and Turbine Buildings, the Chemical Systems, Nuclear Services and Superheater Buildings (U1), two Primary Auxiliary Buildings (Units 2 & 3), the Maintenance Outage Building (Unit 2), the Outage Support Building (Unit 3), the Emergency Diesel Generator Buildings, the Generation Support Building, the Intake/Screenwell Structures, the Discharge Canal, and the ISFSI. Figures 3A, 3B and 3C show the locations of these and other facilities at the station.

4.1 Environmental Setting

4.1.1 Physiography

The IPEC site lies within the Manhattan Prong of the larger Hudson Highlands physiographic province. The Manhattan Prong is a northeast-trending band of Late Precambrian to Early Paleozoic igneous and metamorphic rocks consisting of gneiss, schist and marble extending from Manhattan and the Bronx, through segments of Brooklyn, Staten Island, parts of Westchester County, and upland portions of southwestern Connecticut. The Hudson Highlands province, which is the northeast extension of the Reading Prong in Pennsylvania, also encompasses the Ramapo Mountains in New Jersey and the Taconic Mountains in New York. The Hudson Highlands form the core of the Appalachian Mountains throughout portions of eastern Pennsylvania, northern New Jersey, southern New York and most of Connecticut [7].

4.1.2 Geology

The Hudson Valley has been subjected to repeated glacial advance and retreat, creating a glacial morphology characterized by main and tributary valleys whose original form has been sculpted by glacial erosion. Bedrock ledges are typically exposed in the upper portions of the valleys. Glacial till of varying thickness generally lies directly on the bedrock surface. Glaciofluvial deposits primarily consisting of sand and gravel, and glaciolacustrine deposits primarily consisting of silt and clay, often overlie till in the lower portions of glaciated valleys. Till is typically unstratified and poorly sorted. At the IPEC site, it consists of a silty, fine- to medium-grained, brown, sandy matrix containing fine gravel to boulder-size bedrock fragments [8].

The predominate rock type at the site is the Inwood Marble, a crystalline metamorphic carbonate rock. The Inwood has very low primary porosity. Groundwater does not flow through the rock matrix but is confined to flow within fractures in the rock [8]. Overburden geology at the site is limited to a layer ranging in thickness from 3.5 to 59 feet below ground surface (bgs), with thicknesses generally increasing toward the Hudson River. Overburden materials are dominated by anthropogenic fill. Soil-based fill materials at the site consist primarily of silty clay, sand and gravel mixtures (i.e., regraded/transported on-site glacial till) or gravel/cobble/boulder-size blast rock produced during plant construction. In areas adjacent to structures excavated into bedrock, the fill consists of concrete, compacted granular soils, and blast rock [8].

4.1.3 Hydrology

The Hudson River below the dam at Troy, immediately below the confluence of the Hudson and Mohawk Rivers, (the "Lower Hudson River") is a tidally-influenced, estuarine waterway. Fresh water from the combined Hudson and Mohawk Rivers, as well as from numerous tributaries, discharges directly into the tidal portion of the river. Seawater enters the extreme lower reaches of the river through the Narrows and the Harlem/East River. The distribution of saltwater is influenced by fresh water flow, tides, physical characteristics of the river channel, and weather. Flow in the Lower Hudson River is controlled more by tides than by runoff from the tributary watershed. River width opposite IPEC ranges from 4,500 to 5,000 feet. Water depths within 1,000 feet of the shore near the site are variable, with an average depth of 65 feet. Tidal flow past the plant is about 80 million gallons per minute (gpm) about 80 percent of the time [9].

Review of historical records indicates that flooding at the site is non-existent. Flood stages are primarily the effect of tidal influence, with the secondary influence of runoff. The highest water elevation recorded at the site was 9 feet 8 inches above MSL, which occurred during the extra-tropical Superstorm Sandy in November 2012. Since the river water elevation would have to reach 15 feet 3 inches above MSL before it would enter any of the IPEC buildings, the potential for flooding damage at the site appears to be extremely remote [9].

Within a 5-mile radius of the plant only one municipal water supply uses ground water. That system is operated by the Spring Valley Water Company, in Rockland County, New York. Other wells in the area of the plant are used for industrial and commercial purposes. The rock formations in the area and elevations of wells relative to the plant are such that accidental releases of materials at IPEC that could impact soil or groundwater quality will not reach these sources of groundwater [9].

Only two reservoirs within a 5-mile radius are used for municipal water supplies. The first, Camp Field Reservoir, is the raw-water receiving basin for the system which serves the city of Peekskill. This system uses the Catskill Aqueduct and Montrose Water District as alternative sources of water supply. The second reservoir, the impounding reservoir for the Stony Point water system, serves the towns of Stony Point and Haverstraw, and the villages of Haverstraw and West Haverstraw, all on the west side of the Hudson River. The Stony Point system is connected to the Spring Valley Water Company to provide an alternative source of supply [9]. Although there are wetlands near the IPEC site, no regulated wetlands exist on the site [10].

4.1.4 Climatology

The climate of the Lower Hudson region (south of the confluence of the Mohawk and Hudson Rivers at Troy, NY) is generally humid continental [11]. Winter temperatures average below freezing during January and February. Cold air damming east of the Appalachians leads to protracted periods of cloud cover and precipitation east of the range, primarily between the months of October and April.

Annual precipitation is fairly even throughout the year across New York state. Most of the Hudson River Basin receives about 40 inches annually [11]. Weather in New York is heavily influenced by two air masses: a warm, humid one from the southwest and a cold, dry one from the northwest. In the hotter months, large, long-lived complexes of thunderstorms can invade the state from Canada and the Great Lakes, while tropical cyclones can bring rains and winds from the southwest during the summer and fall. On average, hurricane impacts in the state occur once every 18 to 19 years, with major hurricane impacts every 70 to 74 years. An average of ten tornadoes touch down in New York annually [12].

4.1.5 Meteorology

Meteorological conditions in the area of the IPEC site were determined prior to start-up of Unit 1 during a two-year test program conducted by New York University under contract with Con Edison from 1955 to 1957 [11]. Data derived during this program provide a basis for preliminary determination of annual average gaseous waste release limits, calculation of exposure from potential accidents, and design criteria for storm protection.

The validity of conclusions based upon that test program was verified by a second test program completed in October 1970. The meteorological analysis also includes data from periods of November 26, 1969 through October 1, 1970, and January 1, 1970 through December 31, 1971. These data were used in evaluating the effects of gaseous discharges from the plant during normal operations and during a postulated loss-of-coolant accident. In addition, data supplied by the U.S. Weather Bureau at the Bear Mountain Station regarding the meteorological conditions during periods of precipitation were used to evaluate the rainout of fission gases into surface water reservoirs following a postulated loss-of-coolant accident. The evaluations indicated that the site meteorology provides adequate diffusion and dilution of any released gases [11]. When wind speeds are approximately 4 meters per second or less the direction of air flow is generally up the Hudson River valley during the day and down the Hudson River valley during the night.

Meteorological conditions at the site are continuously monitored with instruments mounted on a 100-meter tower located southwest of the Training Center. Data on temperature, wind speed, wind direction, and atmospheric stability are recorded and displayed in the control room. Precipitation accumulation is also recorded by a separate instrument at ground level.

4.2 IPEC Conceptual Site Model

As described in MARSSIM, the Conceptual Site Model (CSM) is a synthesis of known site information regarding the hydrogeology and groundwater flow domain, potential contaminants and their sources, mechanisms for their release to the environment, pathways for contaminant transport and exposure, and the potential human or environmental receptors of contamination. The CSM considers locations of known or suspected contamination, types and concentrations of contaminants, potentially contaminated media, mechanisms for their transport, locations of potential receptors, and locations of potential reference (background) areas.

The CSM is used to guide the site characterization process, including determinations regarding the media to be sampled and the chemical analyses to be performed, development of strategies for collection of data and recommendation of future investigation activities to fully assess the nature and extent of contamination [2]. As more site information is developed, the CSM must be evaluated and may be modified [2].

4.2.1 Hydrogeologic Setting

In general, flow at the top of a watershed is largely downward and flow at the bottom, near the bank of the river that drains the watershed, is largely upward. In the mid-section of the watershed, flows are predominantly horizontal. Temporal and spatial variations in areal recharge rates, rock heterogeneities, and tidal influences cause local variations from these general flow patterns.

In some areas of the IPEC site groundwater flow patterns are dominated by shallow anthropogenic features. These features include foundation walls, pumping from building foundation drains, subsurface utilities, and flows in the Intake Structures and Discharge Canal. According to construction plans, lean concrete was used as backfill material for foundation walls in a number of locations, primarily associated with Unit 1 structures. At Units 2 and 3, it appears that soil or blast rock was the material most commonly used as backfill against foundation walls [8]. These various backfill materials have differing capacities to transmit and store groundwater and the contaminants that it may transport.

The IPEC site is situated on a west-facing hillside that forms a portion of the eastern slope of the Hudson River Valley. Plant construction required reduction in bedrock surface elevations and installation of foundation drains. These man-made features have lowered the groundwater elevations beneath the station relative to pre-construction conditions, restricting groundwater on site to flow to the west toward the Hudson River; and not to the north, east or south. Groundwater contaminants released on the site will remain limited to the IPEC property until their ultimate discharge to the Hudson River because the subsurface migration of site contaminants is controlled by groundwater flow, which, in turn, is governed by the post-construction hydrogeologic setting [8].

A release of tritium to the subsurface was discovered in August of 2005 during construction activities at Unit 2 associated with the Independent Spent Fuel Storage Installation Project. The release was investigated during a 2-year comprehensive hydrogeologic study that included installation and sampling of monitoring wells at forty-one locations across the site. The wells at most of these locations were constructed with multiple discrete sampling intervals totaling more than 140, to allow determination of the vertical distribution of hydraulic heads and contaminants. Eighteen monitoring wells that had been installed prior to the 2005 discovery were also sampled during the investigation.

Investigation of the release traced contamination back to two separate structures, the Unit 2 and Unit 1 Spent Fuel Pools (SFPs). Two commingled plumes resulting from these SFP releases have been fully characterized and their extent, activity and impact determined. The two primary radionuclide contaminants of interest were found to be tritium and strontium. Other contaminants, including radionuclides of cesium, cobalt, and nickel, have been found in a subset of groundwater samples, but always in conjunction with tritium or strontium [8]. Complete documentation of the investigation of groundwater contamination is provided in the 2008 report by GZA GeoEnvironmental, Inc [8]. The GZA report and other information pertaining to environmental conditions at the station have been provided to the NYSDEC, Westchester County Department of Health, NRC, U S Geological Survey (USGS) and communicated to the public through the website “safesecurevital.com”.

A Long-Term Groundwater Monitoring program was initiated in 2008 and has been in operation since that time. Most site wells are sampled and analyzed approximately four times each year, although some are sampled more frequently and some less frequently, depending upon their locations relative to the axis of the contaminant plumes and the trends of measured contaminant concentrations. The objectives of the monitoring program are to comply with the intent of the NEI Industry Groundwater Protection Initiative (NEI 07-07), characterize current groundwater contaminant migration to the river, provide timely detection of potential future releases associated with the existing infrastructure and confirm that natural attenuation of the contaminant plumes is progressing by demonstrating an overall reduction in activity over time.

4.2.2 Potential Sources of Environmental Contamination

Potential sources of soil and groundwater contamination, both radiological and non-radiological, include the Spent Fuel Pools, various tanks, drains and pipelines containing radioactive liquids; radiologically contaminated components and equipment stored in temporary RCAs (SeaLand containers); tanks, drums and equipment containing fuel oil, diesel fuel, hydraulic oil and lubricating oil; station transformers containing mineral oil dielectric fluid; and spills from chemical storage areas, machine shops and paint shops.

Contaminants from some of these sources potentially could be released directly to the soil where infiltrating precipitation would transport them to the groundwater. Residual contamination on plant equipment and impermeable surfaces potentially could be mobilized in storm water and infiltrate the groundwater. Minor spills and leaks of fuel oil, diesel fuel, hydraulic oil and lubricating oil have occurred from various pieces of mobile equipment during the operating history of the station.

4.2.2.1 Potential Non-Radiological Contaminant Sources

There are no current known unauthorized releases to the environment in plant systems containing non-radiological contaminants. SSCs that have in the past or may in the future have a potential to release such materials to the environment include:

- Underground and above ground storage tanks containing fuel oil, lube oil, hydraulic oil and other petroleum products
- Transformers containing mineral oil dielectric fluid
- Mobile and stationary hydraulic systems
- Oil-filled mechanical equipment
- Chemical and drum storage areas
- Road salt storage facilities
- Storm drain system

Figure 4 shows the locations and preliminary non-radiological classifications of hazardous material storage areas and large transformers containing mineral oil dielectric fluid in the area of Units 1 and 2. Figure 5 shows the locations and preliminary non-radiological classifications of the same types of facilities in the area of Unit 3. Figure 6 shows the arrangement and preliminary radiological and non-radiological classification of the Storm Drain System, which is common to all units at the station. Figure 7A, Figure 7B and Figure 7C show the preliminary non-radiological classifications of the same station facilities shown in Figure 3A, Figure 3B and Figure 3Figure 3C.

Table 1 and Table 2 provide two different sources of information summarizing the recorded releases to the environment of non-radiological contaminants that have occurred during the operating history of IPEC. Table 1 contains information either as reported to Entergy during its acquisition of the station or occurring during Entergy's period of ownership, as reflected in site records. With respect to Table 1, releases that occurred within and were completely isolated in various buildings at the station were immediately and completely remediated and are not listed because they pose no risk of soil or groundwater contamination that might require investigation at the time of decommissioning. Table 1 includes IPEC Corrective Action Reports pertaining to releases of hazardous materials outside of buildings at the station.

Table 1: Summary of Corrective Action Reports Concerning Non-Radiological Incidents at Indian Point Energy Center

Report Number	Date	Description of Incident
SOR 91-3-109	5/25/1991	100-gallon oil release to Unit 3 Turbine Hall floor and 20 gallons to Discharge Canal
SOR 91-3-144	11/27/1991	Overflow of Unit 3 R4D4 turbine lube oil separator sludge tank
CR-IP2-1996-01004	4/23/1996	20-gallon oil release
CR-IP2-1996-01211	5/16/1996	1-gallon oil release containing 139 ppm PCBs
CR-IP2-1996-01942	8/20/1996	10-gallon oil release to manhole 9475
CR-IP2-1996-02073	9/10/1996	20-gallon waste oil release at Service Center
CR-IP2-1996-02167; CR-IP2-1996-02167 CA	9/20/1996	500-gallon oil release to soil at Fabrication Shop
CR-IP2-1997-01217	4/18/1997	< 5-gallon oil release on access road to Unit 2 and Unit 3
CR-IP2-2000-01957	3/21/2000	35-gallon hydraulic oil release from forklift
CR-IP2-2006-04701	8/4/2006	Diesel fuel discovered in Transformer Yard manholes
CR-IP2-2007-00747	2/9/2007	Several gallons transformer oil released from Unit Auxiliary Transformer
CR-IP2-2010-06803	11/7/2010	21 Main Transformer explosion
CR-IP2-2016-05252	8/21/2016	3-gallon fuel oil release at GT1 Fuel Oil Dump Tank
CR-IP3-1995-00524	3/15/1995	Oil sheen in Discharge Canal emanating from crack in east wall
CR-IP3-1996-02113	9/19/1996	Oil release on the South Gate Access Road at MTF
CR-IP3-1997-02006	8/7/1997	0.5-gallon hydraulic oil released to roadway from forklift
CR-IP3-2005-01089	3/14/2005	> 5 gallons transformer oil released from circulating oil pumps
CR-IP3-2007-01844	4/6/2007	5-gallon release of oil from 31 Main Transformer
CR-IP3-2008-00686	3/8/2008	Downed power pole near Training Building
CR-IP3-2008-00691	3/9/2008	20-gallon release of oil from damaged transformer on downed power pole
CR-IP3-2015-02913	5/9/2015	Fire and explosion on 31 Main Transformer
CR-IP3-2015-03259	5/29/2015	Oil release to the Hudson River from 31 Main Transformer fire on 5/9/2015

Table 2 is a list of spills at IPEC that are recorded in the NYSDEC on-line Spills Database. This database contains records from January 1978 to March 15, 2019. Copies of documentation related to each incident in Table 1 and Table 2 are available through electronic links to this report. The list of IPEC corrective action reports (CRs) in Table 1 and NYSDEC list of spill reports in Table 2 are not intended to be correlated. Some of the IPEC CRs relate to small releases of materials that are less than the NYSDEC reportable quantity and do not appear in the NYSDEC Spills database. Some NYSDEC spill reports relate to release of materials (freon, refrigerant, etc.) that had no lasting impact to soil or groundwater. While CRs may have been written for these incidents, they are not listed because of their minor significance. Some NYSDEC spill reports may relate to materials that were not identified by the search terms used in searching the IPEC CR database.

Table 2: New York Department of Environmental Conservation Spill Reports

Spill No.	Date	Incident
8706397	10/28/1987	10 gallons of unknown petroleum to surface water
9607728	9/19/1996	No. 2 fuel oil to soil
9700806	4/18/1997	5 gallons motor oil to soil
505387	8/2/2005	Motor oil and gasoline to soil
506872	9/6/2005	7 gallons cutting oil to soil
507707	9/27/2005	5 gallons dielectric fluid to soil
511465	12/29/2005	60 pounds freon to soil
601100	4/28/2006	Dielectric fluid to soil
601272	5/3/2006	35 pounds refrigerant to air
604472	7/20/2006	Freon to air
604838	7/28/2006	1 gallon ethylene glycol to soil
606124	8/28/2006	Unknown petroleum to soil
606684	9/11/2006	Gasoline to soil
607382	9/28/2006	3 gallons ethylene glycol to soil
614048	3/31/2007	4 gallons lube oil to soil
700825	4/20/2007	5 gallons dielectric fluid to soil
708071	10/23/2007	Petroleum to discharge canal
708465	10/30/2007	5 gallons freon to soil
710310	12/28/2007	1 gallon refrigerant to air
713655	3/26/2008	Lube oil to soil
802547	6/5/2008	100 pounds hypochlorite to soil
806540	9/11/2008	0.75 antifreeze to pavement
1005274	8/10/2010	30 pounds freon to air
1008306	11/8/2010	100 gallons transformer oil to soil and surface water
1102988	6/15/2011	0.01 gallon hydraulic oil to soil

Spill No.	Date	Incident
1105302	8/9/2011	5 gallons unknown material to soil
1108693	10/11/2011	19 pounds freon to air
1110316	11/19/2011	Unknown petroleum to surface water
1111217	12/16/2011	0.01 gallons motor oil to soil
1113561	3/3/2012	Unknown petroleum to surface water
1216119	3/6/2013	Lube oil to surface water
1302229	6/1/2013	19 pounds freon to air
1303054	6/20/2013	1 gallon antifreeze
1306474	9/19/2013	Cable oil to soil
1400249	4/8/2014	4 gallons hydraulic oil to soil
1407802	10/29/2014	1 gallon antifreeze
1501459	5/9/2015	Transformer oil to soil and surface water
1511986	3/17/2016	Unknown petroleum
1602271	6/5/2016	Unknown hazardous material to water
1605205	8/21/2016	3 gallons fuel oil to soil
1606485	9/30/2016	Lube oil to surface water
1607729	11/8/2016	2 pounds dielectric fluid to soil
1706804	10/12/2017	1 gallon ethylene glycol to pavement
1708394	12/5/2017	27 pounds hydrazine

The following is a summary of known sources of non-radiological contamination which have been identified by review of available site records in addition to those listed in Tables 1 and 2.

Unit 2 Transformer Yard

Plant personnel have reported observing visible staining of bluestone and a sheen on surface water that collects in the U2 Transformer Yard (Figure 3A, cell B5 Figure 4) during periods of heavy precipitation [13] [14]. Con Edison managed the condition by removing visibly stained soil and deploying sorbent pigs around the area storm drain during periods when surface drainage accumulated [15].

Diesel fuel was discovered in manholes in the Unit 2 Transformer Yard in August 2006 (CR-IP2-2006-04701).

A bushing failure and fire in the 21 Main Transformer in 2010 resulted in release of mineral oil dielectric fluid to soil and the Discharge Canal. The dielectric fluid did not contain PCBs. (CR-IP2-2010-06803; NYSDEC Spill No. 1008306) [16] [17] [18].

Unit 2 Turbine Generator Building

The deluge system that automatically engaged to extinguish the 21 Main Transformer fire in 2010 released a large volume of water and fire-suppression foam. As a result, water and transformer oil overflowed the berm containing the transformer. The released oil infiltrated the local soil and apparently accumulated in pockets beneath the Turbine Generator

Building foundation (Figure 3A, cells B5 to B6). Groundwater monitoring wells were installed to investigate and remove the accessible oil. The contaminated trap rock within the transformer berm was removed, an impermeable liner was applied to the berm floor and walls, clean trap rock was placed in the berm and a replacement 21 Main Transformer was installed [19] [16].

Unit 3 Transformer Yard

Oil staining was observed on the 31 and 32 Main Transformers (Figure 3A, cell B3), their concrete footings and surrounding soil in 2000 during a radiological and hazardous condition assessment of the Unit 3 site [20].

In 2005 several gallons of non-PCB transformer oil leaked from several of the transformer oil circulating pumps and their associated isolation valve gland nuts (CR-IP3-2005-01089).

A bushing failure in the 31 Main Transformer in 2007 resulted in a 5-gallon release of transformer dielectric fluid (CR-IP3-2007-01844; NYSDEC Spill Report 700825). This transformer was replaced following the bushing failure.

An internal fault and fire in 2015 in the 31 Main Transformer resulted in an oil release to soil and the Discharge Canal (CR-IP3-2015-02913; CR-IP3-2015-03259; NYSDEC Spill Report 1501459) [16]. The mineral oil dielectric fluid released during the 2007 and 2015 transformer failures did not contain PCBs [17] [21] [22].

The deluge system that automatically engaged to extinguish the fire in 2015 released a large volume of fire-suppression foam and water. As a result, water and transformer oil overflowed the berm containing the transformer, infiltrated surrounding soil, entered the local storm drain and flowed to the Discharge Canal. The contaminated trap rock within the berm was removed, an impermeable liner was applied to the berm floor and walls, clean trap rock was placed in the berm and a replacement 31 Main Transformer was installed.

Unit 3 Turbine Generator Building

In 1989 3,500 gallons of lubricating oil was released from a corroded return pipeline beneath the Unit 3 Turbine Generator Building [23]. Oil also was released from the R4D4 Sludge Tank to the Unit 3 Turbine Generator Building floor (Figure 3A, cells B3 to B4) and the Discharge Canal in 1991 (SOR-91-3-109). In 1995 oil was detected issuing from floor drains of the Unit 3 Turbine Generator Building 5-foot elevation and seeping into the Discharge Canal (CR-IP3-1995-00524). The oil was removed from the floor drains and the drains were repaired. An investigation by Foster Wheeler, a hydrogeologic consultant, could not provide a definitive solution without performing additional studies [24].

As of April 1999, no additional oil was evident and no seepage into the discharge canal had been detected. Buried safety-related utilities are located in the area where oil had been released and further subsurface investigation there would have risked damage to vital plant equipment. Because of this condition, the absence of further evidence of oil seepage into the canal and the apparent low risk of environmental impact, inspectors from the NYSDEC agreed that there was no benefit to be gained from additional investigation. A monitoring program in nearby groundwater monitoring wells was established [20] [24].

Maintenance Training Facility

Fuel oil was released from an underground storage tank on the south side of the Maintenance Training Facility (Figure 5, cell E4) in 1996 (CR-IP3-1996-02113). The tank and contaminated soil were removed, and the tank was replaced with a 1,000-gallon above ground storage tank. Two soil borings were advanced in the area in 2000. Low levels of petroleum constituents were detected in two soil samples collected from one of the soil borings. No petroleum constituents were detected in groundwater samples collected from monitoring wells installed in the soil borings [14].

Buchanan Service Center

Twenty gallons of waste oil were released at the Buchanan Service Center (Figure 4, cell D3) in September 1996 (CR-IP2-1996-02073).

A fueling station for IPEC vehicles was formerly located in the southeast portion of the Service Center Yard (Figure 4, cell D3). Four underground storage tanks containing petroleum products were removed from the area in 1998. Two 4,000-gallon tanks contained gasoline, one 4,000-gallon tank contained diesel fuel and one 275-gallon tank contained waste oil [14]. A chemical waste storage area also was located in the area and also has been removed.

Soil samples from three soil borings and groundwater samples from two monitoring wells were collected for chemical analysis in 2000 during a subsurface investigation of the area. Results of the sample analysis indicated soil and groundwater contamination in the area of the removed underground storage tanks [14]. In January 2001 Con Edison proposed to the NYSDEC a program of semi-annual monitoring of groundwater from the two monitoring wells [15].

Bulk Oil Storage Tanks 11 and 12

Both Bulk Storage Tank 11 and the adjacent Tank 12 (Figure 4, cell C3) are large (2,350,000-gallon) above ground steel tanks that were constructed in 1962 and originally stored No. 6 fuel oil for use on site. A release of approximately 80,000 gallons of No.6 fuel oil from Tank 11 occurred in 1980. Surrounding contaminated soil was removed and a lined berm was constructed around the tank [13]. In 1993 both Tank 11 and Tank 12 were drained. Tank 12 was retired from service at that time and Tank 11 began to store No. 2 fuel oil [14]. Tank 11 was retired from service in 2006. In 2000 two surface soil samples were collected from the area of the tanks. Two soil borings were also drilled near the tanks and groundwater monitoring wells were installed in the soil borings. Low levels of petroleum constituents were detected in the soil and groundwater samples [14].

Hellgate Transformer

The Hellgate Transformer (Figure 4, cell B5) is located near the southwest corner of the Gas Turbine 1 Building. Oil staining was noted on the concrete pad supporting this transformer during a Phase 1 environmental site assessment of Units 1 and 2 in 2000 [13]. Sampling and chemical analysis of surface soil adjacent to the slab identified contamination with petroleum constituents and low levels of PCBs [14]. The Hellgate Transformer was removed from the station on May 1, 2000, the concrete pad was steam cleaned, and the unit was replaced with an air-cooled transformer. Five cubic yards of visibly stained soil adjacent to the pad were removed on May 3, 2000 and shipped to a licensed waste disposal facility [15].

Gas Turbine 1 Generator Building

In January 2000 during a Phase 1 environmental site assessment of Units 1 and 2 oil seepage from surrounding soil was identified in a portion of the underground Utility Tunnel located between the Unit 1 Turbine Generator Building and the Gas Turbine 1 Generator

Building (Figure 4, cell B5). The area above this section of the tunnel contains the fill manifold for the Gas Turbine 1 fuel oil storage tanks and is also where 55-gallon drums of oil had been stored previously [13]. Two soil borings were drilled in the area of the storage tank fill manifold and Utility Tunnel in March 2000, during a Phase 2 environmental site assessment of Units 1 and 2. Petroleum constituents were detected in soil samples collected from the soil borings and groundwater sampled from monitoring wells constructed in the soil borings [14].

Removal of the oily soil was not attempted because the oil was determined not likely to migrate as it is probably heavy No. 6 fuel oil, and because of the presence of subsurface barriers consisting of a utility tunnel wall to the south, the Discharge Canal wall to the west, a rock outcrop to the east and the Unit 1 Turbine Generator Building foundation to the north. In addition, subsurface utilities in the area, which are nuclear safety-related, preclude the safe excavation of contaminated soil while the plant remains operational. Instead, a semi-annual program of groundwater monitoring, removal of free-phase oil from surrounding monitoring wells (if present) and reporting to the NYSDEC was initiated [15].

Contractor Fabrication Shop

In September 1996 approximately 500 gallons of heating oil were released to the soil outside of the Contractor Fabrication Shop (Figure 3A, cell C3) (CR-IP2-1996-02167). Hazardous material personnel from both Units 2 and 3 responded to clean up the oil.

Mixed Waste Storage

Radiologically contaminated waste containing PCBs is classified as Mixed Waste. Several containers of Mixed Waste are stored in the 108-foot elevation of the Unit 1 Containment Building (Figure 3A, cell C5) in the reactor internals storage pit; on the 108-foot elevation of the Unit 1 Containment Building floor; at the 70-foot elevation of the Unit 1 Containment Building behind Nuclear Boiler #11; and on the 70-foot elevation of the Unit 1 Fuel Storage Building floor at the #12 Excess Make up Cooler [25] [26].

On September 5, 2001 NYSDEC issued a Consent Order to Con Edison for improper storage of the Mixed Waste [27]. On September 6, 2001 Entergy acknowledged in a letter to NYSDEC that it is successor in title to Con Edison relative to Indian Point Units 1 and 2, and that it accepts the obligations of the terms and conditions of the Consent Order. Terms of the settlement of the order included payment of a fine and a commitment to "make reasonable and diligent efforts to locate and contract with an authorized commercial mixed waste treatment/disposal facility that will accept the waste". Entergy was granted authorization to continue on-site storage of the Mixed Waste so long as it is stored "in a manor protective of the public health, safety and welfare and of the environment and in accordance with the requirements of the Nuclear Regulatory Commission pertaining to mixed waste storage and treatment" [27] [25] [26].

Substation A

Substation A (Figure 4, cell B5) previously may have contained a transformer containing PCB dielectric oil (Entergy personnel interview). Samples of surface soil within the top six inches within the substation area were analyzed for PCBs and petroleum constituents in 2000. No PCBs were detected but petroleum constituents were detected [14].

Former Transformer Area West of Unit 1 Turbine Generator Building

The Former Transformer Area West of the Unit 1 Turbine Generator Building (Figure 4, cell A5) formerly contained transformers that may have held PCB-containing oil. Samples of surface soil within the top six inches in the former transformer area were analyzed for PCBs and petroleum constituents in 2000. A low level of Arochlor 1260 was detected in one sample and several petroleum constituents were detected [14].

Soil Pile North of Unit 3 Steam Generator Mausoleum

In 2000 an approximately six-foot high pile of soil posted as a lead hazard was identified in a lay-down area southwest of the Training Center and north of the Unit 3 Original Steam Generator Storage Facility (Figure 3B, Cell C4) [20]. Unit 3 staff identified the area as one where sandblasting of equipment presumably coated with lead-based paint occurred. The soil pile has been removed from the site.

Gas Turbine 2 & 3 Area

In 2000 1.1 ppm of an unidentified petroleum constituent was detected in a groundwater sample from a monitoring well in the Gas Turbine 2&3 area (Figure 4, cell E3), near the Gas Turbine 2 Used Oil Storage Tank. No analyzed compounds were detected in groundwater from this well in 1998 or 1999 [14].

4.2.2.2 Potential Radiological Contaminant Sources

There are two major sources of radiological contamination of groundwater: the Unit 1 and Unit 2 Spent Fuel Pools. A release of tritium to the subsurface was discovered in August of 2005 during construction activities at Unit 2 associated with the Independent Spent Fuel Storage Installation Project. A two-year comprehensive hydrogeologic investigation of the IPEC site was conducted by GZA GeoEnvironmental, Inc. (GZA) [8]. The investigation was initiated in response to the discovery of elevated Tritium (H-3) in MW-111 and in seepage from a hairline crack in the concrete of the Unit 2 Spent Fuel Pool south wall. The investigation was widened to include analysis of the release of Strontium-90 (Sr-90) and other radionuclides from the Unit 1 SFP.

A Long-Term Monitoring Program (LTMP) was established in 2008 to monitor the groundwater plumes that developed as a result of leaks from these two pools and has been in operation since that time. A Sr-90 plume extends from the Unit 1 SFP to the Hudson River and a tritium plume extends from the Unit 2 SFP to the Hudson River [28] [29]. The objectives of the LTMP are consistent with those of the Nuclear Energy Institute 07-07 Industry Groundwater Protection Initiative. The LTMP was designed to collect sufficient data to 1) monitor radioactivity levels in the groundwater, 2) monitor groundwater elevations and flowrates, 3) monitor groundwater near SSCs for timely detection of potential future leaks and 4) monitor changes in the plumes to evaluate the effects of Monitored Natural Attenuation (MNA) [30].

The LTMP currently consists of a network of monitoring wells at forty-five (45) locations. Most of the locations are single or multi-level wells. Other locations include building drains and manholes. The groundwater monitoring locations are sampled either quarterly, semi-annually or annually. All groundwater samples are analyzed at an off-site laboratory for H-3, Sr-90 and for gamma emitters. In addition, several wells located in the Unit 1 plume are also analyzed for Nickel-63 (Ni-63). The data gathered from the LTMP is evaluated against plant-derived Investigation Levels (ILs) and summarized by GZA in quarterly reports to IPEC. If ILs are reached or exceeded, actions such as re-analysis, re-sample or initiation of an investigation can be implemented [31].

There are no known current ongoing leaks to the environment from plant systems containing radioactive liquids that are not monitored by the LTMP. SSCs that have a direct or indirect pathway to ground and have the potential to impact the environment have been captured by the LTMP.

Figure 8A, Figure 8B and Figure 8C show the preliminary radiological classifications of the same station facilities shown in Figure 3A, Figure 3B and Figure 3C, respectively.

The following transient events have occurred at the station since establishing the LTMP [30]. With the exception of the anticipated increase in leakage from the Unit 1 Fuel Pool caused by a raised water level to support removal of fuel rods, the remaining events were identified by the LTMP and the NRC 80-10 program [32]. Each of the events has been investigated and resolved through various corrective actions.

- Increased Unit 1 West Pool leakage in 2008 due to raised pool level for fuel rod removal.
- Waste Distillation Tank valve release in the Unit 1 Fuel Storage Building in 2009.
- RWST/Reverse Osmosis Skid surface spill in Unit 2 in 2009.
- Unit 3 Fuel Storage Building H-3 ventilation condensate release to the roof, draining to manholes in 2010.
- Unit 1 Chemical Systems Building Sample Sink overflow in 2011.
- Unit 2 Fan Building 51’ floor release in 2012.
- Unit 3 Primary Auxiliary Building Air Operated Valve steam release in 2012.
- Unit 1 Containment Spray Annulus overflow in 2013.
- Unit 2 Fan Building 51’ floor drain over fill in 2014.
- Unit 2 Reverse Osmosis/Reject spill in 2016.
- Unexpected increase in H-3 concentration in MW-33

The following incidents are listed in the 10 CFR 50.75(g) file maintained by IPEC to document operational occurrences that may have significance for decommissioning.

Table 3: Summary of Events Concerning Radiological Incidents at IPEC

Report Number	Date	Description of Incident
N/A - Binder A, Loc. 4	Late 1970s to early 1980s	Fuel Storage Building (FSB) alleyway - Resin sluicing from drumming station contaminated the area periodically
N/A - Binder A, Loc. 6, & Binder B	Not Identified	Unit 2 to Unit 1 Underground transfer line, potential leaks
N/A - Binder A, Loc. 15	Not Identified	Blowdown alt. path to U1 flash tank, failed gasket in Emergency Diesel Generator (EDG), underground leaks
Memo from J Kelly to Distribution	Oct 1978	Investigation of contamination identified onsite. Refueling Water Storage Tank (RWST) area, FSB east wall, FSB/Primary Auxiliary Building (PAB)/VC pit.
NSE 79-3-077-WDS	May 1979	Septic fields were dug up and moved to a location near met tower.
Memo IP-DQ-15839	Dec 1981	Investigation of contamination identified onsite, and follow-up to 1978 report.
N/A - Binder A, Loc. 1	1986	Waste Hold-up Tank backup into MOB drain line.
Memo to File 3-342	Mar 1986	Unit 3 storm drains - Evaluation of radioactivity in the storm drain system
Draft SAO-132 Report on U2 SFP leak	1990 - 1992	SAO-132 report describes initial findings of the Unit 2 SFP leak and corrective actions
Memo IPI-91DM-279	Sep 1991	Report of contaminated soil found at the base of the Unit 3 RWST hill.
Memo IP-CHM-91-027	Dec 1991	Investigation results of storm drain contamination at IP3
IP3-RES-93-331 -360, SOR 93-371	Jul 1993	Primary Water Storage Tank (PWST) soil contamination and remediation
SOR-94-275, NRC Inspection Report 94-30	1994	Unit 1 Spent fuel, components, stored in pools; water leakage to underground areas

Report Number	Date	Description of Incident
N/A - Binder A, Loc. 19 & 19a	Apr 1994	Boric Acid Building (BAB) fence line - Co-60 and Cs-137 on north shoulder of BAB
N/A - Binder A, Loc. 6, & Binder B	Jun 1994	RWST Rock Pad 80' - Potential leaking transmitter boxes, valve maintenance, flange leaks
N/A - Binder A, Loc. 5	Jul 1994	Aux Boiler Feedpump Alleyway - Overhead line steam blowout in past
N/A - Binder A, Loc. 17	Mid 1990s	Maintenance Outage Building (MOB)/FSB alleyway - Leakage from Spent Fuel Pool (SFP)
DER-99-1009	May 1999	Contamination found in curtain drain around U3 Outage Support Building (OSB)
Indian Point 2 Steam Generator Tube Failure Lessons-Learned Report (TAC No. MA9163)	Feb 2000	A single tube in Steam Generator 24 at Unit 2 failed, leading to a transient and shutdown of the reactor.
N/A - Survey form	Mar 2000	Spill on pavement from bladder from NaOH tank, frisk & smears clean, water had Co-60
DER-00-1894	Aug 2000	Leakage from Unit 3 95' FSB through concrete to soil
Backup SFP Cooling System Action Plan	Apr 2003	Leak onto Monitor Tank pad and onto driveway next to pad
TID-03-008	Aug 2003	Unit 2 - Leakage from inside PAB into alleyway.
CR-IP2-2005-03557, CR-IP2-2005-03986, Draft SAO-132 report, GZA 2008 report	Sep 2005	Unit 2 - A hairline crack several feet in length was found at approximately 60-foot level of Unit 2 spent fuel pool south wall. Elevated H-3 in MW-111, GZA Hydrogeological investigation
CR-IP2-2006-01682	Apr 2006	Aux Condensate drained to the ground because the steam trap did not work properly.
CR-IP2-2006-01896	Apr 2006	IP-2 Supplemental Spent Fuel Pool Cooling System Secondary Side Tritium contamination & leakage. 200 Gallons of 20,000 pCi/L water spilled to asphalt and storm drain.

Report Number	Date	Description of Incident
CR-IP2-2016-00564	Feb 2016	Unit 2 Reverse Osmosis/Reject spill
CR-IP3-2006-03818	Dec 2006	IP-3 Back Up Spent Fuel Pool Cooling System Leak - water leaked out of valves open for freeze protection. Less than 1 gal. leak total. One water sample 1E-7 uCi/cc Co-60. Non-detect tritium.
CR-IP2-2007-00921	Feb 2007	Minor dripping from PW-612&613 to the dirt under what is to be the concrete floor of the truck bay area.
CR-IP3-2017-00297	Jan 2017	31 Waste Hold Up Tank Overflow
CR-IP3-2017-02632	May 2017	Nuclear Tank Farm - RWST Manway Leak
CR-IP3-2017-03202 CR-IP3-2017-03208	Jun 2017	Ops was valving in 31 Mixed Bed for flushing and CH-352 and CH-305 leaked
CR-IP3-2017-04289	Sep 2017	Nuclear Tank Farm - Level transmitter LT-181 leaked
CR-IP3-2017-05288	Nov 2017	Nuclear Tank Farm -Aux Condensate valve UH-99 leaked
CR-IP2-2018-03624 IPEC Quarterly Long-Term Groundwater Monitoring Report No. 39	Jun 2018	Unexpected increase in H-3 concentration in MW-33

N/A as used in this table denotes that the reviewed document did not have a report type number associated with it, rather was a copy of log notes, memos, or letters.

4.2.2.3 Groundwater Impacts

The Unit 1 groundwater plume is characterized by Strontium from legacy leakage of the Unit 1 fuel pools [28]. The Unit 1 pools were drained in 2008. The West Pool leaked water under the Unit 1 Fuel Storage Building and is responsible for the Strontium groundwater plume discovered in 2006. The previous owner of the station had identified leakage from the West Fuel Pool in the 1990's and was managing the leakage by collecting it from a reconfigured footing drain that surrounds the Unit 1 Fuel Storage Building. However, based on the groundwater investigation begun in 2005, it has been determined that the pool leakage management program was not successful in collecting all of the leakage. As a result, contaminants released from the Unit 1 Spent Fuel Pools, have been detected at various locations near the site of Unit 1. In response to the finding that the leak collection system was not functioning as believed, Entergy promptly initiated a program to reduce the concentration of radionuclides in the Unit 1 West Pool water, beginning in April 2006, via enhanced demineralization water treatment [8].

The final defueling of the Unit 1 SFPs in 2008 resulted in a noticeable increase in Strontium levels proximate to the SFPs, as well as indications of downgradient increases in Strontium plume activity. This behavior was predicted given the requirement to temporarily raise the pool levels to allow removal of fuel rods, thus increasing the leakage rate from the pools. By the end of 2008, all the fuel rods were removed from the Unit 1 pools and the pool water was drained. The Sr-90 levels proximate to the pool have since decreased and, as expected, the levels downgradient of the pool are also returning to, or are already less than, pre-defueling levels as the additional Sr-90 contaminated water flushes through the groundwater flow system [30].

The predominant radionuclide found in the groundwater plume from the Unit 2 SFP is Tritium [29]. The releases there were due to: 1) historic damage in 1990 to the SFP liner, with subsequent discovery and repair in 1992; and 2) a weld imperfection in the stainless-steel Transfer Canal liner identified by Entergy in September 2007 and repaired in December 2007. To the extent possible, the Unit 2 pool liner has been tested and repairs have been completed. The identified leakage has therefore been eliminated and/or controlled.

Specifically, Entergy has: 1) confirmed that the 1990 damage to the liner was repaired by the prior owner of the station and the liner is no longer leaking; 2) installed a containment system (collection box) at the site of the leakage discovered in 2005, which precludes further release to the groundwater; and 3) completed an exhaustive inspection of the Transfer Canal liner that identified a weld imperfection and leak in the liner. The canal was subsequently drained to stop the leak and the weld was repaired by Entergy in December 2007. Therefore, all identified Unit 2 SFP leaks have been addressed. Water likely remains between the Unit 2 SFP stainless steel liner and concrete walls, and thus additional discharge of pool water cannot be completely ruled out. However, if it exists, the data indicate that the discharge must be small and of little impact to the groundwater [8].

In 2005, the Unit 2 Spent Fuel Pool contained water with Tritium concentrations of up to 40,000,000 pCi/L. The highest Tritium levels measured in groundwater (up to 601,000 pCi/L) were detected early in the investigation at MW-30 [8]. This location is immediately adjacent to the IP2 SFP and directly below the hairline shrinkage cracks discovered in 2005. From there, the Tritium contamination tracks with downgradient groundwater flow through the Unit 2 Transformer Yard, under the Discharge Canal and discharges to the Hudson River between the Unit 1 and Unit 2 Intake Structures [29]. Because of the high concentration of Tritium in the SFP, a leakage rate of only a few liters per day will result in the Tritium groundwater plume observed on the site [8].

Given the likely ages of the SFP leaks identified and characterized during GZA's hydrogeological investigation, it is probable that the Unit 2 (Tritium) and the Unit 1 (Strontium) plumes had reached steady state conditions prior to the beginning of the LTMP. The data gathered by the LTMP generally demonstrates a clear, overall decrease in total plume activity since the beginning of the LTMP, with some perturbations caused by the previously identified leaks presented in Section 4.2.2.2. Therefore, the overall, long-term reductions in activity in both plumes are consistent with the recommended remedial technology of Monitored Natural Attenuation (MNA) [33].

4.2.3 Contaminant Transport

Groundwater flows from areas of higher head to areas of lower head along the path of least resistance. At the IPEC site, groundwater discharges into the Discharge Canal, the Hudson River, and to system underdrains. As evidenced by site groundwater contours, groundwater discharge is not uniform along the river or the Discharge Canal. That is, in areas of the site with higher transmissivities (lower resistance to flow) the aquifer will discharge more water than in other areas with lower transmissivities. Additionally, seasonal fluctuations in the water table due to changes in rainfall and snow melt will alter groundwater discharge patterns and changes in river elevation cause additional short-term variations in groundwater discharge rates [8]. Consequently, the rate of groundwater discharge is not constant in time.

Groundwater flow at the site occurs in two distinct hydraulic regimes that are vertically connected: bedrock and overburden soils. Most of the groundwater flow and contaminants are found in bedrock fractures. No evidence of large-scale solution features associated with karst systems has been identified in the rock cores obtained from any of the bedrock borings advanced at the site. If they existed, such features would likely be preferential flow paths where contaminants would be transported more easily. GZA's on-site investigatory findings are consistent with those expected for the Inwood Marble, in which groundwater flows through generally small-aperture inter-connected fractures that occur within only about one or two percent of the rock mass [8].

The second groundwater flow regime is in the unconsolidated soil deposits. This regime includes groundwater found in native glacial and alluvial deposits, as well as groundwater flow in anthropogenic materials such as blast rock fill. Residual contaminants can be stored in the pore space within the unsaturated zone of this material near contaminant source areas. Infiltrating precipitation periodically mobilizes these residual contaminants to the underlying saturated zone where impacts to groundwater can continue for some time after the source of contamination has been remediated.

The major groundwater transport mechanism is advection. Sorption retards the migration of non-radiological and radiological contaminants other than Tritium relative to groundwater advection rates, while Tritium, within hydraulically interconnected fractures, can migrate at rates that approach the groundwater seepage velocity [8].

The bedrock underneath the site is sufficiently fractured and interconnected to allow the aquifer to be viewed as a non-homogenous and anisotropic porous medium on the scale of the site. Based on this finding, and because advection is the controlling transport mechanism, small-scale heterogeneities in the fractured rock aquifer do not significantly alter the direction of groundwater flow, and consequently contaminant migration in the saturated zone [8].

Construction activities at IPEC have removed portions of the bedrock to allow placement of relatively impermeable concrete building foundations, excavated utility trenches with relatively permeable backfill, and installed storm drain, and foundation drain systems that divert natural groundwater flow. These structures complicate local groundwater and contaminant flow paths on site but do not alter their ultimate discharge to the Hudson River.

While radionuclide contaminants have been detected at various locations on the IPEC site, both the on-site and off-site analytical testing, as well as the groundwater elevation data, demonstrate that groundwater contaminants are not flowing off-site and do not flow to the North, East or South. Groundwater flow and thus contaminant transport is West to the Hudson River via 1) groundwater discharge directly to the river; 2) groundwater discharge to the Discharge Canal, and 3) groundwater infiltration into storm drains which discharge to the canal [8].

The LTMP groundwater analytical data demonstrate that the concentrations of radiological contaminants discharging to the river from the IPEC site are a small fraction of the permitted effluent limits. At the locations where contaminated groundwater discharges to the Hudson River, the concentrations have been, and will continue to be, reduced by sorption, hydrodynamic dispersion and radiological decay [8].

4.2.4 Potential Contaminant Receptors

Currently, there is no drinking water exposure pathway to humans that is affected by contaminated groundwater at Indian Point Energy Center. Potable water sources in the area of the station are not presently derived from groundwater or the Hudson River, a fact confirmed by the New York State Department of Health [34].

The principal exposure pathway to humans is from the assumed consumption of aquatic foods (i.e., fish or invertebrates) taken from the Hudson River in the vicinity of Indian Point. The annual calculated exposure to the maximum exposed hypothetical individual, based on application of Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Release of Reactor Effluents for the Purpose of Evaluation of Compliance with 10 CFR Part 50, Appendix I," relative to the liquid effluent aquatic food exposure pathway is currently, and is expected to remain, less than 0.1 % of the NRC's "As Low As is Reasonably Achievable (ALARA)" guidelines of Appendix I of Part 50 (3 mrem/yr total body and 10 mrem/yr maximum organ). This level is considered to be negligible with respect to public health, safety, and the environment [34].

Fish and crabs are sampled in the Hudson River as a component of the station's radiological environmental monitoring program (REMP). Each of the samples is analyzed for gamma-emitting radionuclides, Sr-90 and Ni-63. Aquatic vegetation samples are also analyzed for gamma-emitting radionuclides. Review of the 2015, 2016 and 2017 Annual Radiological Environmental Operating Reports for IPEC Units 1, 2 and 3 indicates that no radioactivity attributable to IPEC was detected in any REMP samples collected for those years [35] [36] [37].

In addition, the annual REMP reports for those years also present rolling 10-year summary tables of Cs-137 concentrations in fish and invertebrates. Those tables show that there has been no Cs-137 detected in any indicator or control sample since 2005 [35] [36] [37]. The absence of Cs-137 in indicator and control samples of fish and invertebrates taken for the IPEC REMP program is further evidence that there is no significant exposure from discharge of radioactive effluents from the station, with respect to public health, safety and the environment.

IPEC Conceptual Site Model Supporting Documents

2013 Qtr. 1 LT GW Monitoring Report.pdf
2013 Qtr. 2 LT GW Monitoring Report.pdf
2013 Qtr. 3 LT GW Monitoring Report.pdf
2013 Qtr. 4 LT GW Monitoring Report.pdf
2014 Qtr. 1 LT GW Monitoring Report.pdf
2014 Qtr. 2 LT GW Monitoring Report.pdf
2015 Annual Radioactive Eff. Release Rpt.pdf
2015 Qtr. 3 LT GW Monitoring Report.pdf
2015 Qtr. 4 LT GW Monitoring Report.pdf
2016 Annual Radioactive Eff. Release Rpt.pdf
2016 Qtr. 1 LT GW Monitoring Report.pdf
2016 Qtr. 2 LT GW Monitoring Report.pdf
2016 Qtr. 3 LT GW Monitoring Report.pdf
2016 Qtr. 4 LT GW Monitoring Report.pdf
2017 Annual Radioactive Eff. Release Rpt.pdf
2017 Qtr. 1 LT GW Monitoring Report.pdf
2017 Qtr. 2 LT GW Monitoring Report.pdf
2017 Qtr. 3 LT GW Monitoring Report.pdf
2018 Qtr. 1 LT GW Monitoring Report.pdf
CR-IP2-2005-03986, Elevated H-3 Levels at MW-111.pdf
CR-IP2-2016-00564, U2 Groundwater Event Root Cause Eval.doc
CR-IP2-2016-00564, U2 Groundwater Event.pdf
CR-IP2-2018-03624, H-3 Results in MW-33 Have Increased.pdf
Groundwater flow model.pdf
Groundwater Interim status report.pdf
Item 32 - EarthTech Report 2000.pdf
NRC Inspection Report 2015003.pdf
NRC Inspection Report 2016003.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf
PCB Mixed Waste

5 MARSSIM Investigation Process

The HSA is the first step in a process described in MARSSIM. The purpose of MARSSIM is to provide a standardized approach to demonstrating compliance with a dose or risk-based regulation. MARSSIM provides guidance to prepare and implement a statistically valid site investigation and survey plan that will support termination of the NRC operating license for a facility [2].

5.1 Approach and Rationale

The primary tasks in the site investigation and survey process are:

- Historical Site Assessment
- Scoping Survey
- Characterization Survey
- Remedial Action Support Survey
- Final Status Survey
- Regulatory Agency Confirmation and Verification

A phased approach is used in the site investigation process so that the information developed during each successive task benefits from and builds upon information from previous tasks. If a scoping survey determines that an area impacted by radioactivity at levels above background or other contaminants above background is smaller or the contaminants are fewer or less concentrated than had been identified by the HSA, fewer resources and less effort can be expended during the characterization survey and later tasks. In this way, investigation can proceed most efficiently. A brief discussion of each of the tasks in the MARSSIM process follows [2].

5.1.1 Historical Site Assessment

The intent of an HSA is to document a comprehensive investigation that identifies and evaluates historical information pertaining to events that may have resulted in contamination during the operating history of the subject site. Contaminants of interest include both radiological and non-radiological materials and may have impacted SSCs of the plant or environmental media within the owner-controlled property. The information developed by the HSA is evaluated to identify and differentiate, through meaningful classifications, potentially "impacted" areas of the site [2]. Non-impacted areas are defined by implication.

As defined in MARSSIM, which pertains only to plant derived residual radioactivity, a "non-impacted" area is any area "where there is no reasonable possibility (extremely low potential) of residual contamination." An "impacted" area is defined in MARSSIM as "any area that is not classified as non-impacted" and "Areas with a possibility of containing residual radioactivity in excess of natural background or fallout levels." Areas determined to be impacted are further classified (based on preliminary information) as Class 1, Class 2 or Class 3, depending upon the apparent extent of their impact [2].

As defined in NUREG-1575, Class 1 areas are those that have, **or had prior to remediation**, a potential for radioactive contamination (based on site operating history) or known contamination (based on previous radiation surveys) at concentrations greater than the site release criteria. Examples of Class 1 areas include:

- site areas previously subjected to remedial actions,
- locations where releases are known to have occurred,
- former burial or disposal sites,
- waste storage sites, and
- areas with contaminants in discrete solid pieces and with high specific activity.

Class 2 areas are those that have, **or had prior to remediation**, a potential for radioactive contamination or known contamination, but not at concentrations expected to exceed the site release criteria. To justify changing the classification from Class 1 to Class 2, there should be measurement data that provides a high degree of confidence that no individual measurement would exceed the site release criteria. Examples of areas that might be classified as Class 2 include:

- locations where radioactive materials were present in an unsealed form,
- potentially contaminated transport routes,
- areas downwind from stack release points,
- upper walls and ceilings of buildings or rooms subjected to airborne radioactivity,
- areas handling low concentrations of radioactive materials, and
- areas on the perimeter of former contamination control areas.

Class 3 areas are potentially impacted areas that are expected to contain levels of residual radioactivity at only a small fraction of the site release criteria, based on site operating history and previous radiation surveys. Examples of areas that might be classified as Class 3 include buffer zones around Class 1 or Class 2 areas, and areas with very low potential for residual contamination but with insufficient information to justify a non-impacted classification [2].

To classify the relative risk that SSCs or areas may have been impacted with non-radiological contaminants, the same approach described in MARSSIM for radiological contaminants has been applied, with the addition of a fourth "impacted" classification designated as "Isolated". Isolated SSCs or areas are contained within buildings or structures. These SSCs or areas are shielded from processes such as precipitation, wind, runoff, infiltration and seepage that would otherwise distribute non-radiological contaminants to the natural environment. There is the potential that structural elements or building materials within these isolated SSCs or areas may have been impacted by release of contaminants within them but the risk of contamination of the natural environment from such incidents is negligible. The Isolated classification is applied solely to non-radiological contamination because the hazards unique to radiological contamination exist whether or not the contamination is isolated.

In lieu of radiological site release criteria non-radiologically contaminated areas can be evaluated for classification by considering various applicable regulatory criteria such as the

NYSDEC Water Quality Standards for Surface Waters and Groundwater [3], NYSDEC Soil Cleanup Objectives [4], U.S. EPA National Primary Drinking Water Standards [5] or U.S. EPA Regional Screening Levels [6]. The prefix NR (Non-Radiological) has been applied to these classifications to differentiate them from MARSSIM-based classifications.

A classification of "NR impacted" does not imply a determination that a RCRA facility investigation (RFI) or corrective action will be required under the Federal Resource Conservation and Recovery Act (RCRA) or a NYSDEC environmental remediation program. The classification has been assigned to some areas or SSCs because materials used or stored there have the potential to contaminate media that could require remediation at the time of decommissioning. Scoping and characterization activities conducted at that time will determine the need for clean-up of areas or SSCs where non-radiological contaminants may have been released to the environment. Only those areas or SSCs where contamination is shown to exist at concentrations greater than the site closure criteria will become RCRA or NYSDEC Areas of Concern (AOCs).

NR Class 1 areas have the greatest potential for contamination and, therefore, receive the highest degree of investigative effort using a graded approach, followed by NR Class 2, NR Class 3 and NR Isolated areas. Non-impacted areas do not receive any level of investigative effort because they have no plausible potential for residual contamination [2].

5.1.2 Scoping Survey

Scoping surveys are conducted after the HSA is completed and consist of measurements, sampling, and analysis. The number and locations of these measurements, samples, and analyses are based on the HSA data and professional judgment. If the results of the HSA indicate that an area is Class 3 or NR Isolated, and no residual contamination at concentrations greater than a small fraction of the site release criteria is found during the scoping survey, the area may be downgraded to Non-Impacted or confirmed as Class 3 and a Class 3 characterization survey and final status survey (FSS) would be performed. However, if the scoping survey of an area with a preliminary classification of Class 3 or NR Isolated identifies residual contamination at concentrations greater than a small fraction of the site release criteria, the area must be reclassified as Class 2 (or Class 1) and a characterization survey performed, followed by an FSS with rigor appropriate for the class.

5.1.3 Characterization Survey

This type of survey is a detailed environmental characterization of an area. The characterization survey is a comprehensive survey and generates substantial data. This survey includes preparation of a reference grid, systematic (random) as well as judgment (biased) measurements, and surveys of different media (e.g., surface soils, groundwater, interior and exterior surfaces of buildings). The decision as to which media will be surveyed is a site-specific decision addressed throughout the site investigation process and informed by the results of the HSA [2].

The data obtained during the site characterization survey will inform follow-on phases of the site decommissioning. The radiological or other contaminant information developed will be used to determine the scope and extent of contamination, to evaluate and select potential methods for any required remediation, and to determine the classification and ultimate disposal method for waste generated during the remediation. Ultimately, the characterization survey will provide sufficient information to successfully design a License Termination Plan that will be approved by federal and/or state regulatory agencies to terminate the site operating license with the goal of release of the site for unrestricted use [2].

5.1.4 Remedial Action Support Survey

If an area is adequately characterized and is determined to be contaminated at concentrations greater than applicable site release criteria, remediation/decontamination ordinarily will be required before the area can be released for unrestricted use. A remedial action support survey is performed while remediation is being conducted and guides the cleanup in a real-time mode. The remedial action support survey also provides the basis for determining when a site or survey unit is ready for the FSS [2].

5.1.5 Final Status Survey

The FSS is used to demonstrate final compliance with release criteria regulations. The primary objectives of the FSS are to select/verify survey unit classification and to demonstrate that the potential dose or risk from residual contamination is less than the release criteria for each survey unit. The FSS process consists of four principal elements:

- Planning
- Design
- Implementation
- Assessment

Although the term Final Status Survey, as defined in MARSSIM, pertains to the assessment of residual radioactivity, it is being expanded in this HSA to encompass sampling and analysis of non-radiological contaminants as well. Additionally, since “release criteria” may also refer to other than license termination criteria, for non-radiological contaminants, the broader “applicable site release criteria” will be used throughout this report.

5.1.5.1 Planning

Final Status Survey planning includes review of the HSA and other pertinent characterization information to establish Data Quality Objectives (DQOs), the final survey unit classification, and the radionuclides or other contaminants of concern. The HSA reviews historical use of licensed and hazardous material at the facility and the levels of potential contamination through personnel interviews and review of plant records and presents preliminary area classifications based on this data. After scoping and characterization surveys are completed, a final classification is assigned to site buildings and areas based upon their potential for contamination. Areas that have no reasonable potential for residual contamination from site operations receive a final classification of non-impacted [2].

As described above, areas or SSCs with reasonable potential for residual contamination from site activities are classified as impacted areas. Impacted areas are divided into three, and in some instances four (for non-radiological contaminants), classifications based upon the potential contamination levels and how the contamination is distributed. Areas with the same classification are broken into survey units. Survey units are fundamental elements for which FSSs are designed and executed. The classification of a survey unit ordinarily dictates how large it can be in terms of surface area [2].

Before the survey process can proceed to the design phase, concentration levels that correspond to the maximum annual radiological dose criterion prescribed by federal regulation 10 CFR 20.1402 (25 mrem/yr) must be established. These concentrations are established for either surface contamination (measured in disintegrations per minute [DPM] per 100 cm^2) or volumetric contamination (measured in pCi/gm). The concentrations are used in the survey design process to establish the minimum sensitivities required for the available survey instruments and techniques, and in some cases, the spacing of fixed measurements or number of samples to be collected within a survey unit. Surface or volumetric concentrations that correspond to the maximum annual dose criteria are referred to as DCGLs which are site-specific license termination and site release criteria [2].

5.1.5.2 Design

After the license termination criteria are established, a survey design is developed and documented for each survey unit. The plan is documented as a Survey Package that selects the appropriate survey instruments and techniques to provide adequate coverage of the survey unit through a combination of scans, fixed measurements, sampling and analysis. The Survey Package implements the DQOs for its survey unit and provides instructions for carrying out the survey. The Survey Package documents the assessment of survey results, the statistical basis used to determine if the survey unit contains residual contamination at concentrations greater or less than the DCGLs or other applicable site release criteria, and the review and approval of the package [2].

Where radionuclides or other contaminants of concern are present in background at levels that impact the DCGLs or other applicable site release criteria, the planning effort may include establishing appropriate reference areas to determine baseline concentrations for those radionuclides or other contaminants and their variability. A reference coordinate system may be used for documenting locations where measurements were made and to allow replication of survey efforts if necessary. This process ensures that data of sufficient quantity and quality are obtained to make decisions regarding the suitability of the survey design assumptions and whether or not the unit satisfies the applicable site release criteria. Approved site procedures will direct this process to ensure consistent implementation and adherence to applicable requirements [2].

5.1.5.3 Implementation

Survey implementation is the process of carrying out the survey plan (package) for a given survey unit. Implementation consists of scan measurements, fixed measurements, and collection and analysis of samples. Scan measurements for residual radioactivity will always be made, while fixed measurements and sampling may not be necessary. Data are collected and stored using a data management system [2].

5.1.5.4 Assessment

Data assessment includes data Verification and Validation (V&V), review of survey design bases, and data analysis. For a given survey unit, the survey data are evaluated to determine if the residual activity levels in the unit are less than the applicable release criteria and if any areas of elevated activity exist.

In some cases, data evaluation will serve to show that all of the measurements made in a given survey unit are below the applicable site release criteria. In this case, demonstrating compliance with the applicable site release criteria requires little more in the way of analysis [2].

In other cases, residual radioactivity or other contamination may exist with measurement results both above and below the applicable site release criteria. In these cases, statistical tests may be performed to inform the decision as to whether or not the survey unit satisfies the applicable site release criteria. The statistical tests that might be required to make decisions regarding the residual activity levels remaining in a survey unit relative to the applicable site release criteria ordinarily are considered in the survey design to ensure that a sufficient number of measurements are collected.

Quality assurance and control measures are employed throughout the FSS process to ensure that all decisions are made on the basis of data of acceptable quality [2].

5.1.6 Regulatory Agency Confirmation and Verification

The regulatory agencies responsible for the site often confirm whether the site is acceptable for release and any limitations thereon. This confirmation may be accomplished by the agency or an impartial party contracted by the agency. Although some actual measurements may be performed by the agency or its contractor, much of their work for confirmation and verification may involve evaluation and review of documentation and data from completed survey activities. The evaluation may include site visits to observe survey and measurement procedures or split sample analyses by the regulatory agency's laboratory. Therefore, accounting for confirmation and verification activities during the planning stages is important to each type of survey [2].

5.2 Documents Reviewed

Appendix A contains an all-inclusive list of files consisting of all the supporting documents reviewed during the generation of this report. For ease of access, the supporting documents are also listed in their relevant subsections of the HSA.

5.3 Property Inspections

Site tours were conducted in 2018 during the weeks of December 3 through 7, December 10 through 14 and in 2019 during the week of January 21 through 25. These tours included observing SSCs on each elevation of the U1 Chemical Systems, Nuclear Services, and Fuel Storage Buildings; the U2 Fuel Storage, Maintenance Outage, and Primary Auxiliary Buildings; and U3 Administration, Fuel Storage, Outage Support, Primary Auxiliary and Radioactive Machine Shop Buildings.

Tours of the following areas were also conducted:

- Plant Yard
- Unit 1 Former Septic Leach Field
- RAM Pen 1 and 2
- Yard 8
- Retired RAM Pen
- U2 and U3 FSB Alleyways
- U2 and U3 Transformer Yards
- 302 Exemption Area

5.4 Personnel Interviews

Several station employees were consulted during the preparation of this HSA regarding information related to their work responsibilities and their recollection of historical contamination events that may have significance during plant decommissioning. A brief summary of those consulted, by employee experience, and the nature of the information discussed is contained in Table 4.

Table 4: IPEC Employee Discussion Subjects

Employee Experience	Discussion Subjects
Operations Management (U1/2), Outage Management	Operational events, general plant knowledge
Environmental Specialist	Environmental programs, hazardous waste management, 21 Main Transformer fire in 2010 and 31 Main Transformer fire in 2015
R/W Shipping	Radiation protection, R/W operations, operational events
Station Operations Staff	Plant maintenance, operational events, U2 S/G tube rupture
U2 Operations	Operational events, general plant knowledge
R/W Supv, RP Supv, Env. Mgr, U1 Supt	Operational events, general plant knowledge, U1 curtain drains, MOB flooding, U1 alleyway
RP Mgmnt	Septic system, U3 PAB/VC/FSB Junction, operational events
Maintenance, RP, EP	Operational events, general plant knowledge

Based on the consultations with those listed above, there do not appear to be any undocumented incidents of contamination at the station that would be significant for its decommissioning.

6 Assessment Findings

Two hundred ten (210) areas of interest on the IPEC site have been evaluated for potential impact by either radiological or non-radiological contaminants. The areas of interest are subdivided into the following categories: Building or Structure (65). Chemical and Drum Storage Area (4), Exterior Area (16), Oil-Filled Mechanical Equipment (15), Site-Wide Impacts (6), Storage Tanks (83) and Transformers (21).

For non-radiological contaminants, seventy-one (71) of the two hundred ten (210) areas of interest are classified as Non-Impacted. Areas that have been classified preliminarily as having the potential for being Impacted with non-radiological contaminants include eighty one (81) Isolated areas, six (6) Class 3 areas, twelve (12) Class 2 areas, and forty (40) Class 1 areas.

For radiological contaminants, one hundred thirty-nine (139) of the areas of interest have been determined to be Non-Impacted. The remaining seventy-one (71) areas have been classified preliminarily as having the potential for being Impacted with radiological contamination as either Class 1 (22 areas), Class 2 (8 areas), Class 3 (41 areas) or a combination of these classifications where more than one class is appropriate. One (1) area, namely the Unit 2 Transformer Yard, has been assigned a split (Class 1 / Class 2) designation due to the size of the yard and the relatively small area that has been contaminated during plant operation.

None of the impacted areas is considered to be an imminent threat to human health or the environment that would warrant immediate corrective action. Appendix B summarizes the non-radiological findings, including preliminary area classifications for those areas potentially impacted. Appendix C summarizes the radiological findings, including preliminary area MARSSIM classifications for those areas potentially impacted. The map coordinates listed in Appendices B and C refer to the areas shown in the figures.

The following sections provide a detailed breakdown of non-radiological and radiological assessment findings, by category (i.e. site-wide impact, building or structure, exterior area, etc.). For each area of interest classified as Impacted, the sections provide a description and history, known or potential contaminants, potentially contaminated media, preliminary classification, recommended future investigation activities, and support documents. The timing for implementation of the recommended future investigation activities is to be determined by the site based on the schedule for decommissioning activities.

6.1 Non-Impacted Areas

6.1.1 Non-Radiological

Based on identified historical use there is a very low probability that non-radiological contaminants have impacted the environment in the area of the following list of site facilities. Therefore, these facilities have been assigned a preliminary classification of NR Non-Impacted.

- Protected Area Cafeteria
- Emergency Operations Facility
- Generation Support Building
- MAC 4 Security Access Building
- MAC 8 Security Access Building
- Maintenance Outage Building
- Meteorological Tower
- Meteorological Tower Building
- Nuclear Service Building (MP&C)
- Former Con Edison Visitor Center
- Outage Contractor Offices
- Protected Area Access Facility
- Retired Sewage Treatment Plant
- Security Facility
- Security Main Gate
- Spare Transformer Pad
- TLM Building (Environmental and Security)
- Training Building
- Material Storage Building 1
- Material Storage Building 2
- Warehouse
- ISFSI Pad
- Plant Yard
- Radioactive Material Pen 1
- Radioactive Material Pen 2
- Sally Port
- Yard 8
- Sewage Collection System
- Waste Distillate Tanks
- City Water Tank
- Unit 1 Chemical Systems Building
- Unit 1 Containment Building
- Unit 1 Fuel Storage Building
- Unit 1 Nuclear Service Building
- Unit 1 Screenwell House
- Unit 1 Superheater and Administration Building
- Unit 1 Former Septic Leach Field
- Unit 2 Boric Acid Evaporator Building
- Unit 2 Containment Building
- Unit 2 Control Building
- Unit 2 Fuel Storage Building
- Unit 2 Original Steam Generator Storage Facility
- Unit 2 Primary Auxiliary Building
- Unit 2 Simulator

- Unit 2 Fuel Storage Building Alleyway
- Unit 2 Retired Radioactive Material Pen
- Unit 2 Condensate Storage Tank
- Unit 2 Fire Water Storage Tank
- Unit 2 Monitor Tanks
- Unit 2 Primary Water Storage Tank
- Unit 2 Refueling Water Storage Tank
- Unit 3 Administration Building
- Unit 3 Condensate Polisher Building
- Unit 3 Containment Building
- Unit 3 Control Building
- Unit 3 Fuel Storage Building
- Unit 3 Original Security Access Building
- Unit 3 Original Steam Generator Storage Facility
- Unit 3 Outage Support Building
- Unit 3 Primary Auxiliary Building
- Unit 3 Retired Security Access Building
- Unit 3 302 Exemption Area
- Unit 3 Fuel Storage Building Alleyway
- Unit 3 Vapor Containment-Fuel Storage Building- Primary Auxiliary Building Junction
- Unit 3 Condensate Polishing Facility Process Tanks
- Unit 3 Condensate Storage Tank
- Unit 3 Fire Water Storage Tank
- Unit 3 Monitor Tanks
- Unit 3 Primary Water Storage Tank
- Unit 3 Refueling Water Storage Tank
- Unit 3 Training Fire Water Tank

6.1.2 Radiological

Based on identified historical use there is a very low probability that radiological contaminants have impacted the following list of site facilities and areas. Therefore, these features have been assigned a preliminary classification of MARSSIM Non-Impacted.

- Emergency Operations Facility
- Generation Support Building
- Hazardous Material Storage Building
- MAC 4 Security Access Building
- MAC 8 Security Access Building
- Maintenance Training Facility
- Material Storage Building 1
- Material Storage Building 2
- Meteorological Tower
- Meteorological Tower Building
- Nuclear Service Building (MP&C)

- Receiving Warehouse
- Salt Barn
- Security Main Gate
- TLM Building (Environmental & Security)
- Training Building
- Warehouse
- U2 Intake Structure
- U2 Simulator
- U2 Hazardous Waste Storage Bin
- U3 Intake Structure
- U3 Hazardous Waste Storage Building
- Storage Tanks (73)
- Transformers (21)
- Oil Filled Equipment (15)

6.2 Site-Wide Non-Radiological and Radiological Impacts

The impacts listed in this section are distributed throughout the station and their occurrence is not restricted to one building, area or component.

6.2.1 Asbestos-Containing Material

<u>Description and Historical Use</u>

Asbestos Containing Material (ACM) may be present in pump and valve fittings and gaskets, pipe and wire wrap, floor and ceiling tiles, siding and in roofing materials. The material has been used in various locations throughout the plant such as the Turbine Generator and Primary Auxiliary Buildings. ACM has been abated on an opportunistic basis during outages. Nonetheless, some residual ACM continues to be present.

<u>Known and Potential Contaminants</u>

The non-radiological contaminant is Asbestos. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

<u>Potentially Contaminated Media</u>

- Building Materials
- Floor Tiles
- Penetration Sealants
- Pipe Insulation
- Roofing Materials
- Tank Insulation

<u>Preliminary Classification</u>

Because of the human health risks associated with exposure to airborne ACM, areas containing the material are assigned a preliminary classification of NR Isolated.

<u>Recommended Future Investigation Activities</u>

Prepare an inventory of ACM in site SSCs.

<u>Supporting Documents</u>

Ltr from NY Dept of Labor to NYPA dtd 5-25-00 re Variance.PDF
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf

6.2.2 Lead and Lead-Based Paint

Description and Historical Use

Various plant equipment, component and structural steel coatings contain lead-based paint. Lead blocks and blankets are used for shielding in some High Radiation Areas, including in the Reactor Containment, Fuel Storage and Turbine Generator Buildings and in SeaLand containers in temporary radioactive waste storage areas.

Lead-acid batteries are components of the station emergency DC electrical supply. Waste lead-acid batteries are stored in the Hazardous Material Storage Building (Figure 3B). In-service batteries are located in switchgear rooms in the Turbine Generator Buildings and in the Security Facility. Various small batteries for lighting and backup power are located inside buildings throughout the station.

Known and Potential Contaminants

The non-radiological contaminant is Lead. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Batteries
- Lead Paint
- Lead Shielding
- Universal Wastes

Preliminary Classification

Because of the human health risks associated with exposure to lead, areas containing the material are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

- Prepare an inventory of SSCs with lead-based paint coatings.
- Inventory lead blankets, shielding blocks and lead-acid batteries.

Supporting Documents

IP3 Mixed Waste TSDF Permits 6-8-2000.pdf
TLG's Draft Report - Radiological and Hazardous Condition Assessment of ....pdf

6.2.3 Mercury-Containing components

Description and Historical Use

Electrical switches, relays, thermostats, thermometers, gauges, mercury vapor lamps, electronic components, etc. containing mercury are used in various locations throughout the station, including the Reactor Containment, Primary Auxiliary and Turbine Generator Buildings.

Known and Potential Contaminants

The non-radiological contaminants are Mercury and Laboratory Chemicals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Mercury-Containing Components
- Thermometers
- Gauges
- Mercury vapor lamps
- Fluorescent Lights

Preliminary Classification

Because of the human health risks associated with exposure to mercury and mercury vapor, areas containing the material are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Prepare an inventory of mercury-containing components in site SSCs.

6.2.4 PCB-Containing Components

Description and Historical Use

Polychlorinated Biphenyls (PCBs) were used in electrical transformers manufactured between 1929 and 1977 [38]. The original transformers at the station were filled with PCB-containing dielectric fluid. These transformers were either replaced during the early 1980s after the use of PCBs was discontinued or drained and refilled with mineral oil dielectric fluid.

Most transformers at IPEC, including the Unit 2 and Unit 3 Main Transformers, have been tested and found to be PCB-free. A few pieces of equipment, such as some electrical buses and transformer bushings at Unit 3 [24], could not be tested and may contain PCBs. Because the original transformers were provided with PCB-containing dielectric fluid and may have leaked, there is a potential that legacy contamination of soil or groundwater with PCBs could exist. PCB-containing fluorescent light ballasts and capacitors have been used in various locations throughout the station. Most of these components have been removed from the site but a few remain.

The Unit 1 control rod drive motor system and Nuclear Service Building ventilation equipment contain PCBs. These components remain in the Unit 1 RCA.

As discussed in Subsection 4.2.2.1, Mixed Waste containing PCBs is stored in the Unit 1 Containment Building.

Known and Potential Contaminants

The non-radiological contaminant is PCB-Containing Dielectric Oil.

Potentially Contaminated Media

- Capacitors
- Fluorescent Light Ballasts
- PCB-Containing Dielectric Oil
- Transformer Bushings

Preliminary Classification

Because of the human health risks associated with exposure to PCBs, areas with components containing the material, including the original transformers at the station, are assigned a preliminary classification of NR Class 2.

Recommended Future Investigation Activities

- Test electrical equipment that has not been shown to be PCB-free.
- Prepare an inventory of PCB-containing components in site SSCs.

Supporting Documents

21 xfmr pcb results.jpg
31 Main Transformer Spill, etc Closeout.pdf

31 xfmr PCB results.jpg
CR-IP2-1996-01211, 1 gallon oil spill containing 139 ppm PCBs.pdf
Emails re PCB Search and Calculation .PDF
IP2 Mixed Waste Consent Order.pdf
IPEC Transformer Failure and PCBs.docx
Memo to P.Gauron, PC and C.Wells re NYPA Acquisiton .PDF
PCB Mixed Waste.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf
TLG - NYPA Due Diligence Information.pdf

6.2.5 Sewage Collection System

Description and Historical Use

The Sewage Collection System has undergone changes since its initial construction as part of Unit 1. The system consisted of piping, the Retired Sewage Treatment Plant and the Former Septic Leach Field located near the Waterfront Warehouse. As detailed in the discussion about the U1 Former Septic Leach Field (Section 6.3.2.3.1), the septic field was removed to support U3 construction activities. At that time the Sewage Treatment Plant was retired in place, and all sewage from the station is now collected on-site, monitored for radioactivity, and pumped to the Buchanan sewage treatment plant [39].

This section addresses the system components that still exist, including the Retired Sewage Treatment Plant, but not the remains of the Former Septic Leach Field.

Known and Potential Contaminants

The radionuclides of concern (ROCs) are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

High levels of radioactivity, relative to assumed release criteria, were found in the Former Septic Leach Field soils due to the fact that the soils acted as a filter and concentrator. The remainder of the Sewage Collection System is assigned a preliminary classification of MARSSIM Class 3 based on the discussion above and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the systems structures and components of the Sewage Collection System.
- Radiological analysis of sediment samples found in system components.

Supporting Documents

Buchanan Waste Water Line documents.PDF

6.2.6 Storm Drain System

Description and Historical Use

The Storm Drain System conveys drainage from roads, parking areas, roof drains and grassy surfaces throughout the station to a total of twelve outfalls (eight to the Discharge Canal and four to the Hudson River) (Figure 6).

The storm drain system is known to have become radiologically contaminated from varying sources throughout the operating history of the station. Entries in the 50.75(g) file provide radiological analyses of sediment samples taken in manholes and catch basins throughout the system. The results of those analyses show levels that are in excess of the screening values for soil, which while not directly applicable, provide some perspective. Manholes and catch basins are accumulators of sediment so it is not surprising that elevated levels of radioactivity have been identified in these components. It is very unlikely that the piping and wall components of the system will have surface contamination levels in excess of the surface contamination DCGLs.

Known and Potential Contaminants

Low levels of PCBs were detected in the North Curtain Drain surrounding a portion of the Unit 1 Fuel Storage Building in 1994 [14]. This curtain drain formerly emptied into the Storm Drain System. Water from the drain is sampled routinely and now routed through a carbon filtration system prior to direct discharge to the Discharge Canal.

Drainage from station parking lots and roads may transport petroleum constituents and metals. The non-radiological contaminants are Oil and Grease, Petroleum Constituents, PCBs and RCRA Metals.

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Groundwater
- Storm Drain Sediment
- Storm Water
- Concrete
- Steel
- Drain Pipes

Preliminary Classification

Because the Storm Drain System receives drainage from all parts of the Protected Area it has the potential to contain a wide variety of contaminants, both non-radiological and radiological. As such, despite monitoring, some contaminants have accumulated in catch basin sediment traps within the system. Therefore, the Storm Drain System is assigned a preliminary classification of NR Class 3 and MARSSIM Class 2.

Recommended Future Investigation Activities

- Chemical analysis for the list of potential contaminants in samples of sediment in storm drain catch basins, pipes and near system outfalls, and in samples of soil and groundwater near areas determined to be impacted.
- Direct measurements and contamination surveys of the systems structures and components, after the sediment has been removed from the system.
- Gamma walkover survey to identify areas with elevated activity.
- Radiological analysis of soil and/or sediment samples taken in areas with elevated activity and in a random fashion.

Supporting Documents

CR-IP2-1996-01942, 10 gallon oil spill to manhole 9475 near old command post.pdf
CR-IP2-2000-09854, Rad Effluents Audit 00-03-F.pdf
CR-IP2-2006-01896, H-3 Leak from BUSFPC System to FSB Alleyway.pdf
CR-IP2-2006-04701, Diesel oil in manholes and pipe segments in transformer yard.pdf
Drain A-2 50.75(g) Notebook Entry.pdf
IPEC SPDES permits.pdf
Map 2 - Site Plan.pdf
Site Storm Drains Evaluation.pdf
Site Storm Drains.pdf
Storm Drain Sampling.pdf

6.3 Unit 1 Impacts

6.3.1 Non-Radiological Impacts

6.3.1.1 Building or Structure

6.3.1.1.1 U1 Contractor Fabrication Shop

Description and Historical Use

Contractors from various trades such as pipe-fitting, sheet metal and insulation used this shop area. The Unit 1 Contractor Fabrication Shop is shown in Figure 3A, cell 3C.

In September 1996 approximately 500 gallons of fuel oil spilled to soil outside of the shop (CR-IP2-1996-02167). Hazardous material response personnel from both Units 2 and 3 responded to clean up the oil.

Known and Potential Contaminants

The non-radiological contaminants are Cutting Oil, Petroleum Constituents, RCRA Metals, and Fuel Oil.

Potentially Contaminated Media

- Building Materials (Floor)
- Soil
- Groundwater

Preliminary Classification

Releases that may have occurred inside the Contractor Fabrication Shop are not likely to have significantly impacted environmental media. However, residual contamination may remain from the release of a relatively large volume of fuel oil to soil in 1996. The area of the release is assigned a preliminary classification of NR Class 2.

Recommended Future Investigation Activities

Collect samples of soil and groundwater from locations adjacent to the shop and analyze the samples for Potential Contaminants.

Supporting Documents

CR-IP2-1996-02167 CA, 500 gallon oil spill to ground at Fab Shop.pdf
CR-IP2-1996-02167, 500 gallon oil spill to ground at Units 2 and 3.pdf

6.3.1.1.2 U1 Gas Turbine 1 Generator Building

Description and Historical Use

The Unit 1 Gas Turbine Generator formerly provided emergency electrical power to Unit 1 and has been retired. The location of the Unit 1 Gas Turbine 1 Generator Building is shown in Figure 3A, cell B4.

As discussed in Subsection 4.2.2.1, oil seepage was identified in a portion of the underground Utility Tunnel located between the U1 Turbine Building and the GT 1 Generator Building. The area above this section of the tunnel contains the fill manifold for the GT1 fuel oil storage tanks and is also where 55-gallon drums of oil had been stored previously [13].

Two soil borings were drilled in the area of the storage tank fill manifold and Utility Tunnel in March 2000, during a Phase 2 environmental site assessment of Units 1 and 2. Petroleum constituents were detected in soil samples collected from the soil borings and groundwater sampled from monitoring wells constructed in the soil borings [14].

Removal of the oily soil was not attempted because the oil was determined not likely to migrate as it is probably heavy No. 6 fuel oil, and because of the presence of subsurface barriers consisting of a utility tunnel wall to the south, the Discharge Canal wall to the west, a rock outcrop to the east and the Unit 1 Turbine Building foundation to the north. In addition, subsurface utilities in the area which are nuclear safety-related preclude the safe excavation of contaminated soil while the plant remains operational. Instead, a semi-annual program of groundwater monitoring, removal of free-phase oil from surrounding monitoring wells (if present) and reporting to the NYSDEC was initiated [15].

Known and Potential Contaminants

The non-radiological contaminant is Petroleum Constituents.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because contaminated soil and groundwater was confirmed by sampling in 2000 and was left in place, residual contamination may remain. The area adjacent to the Unit 1 Gas Turbine Generator Building where the fill manifold for the fuel oil tanks is located is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for Petroleum Constituents to determine the current environmental conditions in the area.

Supporting Documents

Draft Letter to NYSDEC re 4 AOCs at IPEC.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf

6.3.1.1.3 U1 Monitor House and Utility Tunnel

Description and Historical Use

The U1 Monitor House and Utility Tunnel (Figure 3A, cell D4) is at the eastern terminus of the underground Utility Tunnel through which pipes formerly conveyed fuel oil from the large Bulk Oil Storage Tanks 11 and 12 to the Main Boiler. Large volumes of No. 6 and No.2 fuel oil were transported through the Monitor House and Utility Tunnel between 1972 and 2006. However, no record of a release of hazardous material in this building has been found.

As discussed in Subsection 0, oil was observed seeping into a portion of the Utility Tunnel near the Unit 1 Gas Turbine 1 Generator Building in 2000. The source of the oil was presumed to be the fill manifold for the two 30,000-gallon fuel oil storage tanks for Gas Turbine 1, and/or releases from 55-gallon drums of oil which had been stored in the area previously [13].

Known and Potential Contaminants

The non-radiological contaminant is Petroleum Constituents.

Potentially Contaminated Media

- Building Materials (Floor)
- Piping
- Soil

Preliminary Classification

Valves controlling the flow of petroleum products from Bulk Oil Storage Tanks 11 and 12 are located within the U1 Monitor House and Utility Tunnel. Although leaks from these valves may have occurred, it is not likely that releases in the building have caused gross contamination of soil or groundwater. This building is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the building floor and interior for indications of staining, cracks or openings that could release the potential contaminants to the environment.

6.3.1.1.4 U1 Turbine Generator Building

Description and Historical Use

The Unit 1 Turbine Generator Building (Figure 3A, cell B5) formerly housed the Unit 1 Turbine Generator. With the retirement of Unit 1, the Turbine Generator and some of its associated equipment was removed. The building now contains office space and a machine shop. No record of a release of hazardous material in this building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Cutting Oil, Petroleum Constituents, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the machine shop is contained within the Unit 1 Turbine Generator Building, it is not likely that releases that may have occurred in the machine shop have caused gross contamination of soil or groundwater. This building is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the building floor and interior for indications of staining, cracks or openings that could release the potential contaminants to the environment.

6.3.1.2 Oil-Filled Mechanical Equipment

6.3.1.2.1 U1 Building Elevators

Description and Historical Use

Elevators in the Unit 1 Chemical Systems Building, Nuclear Service Building, Turbine Generator Building and Containment Building each contain approximately 50-gallon reservoirs of hydraulic oil. No record of a release of hazardous material from the elevators has been found.

Known and Potential Contaminants

The non-radiological contaminants are Hydraulic Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Concrete

Preliminary Classification

Because the elevators are contained within their buildings, it is not likely that releases that may have occurred from their hydraulic oil reservoirs have caused gross contamination of soil or groundwater. These building elevators are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the hydraulic oil reservoirs and the bottom of the elevator shafts for indications of staining, cracks or openings that could release the potential contaminants to the environment.

6.3.1.3 Exterior Area

6.3.1.3.1 U1 Former Transformer Area

Description and Historical Use

The Former Transformer Area West of the Unit 1 Turbine Generator Building (Figure 4, cell A5) formerly contained transformers that may have held PCB-containing dielectric oil. As discussed in Subsection 4.2.2.1, samples of surface soil within the top six inches in the former transformer area were analyzed for PCBs and petroleum constituents in 2000. A low level of Arochlor 1260 was detected in one sample and several petroleum constituents were detected [14].

Known and Potential Contaminants

The non-radiological contaminants are Dielectric Oil, Petroleum Constituents, PCBs, and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because contamination of soil in the Former Transformer Area was confirmed by sampling and analysis in 2000 a preliminary classification of NR Class 1 is assigned to the area.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants to determine the current environmental conditions in the area.

Supporting Documents

Phase II ESA Units 1&2 Mar 2000.pdf

6.3.1.4 Storage Tanks

6.3.1.4.1 U1 Bulk Oil Storage Tanks 11 and 12

Description and Historical Use

Unit 1 Bulk Oil Storage Tanks 11 and 12 (Figure 4, cell C3) are each 2,350,000-gallon steel above ground storage tanks constructed in 1962. The tanks were filled, and fuel oil was dispensed through pipes in the Underground Utility Tunnel. Fuel deliveries were made from barges that tied up at the IPEC dock at Unit 1.

Each tank originally stored No. 6 fuel oil. As discussed in Subsection 4.2.2.1, Tank 11 was over filled in 1980. Surrounding contaminated soil was removed and a lined dike was constructed around the tank.

In 1993 both Tank 11 and Tank 12 were drained. Tank 12 was retired from service at that time and Tank 11 began to store No. 2 fuel oil [14]. Tank 11 was retired from service in 2006.

In 2000 two surface soil samples were collected from the area of the tanks. Two soil borings were also drilled near the tanks and groundwater monitoring wells were installed in the soil borings. Low levels of petroleum constituents were detected in the soil and groundwater samples [14].

Known and Potential Contaminants

The non-radiological contaminant is Petroleum Constituents.

Potentially Contaminated Media

- Soil
- Groundwater
- Tank Interior

Preliminary Classification

Because of the large volume of oil formerly stored in Bulk Oil Storage Tanks 11 and 12 and the potential for releases from them, the known release from Tank 11 in 1980 and confirmation of soil and groundwater contamination in the area of the tanks in 2000, the tanks are assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for Petroleum Constituents to determine the current environmental conditions in the area.

6.3.1.4.2 U1 Ignition Oil Tank 11IOT

Description and Historical Use

Ignition Oil Tank 11IOT is a 6,250-gallon above ground tank containing fuel oil for the House Heating Boiler. The tank is located in a vault in the Superheater and Administration Building (Figure 4, Cell B5). A release of fuel oil from this tank reportedly occurred in the 1990s, but no record of the release has been found.

Known and Potential Contaminants

The non-radiological contaminant is Fuel Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because Ignition Oil Tank 11IOT is located in a vault inside the Superheater and Administration Building, the release of Fuel Oil from the tank in the 1990s is unlikely to have resulted in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Ignition Oil Tank 11IOT for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.3.1.4.3 U1 Ignition Oil Tank 12IOT

Description and Historical Use

Ignition Oil Tank 12IOT is a 6,250-gallon above ground tank containing fuel oil for the House Heating Boiler. The tank is located in a vault in the Superheater and Administration Building (Figure 4, Cell B5). A release of fuel oil from this tank reportedly occurred in the 1990s but no record of the release has been found.

Known and Potential Contaminants

The non-radiological contaminant is Fuel Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because Ignition Oil Tank 12IOT is located in a vault inside the Superheater and Administration Building, the release of Fuel Oil from the tank in the 1990s is unlikely to have resulted in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Ignition Oil Tank 12IOT for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

Storage Tanks Supporting Documents

CR-IP2-2016-05252, 3 gallons of fuel oil spilled to ground from Gas Turbine 1 dump tank.pdf
Phase II ESA Units 1&2 Mar 2000.pdf

6.3.1.5 Transformers

6.3.1.5.1 U1 Hellgate Transformer

Description and Historical Use

Oil staining was noted on the concrete pad supporting the Unit 1 Hellgate Transformer (Figure 4, cell B5) during a Phase 1 environmental site assessment of Units 1 and 2 in 2000 [13]. Sampling and chemical analysis of surface soil adjacent to the slab identified contamination with petroleum constituents and low levels of PCBs [14].

The Unit 1 Hellgate Transformer was removed from the Site on May 1, 2000, the concrete pad was steam cleaned, and the unit was replaced with an air-cooled transformer. Five cubic yards of visibly stained soil adjacent to the pad were removed on May 3, 2000 and shipped to a licensed waste disposal facility [15].

Known and Potential Contaminants

The non-radiological contaminants are Dielectric Oil, PCBs, and Petroleum Constituents.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because contamination of soil adjacent to the Hellgate Transformer was confirmed by sampling and analysis in 2000 and contaminated soil was removed in 2000 the area of the transformer is assigned a preliminary classification of NR Class 2.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants to determine the current environmental conditions in the area.

6.3.1.5.2 U1 138 kV Underground Cable

Description and Historical Use

A 138 kV oil-filled underground feeder cable runs from Unit 1 to Unit 3. Oil potheads are located in the Unit 1 Superheater structure (Figure 4, cell B5), where the cable transitions to above ground. Oil leaks have been detected historically in manholes associated with the feeder cable.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil and potentially PCBs.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets such as those on underground cable potheads commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. The detection of oil historically in manholes associated with the 138 kV underground feeder cable suggests the potential for contamination of soil and/or groundwater in its vicinity. A preliminary classification of NR Class 2 is assigned to the underground cable.

Recommended Future Investigation Activities

Inspect the potheads at the terminations of the 138 kV Underground Cable, the manholes associated with the cable and surrounding areas for indications of a release of the Potential Contaminants to the environment.

Transformers Supporting Documents

Draft Letter to NYSDEC re 4 AOCs at IPEC.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf

6.3.2 Radiological Impacts

6.3.2.1 Radionuclides of Concern

The following waste characterization analyses (which were performed to demonstrate compliance with 10 CFR Part 61) were reviewed to determine the primary Radionuclides of Concern (ROCs):

- West Pool Resin Sample (2008)
- East Pool Sludge Sample (2004)
- SRST Resin Sample (2005)

A composite list of radionuclides identified as "positive" by IPEC's evaluation of the 10 CFR Part 61 analyses was produced and is included in Table 5 as a master list of ROCs. If the fraction remaining at any of the time periods listed was less than 1.0E-6, the value at that time period was replaced with 0.0E+00.

Table 5: Unit 1 Composite List of Positively Identified Radionuclides

Radionuclide	Half-Life (yrs)	Fraction Remaining After			
		2 yrs	5 yrs	10 yrs	50 yrs
H-3	1.2E+01	8.9E-01	7.5E-01	5.7E-01	6.0E-02
Fe-55	2.7E+00	6.0E-01	2.8E-01	7.9E-02	3.2E-06
Co-60	5.3E+00	7.7E-01	5.2E-01	2.7E-01	1.4E-03
Ni-63	1.0E+02	9.9E-01	9.7E-01	9.3E-01	7.1E-01
Sr-89	1.4E-01	4.4E-05	0.0E+00	0.0E+00	0.0E+00
Sr-90	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Cs-137	3.0E+01	9.6E-01	8.9E-01	7.9E-01	3.2E-01
Pu-238	8.8E+01	9.8E-01	9.6E-01	9.2E-01	6.7E-01
Pu-239	2.4E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-240	6.6E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Pu-241	1.4E+01	9.1E-01	7.9E-01	6.2E-01	8.9E-02
Am-241	4.3E+02	1.0E+00	9.9E-01	9.8E-01	9.2E-01
Cm-243	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Cm-244	1.8E+01	9.3E-01	8.3E-01	6.8E-01	1.5E-01

This composite list was subsequently modified (via process knowledge and a realistic analysis of each ROC's respective half-life) and the ROCs were categorized into four distinct groups. These groups are the gamma emitters (Gammas), the Hard to Detect (HTD) and low energy beta emitters (HTD&Betas), tritium, and Transuranics (TRUs). Additionally, several ROCs were added because they are either required analytes by 10CFR20 App. G (I-129 and Tc-99) or are expected to be present in activated concrete (Eu-152, 154, and 155). The results are listed in Table 6.

Table 6: Unit 1 Categorized Radionuclides of Concern

Radionuclide	**Category**	**Half-Life (yrs)**
Cobalt-60	Gammas	5.3E+00
Cesium-137	Gammas	3.0E+01
Europium-152[b]	Gammas	1.3E+01
Europium-154[b]	Gammas	8.6E+00
Europium-155[b]	Gammas	4.8E+00
Nickel-63	HTD&Betas	1.0E+02
Strontium-90	HTD&Betas	2.9E+01
Technetium-99[a]	HTD&Betas	2.1E+05
Iodine-129[a]	HTD&Betas	1.6E+07
Hydrogen-3	Tritium	1.2E+01
Plutonium-238	TRUs	8.8E+01
Plutonium-239	TRUs	2.4E+04
Plutonium-240	TRUs	6.6E+03
Americium-241	TRUs	4.3E+02
Plutonium-241	TRUs	1.4E+01
Curium-243	TRUs	2.9E+01
Curium-244	TRUs	1.8E+01
[a] = Tc-99 and I-129 were not identified in site samples but are required 10CFR20 App. G waste stream analytes		
[b] = EU-152,154 & 155 were not identified in site samples but are typically identified in activated concrete		

In summary, when analyzing samples for the presence of radioactivity, the ROCs listed in Table 6, should be requested analytes, based on the origin of the samples. Given that Units 2 and 3 are still operating, there may be a lengthy period between the time of completion of this HSA and initiation of decommissioning activities. With regard to the ultimate list of ROCs for the facility, radionuclide half-life should be considered to eliminate those radionuclides that would have decayed to negligible quantities at the time of decommissioning.

The potential presence of any of these ROCs will be denoted by their respective assigned category for the remainder of the HSA.

Radionuclides of Concern Supporting Documents

2015 Annual Radioactive Eff. Release Rpt.pdf
2016 Annual Radioactive Eff. Release Rpt.pdf
2017 Annual Radioactive Eff. Release Rpt.pdf
U1 Fuel Pool 2004 - 2008.pdf

6.3.2.2 Building or Structure

6.3.2.2.1 U1 Chemical Systems Building

Description and Historical Use

The Chemical Systems Building (Figure 3A, cell C4) is a concrete structure. The radioactive waste disposal Integrated Liquid Waste System (ILWS) is located in the Chemical Systems Building and is the main radioactive liquid waste processing system. The ILWS consists of the liquid waste evaporators and associated equipment and is used to process liquid wastes from drains and sumps in Units 1, and 2. The building also houses ion exchangers, evaporators, heat interchangers, pumps, piping, and tanks to remove and dispose of gaseous and solid radioactive products from the primary coolant and waste liquids.

The following table provides radiation levels at various locations in the Chemical Systems Building. These data were obtained from routine surveys performed in 2017 and 2018. For more specific and comprehensive information, refer to the actual surveys (see Supporting Documents below) that were used to compile this table.

Table 7: Unit 1 Chemical Systems Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
CSB 33'	IWS pumps	1 - 50	*450/50
CSB 33'	Boron transfer pumps	2 - 5	10
CSB 43'	Pipe chase	<0.2 - 80	*80/12
CSB 43'	Sample return & pump 10 cell	<0.2 - 0.5	2
CSB 43'	Test & performance	<0.2 - 3	3
CSB 53'	Elevator	0.2	0.2
CSB 53'	#11 Waste collection tank	0.2-14	14
CSB 53'	#12 Waste collection tank	0.2 - 10	10
CSB 53'	#13 Waste collection tank	<0.2 - 15	15
CSB 53'	#14 Waste collection tank	0.2 - 10	10
CSB 53'	Sample room	<0.2 - 0.8	0.8
CSB 62'	Hallway & Pipe chase	0.2 - 800	*800/250
CSB 70'	Tool Decon & Hitman Skid Room	<0.5 - 1	*115/13
CSB 70'	Excess makeup cooler #11	1 - 40	*100/15
CSB 70'	Excess makeup cooler #12	3 - 15	15
CSB 70'	Demin cell	0.4 - 6	*400/65
CSB 70'	Cold drum storage	0.2 - 2	2
CSB 70'	Drum mixing	0.2	0.2
CSB 70'	Snubber test area	<0.2 - 0.4	0.4
CSB 70'	Waste distillate tanks	0.1 - 0.2	0.2
CSB 70'	North cell & Demin cell	0.3 - 5	12
CSB 70'	Boron & Detergent drum storage room	<0.2	<0.2

Location	Area or Component	Gen Area	Max
CSB 70'	Tool Decon & vacuum	0.4 - 0.8	*50/12
CSB 70'	Snubber test area	<0.2	<0.2
CSB 70'	Radwaste process office	<0.2	<0.2
CSB 70'	Control room & east loading well	<0.2	<0.2
CSB 70'	North decon cell	0.2 - 0.4	0.4
CSB 70'	FHF Section 3	<0.2 - 1	1
CSB 70'	FHF Section 1	1.2 - 25	25
CSB 70'	FHF Section 4	0.4 - 2	2
CSB 70'	FHF Section 2	0.2 - 35	35
CSB 70'	Bailing station	5 - 35	35
CSB 79' 6"	Hot & cold cement mixer cubicles	<0.2	<0.2
CSB 92'	H/V duct room U1/105	<0.2	<0.2
CSB 92'	H/V equipment room	<0.2	<0.2
CSB 92'	West roof	<0.2	<0.2
CSB 92'	East roof	<0.2	<0.2
CSB 108'	Elevator machine room	<0.2	<0.2
CSB 108'	East roof	<0.2 - 0.2	0.2
CSB 108'	Sphere vent room	<0.2	<0.2
Note: *#/# is contact/30 cm			

There are an additional forty-nine (49) rooms and areas that are not surveyed on a regular basis. The entrances to these rooms and areas have seals to prevent unauthorized access. The integrity of these seals is verified annually.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, Tritium, and TRUs. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials
- Concrete
- SSCs

Preliminary Classification

The Chemical Systems Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA during the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of samples of building sumps

Supporting Documents

SAO-132 Report 94-06 H-3 in U1 Sphere Foundation Sump.pdf
U1 Chemical Systems Building surveys.pdf

6.3.2.2.2 U1 Containment Building

Description and Historical Use

The Containment Building is located between and to the east of Units 2 and 3. (Figure 3A, cell C5). The building houses the Reactor Vessel, Reactor Head, Reactor Coolant System, Nuclear Boilers, Pressurizer and auxiliary components associated with the Nuclear Steam Supply System. The Containment Building is a reinforced concrete structure with a steel containment sphere surrounding Unit 1 inside of the concrete dome shield. The Reactor Vessel Head has been removed from the vessel and the reactor internals are still in place.

A drain system encircles the Unit 1 Fuel Storage Building and the Unit 1 Containment Building. This footing drain, typically referred to as the Curtain Drain, is divided into two sections, the North Curtain Drain (NCD) and the South Curtain Drain (SCD). Each of these drains starts at a common high point (elevation of 44 feet) located along the center of the eastern wall of the FSB. These drains then run to the North and South, respectively, and wrap around the two buildings. The NCD formerly flowed to the Storm Drain System but since low levels of PCBs and tritium were detected in 1994, the NCD has been routed to the Containment Building annulus drain, where the flow is treated through carbon filtration and discharged directly to the Discharge Canal. The design objective of these drains appears to be permanent depression of groundwater elevations to below the bottom of the structures [8].

The following table provides radiation levels at various locations in the Containment Building. These data were obtained from routine surveys performed in 2017 and 2018. For more specific and comprehensive information, refer to the actual surveys (see Supporting Documents below) that were used to compile this table.

Table 8: Unit 1 Containment Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
Containment 5'	General Areas	0.5 - 70	*250/70
Containment 15' & 20'	General Areas	0.2 - 3	3
Containment 33'	General Areas	0.2 - 60	*100/60
Containment 33'	Annulus	0.2 - 20	20
Containment 70' to 108'	North stairs	0.2 - 1.2	1.2
Containment 70'	General Areas	0.4 - 60	200
Containment 70'	S/Gs at 4 ft	1.8 - 3	N/A
Containment 79'	General Areas	10	*100/30
Containment 108'	General Areas	0.2 - 35	35
Containment	Polar crane	0.2 - 20	20
Note: *#/# is contact/30 cm			

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, Tritium, and TRUs. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials
- Concrete
- Steel
- SSCs

Preliminary Classification

The Containment Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of samples of building sumps

Supporting Documents

NRC Inspection Report 50-247_92-16.pdf
U1 Containment Building surveys.pdf
Unit 1 Safety Analysis Report.pdf

6.3.2.2.3 U1 Contractor Fabrication Shop

Description and Historical Use

The Unit 1 Contractor Fabrication Shop (Figure 3A, cell C3) provides a place for storage of equipment and parts and a space for maintenance and fabrication activities. This facility was used for various trades such as pipe-fitting, sheet metal and insulation.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Surfaces

Preliminary Classification

The Contractor Fabrication Shop is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.3.2.2.4 U1 Fuel Storage Building

Description and Historical Use

The Fuel Storage Building (Figure 3A, cell C5) is a concrete structure. Located in the Fuel Storage Building are the spent fuel pools, cooling, filtration, and demineralization systems, fuel handling equipment, building ventilation and filtration systems and necessary power and control systems. The Unit 1 fuel pool complex system consists of six interconnected pools; the West Pool and East Pool, a Failed Fuel Pool, Disassembly Pool, a Cask Loading Pool, and a Transfer Pool.

The Unit 1 Reactor was defueled in January 1976. A total of 160 fuel elements were stored in the West Pool until 2008, when they were transferred to the on-site Independent Spent Fuel Storage Installation (ISFSI). The fuel racks remain in the fuel pools.

Con Edison had identified leakage from the West Fuel Pool in the 1990’s and was managing the leakage by collecting it from a reconfigured footing drain that surrounds the fuel storage building.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, Tritium, and TRUs. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials
- Concrete
- Steel
- SSCs

Preliminary Classification

The Fuel Storage Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of samples of building sumps

Supporting Documents

ABS Consulting SFP Concrete report 1105145 R-002 July 2002.pdf
May132008InsepctionReportML081340425 (1).pdf

NRC Inspection Report 50-247_92-16.pdf
NRC Inspection Report 94-80.pdf
SAO-132 Report 94-06 H-3 in U1 Sphere Foundation Sump.pdf
Unit 1 Safety Analysis Report.pdf

6.3.2.2.5 U1 Monitor House and Utility Tunnel

Description and Historical Use

The Unit 1 Monitor House (Figure 3A, cell D4) is a small brick building at the eastern terminus of the underground Unit 1 Utility Tunnel that provides access to the Utility Tunnel. The Utility Tunnel is a seismic Class III structure. The tunnel provides shelter and protection for the city water supply piping used for auxiliary feedwater backup water and other miscellaneous functions. The Utility Tunnel is a rectangular reinforced concrete structure founded on rock. The western portion of the Utility Tunnel also contain the Unit 1/2 radioactive waste discharge pipe that transports waste to the Discharge Canal.

It has been noted in several Condition Reports that the Utility Tunnel is a posted RCA and has loose surface contamination throughout. It was also noted that flaking paint in the tunnel also contains radioactive material.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Surfaces

Preliminary Classification

The Monitor House and Utility Tunnel are preliminarily classified as a MARSSIM Class 2 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

Supporting Documents

CR-IP2-2000-09854, Rad Effluents Audit 00-03-F.pdf
CR-IP2-2001-04352, Utility Tunnel Contaminated.pdf
CR-IP2-2007-02551, Loose surface Contamination Found in U1 Utility Tunnel.pdf

6.3.2.2.6 U1 Gas Turbine 1 Generator Building

Description and Historical Use

The Unit 1 Gas Turbine Generator formerly provided emergency electrical power to Unit 1 and has been retired. The location of the Unit 1 Gas Turbine 1 Generator Building is shown in Figure 3A, cell B4.

As discussed in Subsection 4.2.2.1, oil seepage was identified in a portion of the underground Utility Tunnel located between the U1 Turbine Building and the GT 1 Generator Building. The area above this section of the tunnel contains the fill manifold for the GT1 fuel oil storage tanks and is also where 55-gallon drums of oil had been stored previously [13].

Two soil borings were drilled in the area of the storage tank fill manifold and Utility Tunnel in March 2000, during a Phase 2 environmental site assessment of Units 1 and 2. Petroleum constituents were detected in soil samples collected from the soil borings and groundwater sampled from monitoring wells constructed in the soil borings [14].

Removal of the oily soil was not attempted because the oil was determined not likely to migrate as it is probably heavy No. 6 fuel oil, and because of the presence of subsurface barriers consisting of a utility tunnel wall to the south, the Discharge Canal wall to the west, a rock outcrop to the east and the Unit 1 Turbine Building foundation to the north. In addition, subsurface utilities in the area which are nuclear safety-related preclude the safe excavation of contaminated soil while the plant remains operational. Instead, a semi-annual program of groundwater monitoring, removal of free-phase oil from surrounding monitoring wells (if present) and reporting to the NYSDEC was initiated [15].

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials
- Concrete
- Steel
- SSCs

Preliminary Classification

Because contaminated soil and groundwater was confirmed by sampling in 2000 and was left in place, residual contamination may remain. The area adjacent to the Unit 1 Gas Turbine Generator Building where the fill manifold for the fuel oil tanks is located is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for Petroleum Constituents to determine the current environmental conditions in the area.

6.3.2.2.7 U1 Nuclear Service Building

Description and Historical Use

The Nuclear Service Building is adjacent to but separated from the Unit 1 containment structure. The Nuclear Service Building (Figure 3A, cell B5) is a multi-story reinforced concrete structure that provided equipment and services to support reactor operations. The building contains air compressors, fans and pumps, Reactor Building exhaust ventilation, laundry and lavatory facilities, first aid room, Radiochemistry Laboratory, sample rooms, HP count room and lockers. The building also currently houses retired Unit 1 equipment.

The following table provides radiation levels at various locations in the Nuclear Service Building. These data were obtained from routine surveys performed in 2018. For more specific and comprehensive information, refer to the actual surveys (see Supporting Documents below) that were used to compile this table.

Table 9: Unit 1 Nuclear Service Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
NSB 33'	Contaminated waste drain	0.6 - 4	4
NSB 33'	Eddie current room	<0.2	<0.2
NSB 33'	Rad material storage area	<0.2	<0.2
NSB 43'	Amplifier room	<0.2	<0.2
NSB 53'	Radiochem Lab	0.1 - 1.8	*4.5/1.8
NSB 53'	RCL Sample cell #3	1 - 2	*10/5
NSB 53'	RP count room	<0.2	<0.2
NSB 53'	RP storage area/room	<0.2	<0.2
NSB 62'	Pipe chase	<0.2	<0.2
NSB 72'	Decon room/Equip room	<0.2	<0.2
NSB 72'	Hallway	<0.2	<0.2
NSB 84'	Hallway	<0.2	<0.2
NSB 84'	Plant vent room	<0.2	<0.2
NSB 100'	HV Refrig room	<0.2	<0.2
NSB 115'	Roof	<0.2	<0.2
Note: *#/# is contact/30 cm			

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, Tritium, and TRUs. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials

- Concrete
- SSCs

Preliminary Classification

The Nuclear Service Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA during the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of samples of building sumps

Supporting Documents

U1 Nuclear Service Building surveys.pdf

6.3.2.2.8 U1 Screenwell House

Description and Historical Use

The Screenwell House is a concrete structure and is the location of the Unit 1 water intake. Components in the Screenwell House include the trash racks, traveling screens and pumps for the river water, wash water, and fire protection systems. The Screenwell House also provides protection for alternate safe shutdown system (ASSS) equipment and currently houses support equipment for Unit 2. The building is located at the west end of the Protected Area, on the Hudson River (Figure 3A, cell A5).

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Surfaces

Preliminary Classification

The Screenwell House is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.3.2.2.9 U1 Superheater & Administration Building

Description and Historical Use

The Superheater & Administration Building (S&AB) (Figure 3A, cell B5) is adjacent to but physically separated from the Unit 1 Control Building. The superheater stack is located on top of the Unit 1 S&AB. The structure houses the safety-related battery room No. 23. The construction of the S&AB consists of steel framing on a reinforced concrete mat. The floors are metal grating and reinforced concrete slabs. The exterior walls are masonry and metal siding.

The water treatment plant is located in the S&AB. The water treatment plant was retired in place in 2000 and is no longer the main supply of demineralized water to the Indian Point Energy Center.

The auxiliary steam system, consisting of oil-fired boilers located in the S&AB, supplies steam to Units 1, 2, and 3 for auxiliary operation and for building heating.

As part of the increased utilization of Unit 1 facilities in support of the overall site goal of efficient power production, portions of the conventional (non-nuclear) side of the facility such as the Turbine Generator, oil fired superheaters and associated components have been removed to allow establishment of administrative offices, emergency response facilities and equipment laydown areas. The principle Alternate Safe Shutdown System power supply and associated switch gear installed in support of Unit 2 in response to NUREG -0737 has also been located in Unit 1.

The S&AB also currently houses retired Unit 1 secondary side support equipment and is the location of the Technical Support Center (TSC) for the site.

On the 15’ elevation of the S&AB, there is a Containment Spray Sump that would provide a source of water for the Containment Spray System in the event of an emergency. In 1999, an increasing trend was noted in the amount of Cs-137 (5E-07 mCi/ml) in the water of the sump. After evaluating the potential sources of this contamination, the radioactivity was attributed to steam generator blowdown. This sump had been fenced off and is considered an RCA.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Surfaces

Preliminary Classification

The Superheater & Administrative Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of samples of building sumps

6.3.2.2.10 U1 Turbine Generator Building

Description and Historical Use

The Turbine Generator Building and heater bays are attached to the Superheater & Administration Building (Figure 3A, cell B5). The Turbine Generator Building with its auxiliary bays, houses the turbine generator and associated auxiliaries, the Condensate and Feedwater Systems, switchgear, the Turbine Generator Building crane, and other auxiliary equipment. The Turbine Generator Building also houses the station blackout/Appendix R diesel and two fire water pumps. The Appendix R diesel is located on the turbine pedestal.

The Turbine Generator Building and heater bays are constructed of heavy structural steel framing with steel supported concrete slabs forming the floor area. The building's exterior face is constructed of metal-sandwich panels and concrete brick.

The saturated secondary steam produced in the steam generators was superheated in two oil-fired superheaters and then used to drive a three cylinder, tandem-compound, double-flow high pressure and double-flow low pressure condensing turbine generator. The heat removed from the condensing steam was transferred to the circulating water system and then discharged to the Hudson River.

The Turbine Generator Building is currently being re-used as office space and a machine shop. In addition, the Turbine Generator Building houses a 13.8 kV transformer which provides backup offsite power for Units 2 and 3. Radioactive material was not used or stored in this building, but because of its location in the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials
- Concrete
- Steel
- Roofing Materials
- SSCs

Preliminary Classification

The Turbine Generator Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.3.2.3 Exterior Area

6.3.2.3.1 U1 Former Septic Leach Field

Description and Historical Use

In 1960, during construction of the Unit 1 plant, a Sewage Treatment Plant and sanitary disposal system consisting of a septic tank and surface sand filters was constructed to service plant facilities. This facility was constructed approximately 1000 feet south of the plant structures in an area not anticipated to be needed for future construction (Figure 3A, cell A2). However, during construction of service facilities for the Unit 3 plant, it became necessary to remove this old sanitary disposal system in 1979 to allow for road and storm drainage construction activities to progress. The Sewage Treatment Plant was retired in place and a pumping station was constructed to allow pumping of sewage from the station to the Buchanan sewage treatment plant [39].

In early 1979 a sampling campaign was executed in the sand filter beds. Core borings were taken from each of the 4 sand filters to a depth of approximately 8 feet. These cores were obtained in 2-foot lengths. The majority of the activity detected was concentrated in the top 4 feet of the sand filter beds. The Cs-137 concentration in the top 4 feet ranged from 0.5 pCi/g to 533 pCi/g. The Cs-134 concentration in the top 4 feet ranged from <0.1 to 57.9 pCi/g. The Co-60 concentration in the top 4 feet ranged from 0.1 pCi/g to 119 pCi/g. The total amount of activity present in the 3,000 cubic meters of material was estimated to be less than 100 millicuries.

After much legal and regulatory review and discussions, it was decided to store the excavated material on-site. The best way to store the material was to remove it and relocate it to a containment cell excavated at the southern end of the property. The containment cell was lined and capped with a bentonite clay material to minimize infiltration of ground water which could cause spreading of the contamination. It was determined that only approximately the top four to five feet of material was to be moved to facilitate construction in the original area of the septic leach fields. This decision reduced the volume of material that had to be considered for physical removal and re-location.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Soil

Preliminary Classification

The Septic Field is preliminarily classified as a MARSSIM Class 1 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Radiological analysis of soil samples taken at a depth starting at approximately four feet below the ground surface in a systematic fashion.

Supporting Documents

Mod 79-03-077 Relocation of the Septic field.pdf

6.4 Unit 2 Impacts

6.4.1 Non-Radiological Impacts

6.4.1.1 Building or Structure

6.4.1.1.1 U2 Emergency Diesel Generator Building

Description and Historical Use

The Unit 2 Emergency Diesel Generator Building (Figure 3A, cell B5) contains three Emergency Diesel Generators and three 175-gallon steel above ground storage tanks (Day tanks) containing diesel fuel. The main fuel supply for the generators is stored in three 7,700-gallon steel underground storage tanks equipped with level alarms. No record of a release of hazardous material in this building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel and Lubricating Oil.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the diesel fuel day tanks are in an area that is bermed and contained within the Emergency Diesel Generator Building it is not likely that releases that may have occurred in the building have caused gross contamination of soil or groundwater. However, a relatively large volume of oil is potentially stored. Therefore, this building is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.1.2 U2 Intake Structure

Description and Historical Use

The Unit 2 Intake Structure (Figure 3A,Cells A5 to A6) is the location of the station water intake components including the trash racks, traveling screens and pumps for the circulation water, service water, residual heat removal and fire protection systems.

Sodium hypochlorite is stored in two fiberglass above ground storage tanks and is injected into the circulating water to limit biofouling of the condenser and into the service water to limit biofouling of heat exchangers. No record of a release of hazardous material from the Intake Structure has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil, RCRA Metals, and Sodium Hypochlorite.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

The Intake Structure equipment is not contained within a building and there is the potential that incidental releases of Lubricating Oil could be released to the environment. The Intake structure is assigned a preliminary classification of NR Class 3.

Recommended Future Investigation Activities

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.1.3 U2 Turbine Generator Building

Description and Historical Use

The Unit 2 Turbine Generator Building (Figure 3A,Cells B5 to B6) houses the Unit 2 Turbine Generator and associated auxiliaries, the Condenser, Condensate and Feedwater Systems, switchgear, the Turbine Building crane, and other auxiliary equipment. The Turbine Building is a rigid steel and concrete structure.

Structural steel members in the building are assumed to be coated with lead-based paint. Various components such as pump and valve gaskets and pipe wrap may contain asbestos. Other components such as electrical switches, relays, thermostats and gauges may contain mercury.

As discussed in Subsection 4.2.2.1 a bushing failure and fire in the Unit 21 Main Transformer in 2010 resulted in release of oil to soil and the Discharge Canal. The deluge system that automatically engaged to extinguish the fire released a large volume of water and fire-suppression foam. As a result, water and transformer oil overflowed the berm containing the transformer. The released oil infiltrated the local soil and apparently accumulated in pockets against the downgradient Turbine Building east foundation. Groundwater monitoring wells were installed to investigate and remove the accessible oil.

Known and Potential Contaminants

The non-radiological contaminants are Asbestos, Lead, Lubricating Oil, Waste Oil, RCRA Metals, and Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater
- Lead Paint
- Mercury-Containing Components
- Pipe Insulation
- Sumps

Preliminary Classification

Because of the known release of Dielectric Oil that accumulated at the Unit 2 Turbine Generator Building foundation, a preliminary classification of NR Class 1 is assigned to the building.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants.

Supporting Documents

CR-IP2-2010-06803, main transformer explosion.pdf
Letter to Joyce Jiudice regarding Order on Consent and Associated Schedu....pdf

Spill No.1008306, 100 gallons transformer oil to soil & surface water, 11-8-2010.pdf

6.4.1.2 Chemical and Drum Storage Areas

6.4.1.2.1 U2 Hazardous Waste Storage Bin

Description and Historical Use

Because Units 2 and 3 have separate permits to generate hazardous waste in accordance with provisions of the U.S. Resource Conservation and Recovery Act (RCRA), each Unit must store their hazardous waste separately. As a Large Quantity Generator, Unit 2 stores no more than 1,000 kilograms per month in its Hazardous Waste Storage Bin, located in the parking lot near the northwest corner of the Maintenance Training Facility (Figure 4, Cell C3). No record of a release of hazardous material in this building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Acids-Bases, Batteries, Lead, Mercury, Spent Solvents, and RCRA Metals. Because the Unit 2 hazardous wastes are stored within an enclosed structure, if handled properly these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

The Unit 2 Hazardous Waste Storage Bin is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the floor of the Unit 2 Hazardous Waste Storage Bin for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.2.2 U2 Oil Storage Cabinets

Description and Historical Use

Four cabinets containing a total of up to 1,200 gallons of virgin diesel fuel and lubricating oil in various containers are located west of the Unit 1 Turbine Generator Building (Figure 4, Cell A5). No record of a release of hazardous material from these cabinets has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel and Lubricating Oil. Because the Unit 2 Oil Storage Cabinets are enclosed structures, if handled properly these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

The Unit 2 Oil Storage Cabinets are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the floor of the Oil Storage Cabinets for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

Chemical and Drum Storage Areas Supporting Documents

EN-EV-106__007.pdf
IPEC Haz. Waste Inventory.pdf

6.4.1.3 Exterior Area

6.4.1.3.1 U2 Transformer Yard

Description and Historical Use

The Unit 2 Transformer Yard (Figure 3A, Cell B5) contains the 21 and 22 Main Transformers, Station Auxiliary Transformer and Unit Auxiliary Transformer. As discussed in Subsection 4.2.2.1 plant personnel have reported observing visible staining of bluestone and a sheen on surface water that collects in the U2 Transformer Yard during periods of heavy precipitation [13] [14]. Con Edison managed the condition by removing visibly stained soil and deploying sorbent pigs around the area storm drain during periods when surface drainage accumulated [15].

A bushing failure and fire in the Unit 21 Main Transformer in 2010 resulted in release of oil to soil and the Discharge Canal. (CR-IP2-2010-06803; NYSDEC Spill No. 1008306) [16] [17] [19].

The deluge system that automatically engaged to extinguish the fire released a large volume of water and fire-suppression foam. As a result, water and transformer oil overflowed the berm containing the transformer. The released oil infiltrated the local soil and apparently accumulated in pockets against the downgradient Turbine Building east foundation. Groundwater monitoring wells were installed to investigate and remove the accessible oil. The contaminated trap rock within the transformer berm was removed, an impermeable liner was applied to the berm floor and walls, clean trap rock was placed in the berm and a replacement 21 Main Transformer was installed.

Known and Potential Contaminants

The non-radiological contaminants are Dielectric Oil, RCRA Metals, Petroleum Constituents, and PCB-Containing Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater
- Concrete
- Trap Rock

Preliminary Classification

The Unit 2 Transformer Yard is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants.

Supporting Documents

CR-IP2-2000-01957, hydraulic oil spill near 95' Maintenance Outage Building.pdf

CR-IP2-2006-04701, Diesel oil in manholes and pipe segments in transformer yard.pdf
Draft Letter to NYSDEC re 4 AOCs at IPEC.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf

6.4.1.4 Oil-Filled Mechanical Equipment

6.4.1.4.1 U2 Appendix R Diesel Generator

Description and Historical Use

The Unit 2 Appendix R Diesel Generator is located at the south end of the Unit 1 Turbine Generator Building (Figure 4, Cell A5) and contains approximately 100 gallons of lubricating oil. A day tank containing approximately 800 gallons of diesel fuel for the generator is located near the generator. This day tank is discussed in Section 0. No record of a release of hazardous material from the Unit 2 Appendix R Diesel Generator enclosure has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil, RCRA Metals, and Diesel Fuel. Because the generator is located within the Unit 1 Turbine Generator Building, if handled properly these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 Appendix R Diesel Generator is located within the Unit 1 Turbine Generator Building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the Generator have caused gross contamination of soil or groundwater. The Generator is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the floor of the Unit 2 Appendix R Diesel Generator enclosure for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.4.2 U2 Circulation Water Pump Motors

Description and Historical Use

The Unit 2 Circulation Water Pumps are located in the Unit 2 Intake Structure (Figure 3A, Cells A5 to A6), downstream from the trash rack and traveling screens. Each pump motor contains approximately 100 gallons of lubricating oil. No record of a release of lubricating oil from the pump motors has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location at the Intake Structure it is not likely that releases of Lubricating Oil that may have occurred from the Pump Motors have caused gross contamination of soil or groundwater. The Circulating Water Pump Motors are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Circulation Water Pump Motors for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.4.3 U2 Condensate Pump Motors

Description and Historical Use

The Unit 2 Condensate Pumps are located in the Unit 2 Turbine Generator Building (Figure 3A, Cells B5 to B6). All drains from the Turbine Generator Building flow to the Chemical Services Building for treatment and to ensure that no oil or unmonitored radioactivity leaves the building. The pump motors contain a total of approximately 300 gallons of lubricating oil. No record of a release of lubricating oil from the pump motors has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 2 Turbine Generator Building it is not likely that releases of Lubricating Oil that may have occurred from the Pump Motors have caused gross contamination of soil or groundwater. The Condensate Pump Motors are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Condensate Pump Motors for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.4.4 U2 Diesel Fire Pump Motor

Description and Historical Use

The Unit 2 Diesel Fire Pump is located in a building next to the Unit 2 Fire Water Storage Tank (Figure 3A, Cell C5). The pump motor contains approximately 100 gallons of lubricating oil. A tank with a capacity of 275 gallons is located in the building and stores diesel fuel for the Diesel Fire Pump. This storage tank is discussed in Section 6.4.1.5.16. No record of a release of lubricating oil from the pump motor has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil, RCRA Metals, and Diesel Fuel. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on its location within a small building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the Pump Motor has caused gross contamination of soil or groundwater. A preliminary classification of NR Isolated is assigned to the Unit 2 Diesel Fire Pump Motor.

Recommended Future Investigation Activities

Inspect the area of the Diesel Fire Pump Motor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.4.5 U2 Emergency Diesel Generators

Description and Historical Use

The Unit 2 Emergency Diesel Generators are located in the Unit 2 Emergency Diesel Generator Building (Figure 3A, Cell B5). Each of the three generators contain approximately 150 gallons of lubricating oil. No record of a release of lubricating oil from the Unit 2 Emergency Diesel Generators has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 2 Emergency Diesel Generator Building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the Generators has caused gross contamination of soil or groundwater. The Emergency Diesel Generators are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Emergency Diesel Generators for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.4.6 U2 Technical Support Center Emergency Diesel Generator

Description and Historical Use

The Unit 2 Technical Support Center (TSC) Emergency Diesel Generator is located in the Superheater and Administration Building (Figure 3A, Cell B5). The generator contains approximately 100 gallons of diesel fuel and lubricating oil. Battery banks to supply back up power to the TSC are also located in the Superheater and Administration Building. No record of a release of diesel fuel or lubricating oil from the Unit 2 Technical Support Center Emergency Diesel Generator has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on its location within the Superheater and Administration Building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the generator has caused gross contamination of soil or groundwater. The Unit 2 Technical Support Center Emergency Diesel Generator is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Technical Support Center Emergency Diesel Generator for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5 Storage Tanks

6.4.1.5.1 U2 21 Emergency Diesel Generator Day Tank 21FODT

Description and Historical Use

The Unit 2 21 Emergency Diesel Generator Day Tank is a 175-gallon steel above ground tank located in the Unit 2 Emergency Diesel Generator Building (Figure 4, Cell B5). No record of a release of diesel fuel from the Unit 2 21 Emergency Diesel Generator Day Tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 21 Emergency Diesel Generators Day Tank is located inside the Unit 2 Emergency Diesel Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 21 Emergency Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.2 U2 21 Emergency Diesel Generator Storage Tank 21FOST

Description and Historical Use

The Unit 2 21 Emergency Diesel Generator Storage Tank is a 7,700-gallon steel underground tank equipped with a level alarm and located adjacent to the Unit 2 Emergency Diesel Generator Building (Figure 4, Cell B5). No record of a release of diesel fuel from the Unit 2 21 Emergency Diesel Generator Storage Tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 2 21 Emergency Diesel Generator Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.4.1.5.3 U2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATA

Description and Historical Use

Unit 2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATA is an 80-gallon above ground storage tank containing lubricating oil and is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because Unit 2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATA is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Unit 2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATA for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.4 U2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATB

Description and Historical Use

Unit 2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATB is an 80-gallon above ground storage tank containing lubricating oil and is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because Unit 2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATB is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Unit 2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATB for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.5 U2 22 Emergency Diesel Generator Day Tank 22FODT

Description and Historical Use

The Unit 2 22 Emergency Diesel Generator Day Tank is a 175-gallon steel above ground tank located in the Unit 2 Emergency Diesel Generator Building (Figure 4, Cell B5). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 22 Emergency Diesel Generators Day Tank is located inside the Unit 2 Emergency Diesel Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 22 Emergency Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.6 U2 22 Emergency Diesel Generator Storage Tank 22FOST

Description and Historical Use

The Unit 2 22 Emergency Diesel Generator Storage Tank is a 7,700-gallon steel underground tank equipped with a level alarm and located adjacent to the Unit 2 Emergency Diesel Generator Building (Figure 4, Cell B5). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 2 22 Emergency Diesel Generator Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.4.1.5.7 U2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATA

Description and Historical Use

Unit 2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATA is an 80-gallon above ground storage tank containing lubricating oil and is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because Unit 2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATA is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Unit 2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATA for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.8 U2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATB

Description and Historical Use

Unit 2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATB is an 80-gallon above ground storage tank containing lubricating oil and is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because Unit 2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATB is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Unit 2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATB for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.9 U2 23 Emergency Diesel Generator Day Tank 23FODT

Description and Historical Use

The Unit 2 23 Emergency Diesel Generator Day Tank is a 175-gallon steel above ground tank located in the Unit 2 Emergency Diesel Generator Building (Figure 4, Cell B5). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 23 Emergency Diesel Generators Day Tank is located inside the Unit 2 Emergency Diesel Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 23 Emergency Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.10 U2 23 Emergency Diesel Generator Storage Tank 23FOST

Description and Historical Use

The Unit 2 23 Emergency Diesel Generator Storage Tank is a 7,700-gallon steel underground tank equipped with a level alarm and located adjacent to the Unit 2 Emergency Diesel Generator Building (Figure 4, Cell B5). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 2 23 Emergency Diesel Generator Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.4.1.5.11 U2 Appendix R Diesel Generator Day Tank 2APPR

Description and Historical Use

The Unit 2 Appendix R Diesel Generator Day Tank is an 800-gallon double-walled steel above ground tank with interstitial monitoring located at the south end of the Unit 1 Turbine Generator Building (Figure 4, Cell A5). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 Appendix R Diesel Generator Day Tank is located inside the Unit 1 Turbine Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Appendix R Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.12 U2 Boiler Feed Pump Oil Console BFOC

Description and Historical Use

The Unit 2 Boiler Feed Pump Oil Console is a 1,400-gallon steel above ground tank containing lubricating oil for the Main Boiler Feed Pumps. The tank is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because the Unit 2 Boiler Feed Pump Oil Console is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the Oil Console is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Boiler Feed Pump Oil Console for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.13 U2 Boiler Feed Pump Turbine Oil Conditioner BFPTOC

Description and Historical Use

The Unit 2 Boiler Feed Pump Turbine Oil Conditioner is a 255-gallon steel above ground tank containing lubricating oil for the Boiler Feed Pump Turbine. The tank is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because the Unit 2 Boiler Feed Pump Turbine Oil Conditioner is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the Oil Conditioner is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Boiler Feed Pump Turbine Oil Conditioner for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.14 U2 Clean Lube Oil Storage Tank COST

Description and Historical Use

The Unit 2 Clean Lube Oil Storage Tank is a 23,500-gallon steel above ground tank containing lubricating oil for the Turbine Generator. The tank is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because the Unit 2 Clean Lube Oil Storage Tank is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Clean Lube Oil Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.15 U2 Dirty Oil Storage Tank DOST

Description and Historical Use

The Unit 2 Dirty Oil Storage Tank is a 23,500-gallon steel above ground tank containing waste lubricating oil from the Turbine Generator. The tank is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains
- Tank Interior

Preliminary Classification

Because the Unit 2 Dirty Oil Storage Tank is located inside the Unit 2 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Dirty Oil Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.16 U2 Fire Pump Diesel Storage Tank DFPFOT

Description and Historical Use

The Unit 2 Fire Pump Diesel Storage Tank is a 275-gallon steel above ground tank located within a steel secondary containment in the Fire Pump Building near the Fire Water Storage Tank (Figure 4, Cell B5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 Fire Pump Diesel Storage Tank is located inside a steel secondary containment, a release of Diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Fire Pump Diesel Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.17 U2 Gas Turbine 1 Fuel Oil Dump Tank GT1FODT

Description and Historical Use

The Unit 2 Gas Turbine 1 Fuel Oil Dump Tank is a 275-gallon steel underground tank containing unburned fuel oil from Gas Turbine 1. The tank is located west of the Gas Turbine 1 Building (Figure 4, Cell E3). Three gallons of fuel oil were released from the Unit 2 Gas Turbine 1 Fuel Oil Dump Tank in 2016 (CR-IP2-2016-05252).

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Gas Turbine 1 Fuel Oil Dump Tank is an underground tank that cannot easily be inspected. There is the potential for a release due to undetected leakage or overfilling. The area of this UST is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank excavation when the Gas Turbine 1 Fuel Oil Dump Tank is removed and analyze the samples for constituents of diesel fuel.

6.4.1.5.18 U2 Gas Turbine 1 Lube Oil Reservoir GT1LOR

Description and Historical Use

The Gas Turbine 1 Lube Oil Reservoir is a 3,000-gallon above ground reservoir containing lubricating oil for Gas Turbine 1. The reservoir is located inside the Gas Turbine 1 Building (Figure 4, Cell E5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Gas Turbine 1 Lube Oil Reservoir is located inside the Gas Turbine 1 Building, a release of Lubricating Oil from the reservoir is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Gas Turbine 1 Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminants to the environment

6.4.1.5.19 U2 Gas Turbine 1 Storage Tank GT1FOT11

Description and Historical Use

Gas Turbine 1 Storage Tank GT1FOT11 is a 30,000-gallon underground storage tank containing diesel fuel for Gas Turbine 1. The tank is packed in sand in a vault at the Unit 1 Turbine Generator Building (Figure 4, Cell B5).

As discussed in Subsection 4.2.2.1, in January 2000 during a Phase 1 environmental site assessment of Units 1 and 2 oil seepage from surrounding soil was identified in a portion of the underground Utility Tunnel located between the Unit 1 Turbine Generator Building and the Gas Turbine 1 Generator Building. The area above this section of the tunnel contains the fill manifold for the Gas Turbine 1 fuel oil storage tanks and is also where 55-gallon drums of oil had been stored previously [13].

Two soil borings were drilled in the area of the storage tank fill manifold and Utility Tunnel in March 2000, during a Phase 2 environmental site assessment of Units 1 and 2. Petroleum constituents were detected in soil samples collected from the soil borings and groundwater sampled from monitoring wells constructed in the soil borings [14].

Removal of the oily soil was not attempted because the oil was determined not likely to migrate as it is probably heavy No. 6 fuel oil, and because of the presence of subsurface barriers consisting of a utility tunnel wall to the south, the Discharge Canal wall to the west, a rock outcrop to the east and the Unit 1 Turbine Building foundation to the north. In addition, subsurface utilities in the area which are nuclear safety-related preclude the safe excavation of contaminated soil while the plant remains operational. Instead, a semi-annual program of groundwater monitoring, removal of free-phase oil from surrounding monitoring wells (if present) and reporting to the NYSDEC was initiated [15].

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

There is known soil and groundwater contamination in the area of the fill manifold for Gas Turbine 1 Storage Tanks GT1FOT11 and GT1FOT12. The contaminated soil has not been removed because of nuclear safety-related subsurface utilities in the area of the fill manifold and USTs. Further, because both Gas Turbine 1 Storage Tanks GT1FOT11 and GT1FOT12 are underground tanks that store a large volume of Fuel Oil and cannot be inspected easily the tanks are assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank excavation when Gas Turbine 1 Storage Tanks GT1FOT11 and GT1FOT12 are removed and analyze the samples for constituents of diesel fuel.

6.4.1.5.20 U2 Gas Turbine 1 Storage Tank GT1FOT12

Description and Historical Use

Gas Turbine 1 Storage Tank GT1FOT12 is a 30,000-gallon underground storage tank containing diesel fuel for Gas Turbine 1. The tank is packed in sand in a vault at the Unit 1 Turbine Generator Building (Figure 4, Cell B5).

As discussed in Subsection 4.2.2.1, in January 2000 during a Phase 1 environmental site assessment of Units 1 and 2 oil seepage from surrounding soil was identified in a portion of the underground Utility Tunnel located between the Unit 1 Turbine Generator Building and the Gas Turbine 1 Generator Building. The area above this section of the tunnel contains the fill manifold for the Gas Turbine 1 fuel oil storage tanks and is also where 55-gallon drums of oil had been stored previously [13].

Two soil borings were drilled in the area of the storage tank fill manifold and Utility Tunnel in March 2000, during a Phase 2 environmental site assessment of Units 1 and 2. Petroleum constituents were detected in soil samples collected from the soil borings and groundwater sampled from monitoring wells constructed in the soil borings [14].

Removal of the oily soil was not attempted because the oil was determined not likely to migrate as it is probably heavy No. 6 fuel oil, and because of the presence of subsurface barriers consisting of a Utility Tunnel wall to the south, the Discharge Canal wall to the west, a rock outcrop to the east and the Unit 1 Turbine Building foundation to the north. In addition, subsurface utilities in the area which are nuclear safety-related preclude the safe excavation of contaminated soil while the plant remains operational. Instead, a semi-annual program of groundwater monitoring, removal of free-phase oil from surrounding monitoring wells (if present) and reporting to the NYSDEC was initiated [15].

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

There is known soil and groundwater contamination in the area of the fill manifold for Gas Turbine 1 Storage Tanks GT1FOT11 and GT1FOT12. The contaminated soil has not been removed because of nuclear safety-related subsurface utilities in the area of the fill manifold and USTs. Further, because both Gas Turbine 1 Storage Tanks GT1FOT11 and GT1FOT12 are underground tanks that store a large volume of Fuel Oil and cannot be inspected easily the tanks are assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tanks for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank excavation when Gas Turbine 1 Storage Tanks GT1FOT11 and GT1FOT12 are removed and analyze the samples for constituents of diesel fuel.

6.4.1.5.21 U2 Hydrogen Seal Oil Reservoir HSOT

Description and Historical Use

The Unit 2 Hydrogen Seal Oil Reservoir is a 1,200-gallon above ground reservoir containing Lubricating Oil. The reservoir is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 Hydrogen Seal Oil Reservoir is located inside the Unit 2 Turbine Generator Building, a release of Lubricating Oil from the reservoir is unlikely to result in gross contamination of soil or groundwater. The area of this reservoir is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Hydrogen Seal Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.22 U2 Main Boiler Feed Pump Lube Oil Reservoir MBR

Description and Historical Use

The Unit 2 Main Boiler Feed Pump Lube Oil Reservoir is a 1,400-gallon above ground reservoir containing Lubricating Oil for the Main Boiler. The reservoir is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this reservoir has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 2 Main Boiler Feed Pump Lube Oil Reservoir is located inside the Unit 2 Turbine Generator Building, a release of Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this reservoir is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Main Boiler Feed Pump Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.23 U2 Main Lube Oil Reservoir TLOR

Description and Historical Use

The Unit 2 Main Lube Oil Reservoir is a 15,000-gallon above ground reservoir containing lubricating oil for the Unit 2 Turbine Generator. The reservoir is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this reservoir has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 2 Main Lube Oil Reservoir is located inside the Unit 2 Turbine Generator Building, a release of Lubricating Oil from the reservoir is unlikely to result in gross contamination of soil or groundwater. The area of this reservoir is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Main Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.24 U2 Main Turbine Generator Bearing Oil Drain Tank BODT

Description and Historical Use

The Unit 2 Main Turbine Generator Bearing Oil Drain Tank is a 120-gallon above ground tank containing waste oil from the Unit 2 Turbine Generator bearings. The tank is located in the Unit 2 Turbine Generator Building. (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 2 Main Turbine Generator Bearing Oil Drain Tank is located inside the Unit 2 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Main Turbine Generator Bearing Oil Drain Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.25 U2 Main Turbine Oil Conditioner MTOC

Description and Historical Use

The Unit 2 Main Turbine Oil Conditioner is a 1,150-gallon above ground tank containing lubricating oil for the Unit 2 Turbine (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 2 Main Turbine Oil Conditioner is located inside the Unit 2 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Main Turbine Oil Conditioner for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.26 U2 R2D2 Lube Oil Sludge Tank R2D2ST

Description and Historical Use

The Unit 2 R2D2 Lube Oil Sludge Tank is a 250-gallon above ground tank containing lubricating oil sludge. The tank is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 2 R2D2 Lube Oil Sludge Tank is located inside the Unit 2 Turbine Generator Building, a release of Lubricating Oil sludge from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 R2D2 Lube Oil Sludge Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.27 U2 Westphalia Separator Sludge Tank LOSTSST

Description and Historical Use

The Unit 2 Westphalia Separator Sludge Tank LOSTSST is a 550-gallon above ground tank containing lubricating oil sludge. The tank is located in the Unit 2 Turbine Generator Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 2 Westphalia Separator Sludge Tank LOSTSST is located inside the Unit 2 Turbine Generator Building, a release of Lubricating Oil sludge from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Westphalia Separator Sludge Tank LOSTSST for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.4.1.5.28 U2 Technical Support Center Diesel Tank TSCFODT

Description and Historical Use

The Unit 2 Technical Support Center Diesel Tank is a 75-gallon above ground day tank containing diesel fuel for the Technical Support Center Emergency Diesel Generator. The tank is located in the Unit 1 Superheater and Administration Building (Figure 4, Cell A5). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 2 Technical Support Center Diesel Tank is located inside the Unit 1 Superheater and Administration Building, a release of Diesel Fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 2 Technical Support Center Diesel Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

Storage Tanks Supporting Documents

IP2 2017 SPCC PLAN.pdf
IP2 Storage Tank Information.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf

6.4.1.6 Transformers

The original transformers at the station were filled with PCB-containing dielectric fluid. All of the accessible original equipment containing PCBs have either been replaced or drained and refilled with non-PCB dielectric fluid during the early 1980s after the manufacture of PCBs was banned in 1979. Nevertheless, because the original transformers were provided with PCB-containing dielectric fluid, there is a potential that legacy contamination of soil or groundwater with PCBs could exist.

6.4.1.6.1 U2 Main Transformer 21

Description and Historical Use

Unit 2 Main Transformer 21 is located within a containment structure filled with trap rock in the Unit 2 Transformer Yard (Figure 4, Cell B5). The transformer contains 19,787 gallons of non-PCB dielectric oil. As discussed in Subsection 4.2.2.1 this transformer was replaced in 2010 after a bushing failure and fire released non-PCB dielectric oil to the surrounding soil.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Because of the known release in 2010 and the volume of dielectric fluid that could be released from Unit 2 Main Transformer 21, a preliminary classification of NR Class 1 is assigned to the transformer.

Recommended Future Investigation Activities

Inspect Unit 2 Main Transformer 21 and surrounding area for indications of a release of the Potential Contaminant to the environment.

Collect surface and subsurface soil samples in the area of the transformer to determine if residual dielectric oil remains in the soil. Sample groundwater from nearby monitoring wells to determine if dielectric oil has impacted the local groundwater.

6.4.1.6.2 U2 Main Transformer 22

Description and Historical Use

Unit 2 Main Transformer 22 is located within a containment structure filled with trap rock in the Unit 2 Transformer Yard (Figure 4, Cell B5). The transformer contains 19,787 gallons of non-PCB dielectric oil. No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Because of the volume of dielectric fluid that could be released from Unit 2 Main Transformer 22, a preliminary classification of NR Class 1 is assigned to the transformer.

Recommended Future Investigation Activities

- Unit 2 Main Transformer 22 is adjacent to Unit 2 Main Transformer 21 in the Unit 2 Transformer Yard, where a release of dielectric oil occurred in 2010.
- Inspect Unit 2 Main Transformer 22 and surrounding area for indications of a release of the Potential Contaminant to the environment.
- Collect surface and subsurface soil samples in the area of the transformer to determine if residual dielectric oil remains in the soil. Sample groundwater from nearby monitoring wells to determine if dielectric oil has impacted the local groundwater.

6.4.1.6.3 U2 New Simulator L&P Transformer

Description and Historical Use

The Unit 2 New Simulator L & P (Light and Power) Transformer is a pad-mounted transformer located south of the New Simulator Building (Figure 4, Cell C5). The transformer contains less than 500 gallons of non-PCB dielectric oil. No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 2 is assigned to the Unit 2 New Simulator L&P Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.4.1.6.4 U2 Spare Station Auxiliary Transformer

Description and Historical Use

The Unit 2 Spare Station Auxiliary Transformer contains 8,279 gallons of non-PCB dielectric oil. The transformer is located at the northwest corner of the Unit 2 Turbine Generator Building (Figure 4, Cell A5) and is not in service. No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 2 Spare Station Auxiliary Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.4.1.6.5 U2 Station Auxiliary Transformer

Description and Historical Use

The Unit 2 Station Auxiliary Transformer contains 9,207 gallons of non-PCB dielectric oil. The transformer is located in the Unit 2 Transformer Yard (Figure 4, Cell B5). No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 2 Station Auxiliary Transformer,

Recommended Future Investigation Activities

- The Unit 2 Station Auxiliary Transformer is located in the Unit 2 Transformer Yard, where a release of dielectric oil occurred in 2010.
- Inspect the Unit 2 Station Auxiliary Transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.
- Collect surface and subsurface soil samples in the area of the transformer to determine if residual dielectric oil remains in the soil. Sample groundwater from nearby monitoring wells to determine if dielectric oil has impacted the local groundwater.

6.4.1.6.6 U2 Substation A Transformer

Description and Historical Use

The Unit 2 Substation A Transformer is a pad-mounted transformer located north of the Protected Area Access Facility (Figure 4, Cell B5). The transformer contains less than 500 gallons of non-PCB dielectric oil.

As discussed in Subsection 4.2.2.1 Substation A previously may have contained a transformer containing PCB dielectric oil. Samples of surface soil within the top six inches within the substation area were analyzed for PCBs and petroleum constituents in 2000. No PCBs were detected but petroleum constituents were detected [14].

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 2 is assigned to the Unit 2 Substation A Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.4.1.6.7 U2 Test Transformer (L & P Room)

Description and Historical Use

The Unit 2 Test Transformer (Light and Power Room) is located in the south end of the Unit 1 Turbine Generator Building (Figure 4, Cell A5). The transformer contains less than 500 gallons of non-PCB dielectric oil. No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Because the Unit 2 Test Transformer is located in the L&P Room in the Unit 1 Turbine Generator Building, and based on the volume of dielectric fluid that could be released a preliminary classification of NR Isolated is assigned to the Unit 2 Test Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.4.1.6.8 U2 Unit Auxiliary Transformer

Description and Historical Use

The Unit 2 Unit Auxiliary Transformer contains 6,034 gallons of non-PCB dielectric oil. The transformer is located in the Unit 2 Transformer Yard (Figure 4, Cell B5). Several gallons of transformer oil were released from the Unit Auxiliary Transformer in February 2007 (CR-IP2-2007-00747).

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 2 Unit Auxiliary Transformer,

Recommended Future Investigation Activities

- The Unit 2 Unit Auxiliary Transformer is located in the Unit 2 Transformer Yard, where a large release of dielectric oil occurred in 2010.
- Inspect the Unit 2 Unit Auxiliary Transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.
- Collect surface and subsurface soil samples in the area of the transformer to determine if residual dielectric oil remains in the soil. Sample groundwater from nearby monitoring wells to determine if dielectric oil has impacted the local groundwater.

Transformers Supporting Documents

21 xfmr pcb results.jpg
31 xfmr PCB results.jpg
CR-IP2-2006-04701, Diesel oil in manholes and pipe segments in transformer yard.pdf
CR-IP2-2007-00747, Oil from Unit Aux transformer spilled to surrounding rocks.pdf
CR-IP2-2010-06803, main transformer explosion.pdf
Draft Letter to NYSDEC re 4 AOCs at IPEC.pdf
Emails re PCB Search and Calculation .PDF
Indian Point Main Transformers.pdf
IP2 2017 SPCC PLAN.pdf
IPEC Transformer Failure and PCBs.docx
Letter to Joyce Jiudice regarding Order on Consent and Associated Schedu....pdf
Letter to NYSDEC re Consent Order U2 Main Xfmr.pdf
Main Transformer History.pdf
Phase I ESA Units 1&2 Jan 2000.pdf
Phase II ESA Units 1&2 Mar 2000.pdf
Spill No.1008306, 100 gallons transformer oil to soil & surface water, 11-8-2010.pdf

6.4.2 Radiological Impacts

6.4.2.1 Radionuclides of Concern

The following waste characterization analyses (which were performed to demonstrate compliance with 10 CFR Part 61) were reviewed to determine the primary Radionuclides of Concern (ROCs):

- Dry Active Waste Smears (2014, 2016, 2018)
- LWS Resin Samples (2016, 2018)
- SRST Resin Samples (2015, 2017, 2018)

In addition, a review of the Annual Radiological Effluent Release Reports (ARERRs) for 2015, 2016 and 2017 was performed.

A composite list of radionuclides identified as "positive" by IPEC's evaluation of the 10 CFR Part 61 analyses and ARERRS was produced and is included in Table 10 as a master list of ROCs. If the fraction remaining at any the time periods listed was less than 1.0E-6, the value at that time period was replaced with 0.0E+00.

Table 10: Unit 2 Composite List of Positively Identified Radionuclides

Radionuclide	Half-Life (yrs)	Fraction Remaining After			
		2 yrs	5 yrs	10 yrs	50 yrs
H-3	1.2E+01	8.9E-01	7.5E-01	5.7E-01	6.0E-02
C-14	5.7E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Cr-51	7.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mn-54	8.5E-01	2.0E-01	1.7E-02	3.0E-04	0.0E+00
Fe-55	2.7E+00	6.0E-01	2.8E-01	7.9E-02	3.2E-06
Fe-59	1.2E-01	1.1E-05	0.0E+00	0.0E+00	0.0E+00
Co-57	7.4E-01	1.6E-01	9.5E-03	9.0E-05	0.0E+00
Co-58	1.9E-01	7.9E-04	0.0E+00	0.0E+00	0.0E+00
Co-60	5.3E+00	7.7E-01	5.2E-01	2.7E-01	1.4E-03
Ni-59	1.0E+05	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Ni-63	1.0E+02	9.9E-01	9.7E-01	9.3E-01	7.1E-01
Zn-65	6.7E-01	1.3E-01	5.6E-03	3.1E-05	0.0E+00
Sr-89	1.4E-01	4.4E-05	0.0E+00	0.0E+00	0.0E+00
Sr-90	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Nb-95	9.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zr-95	1.8E-01	3.7E-04	0.0E+00	0.0E+00	0.0E+00
Tc-99	2.1E+05	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Ag-110m	6.8E-01	1.3E-01	6.3E-03	4.0E-05	0.0E+00
Sn-113	3.2E-01	1.2E-02	1.7E-05	0.0E+00	0.0E+00
Sb-124	1.6E-01	2.2E-04	0.0E+00	0.0E+00	0.0E+00
Sb-125	2.8E+00	6.0E-01	2.8E-01	8.1E-02	3.5E-06
I-129	1.6E+07	1.0E+00	1.0E+00	1.0E+00	1.0E+00

Radionuclide	Half-Life (yrs)	Fraction Remaining After			
		2 yrs	5 yrs	10 yrs	50 yrs
Cs-134	2.1E+00	5.1E-01	1.9E-01	3.5E-02	0.0E+00
Cs-137	3.0E+01	9.6E-01	8.9E-01	7.9E-01	3.2E-01
Ce-144	7.8E-01	1.7E-01	1.2E-02	1.4E-04	0.0E+00
Pu-238	8.8E+01	9.8E-01	9.6E-01	9.2E-01	6.7E-01
Pu-239	2.4E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-240	6.6E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Pu-241	1.4E+01	9.1E-01	7.9E-01	6.2E-01	8.9E-02
Am-241	4.3E+02	1.0E+00	9.9E-01	9.8E-01	9.2E-01
Cm-242	4.5E-01	4.5E-02	4.2E-04	0.0E+00	0.0E+00
Cm-243	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Cm-244	1.8E+01	9.3E-01	8.3E-01	6.8E-01	1.5E-01

This composite list was subsequently modified (via process knowledge and a realistic analysis of each ROC's respective half-life) and the ROCs were categorized into four distinct groups. These groups are the gamma emitters (Gammas), the Hard to Detect (HTD) and low energy beta emitters (HTD&Betas), tritium, and Transuranics (TRUs). Additionally, several ROCs were added because they are expected to be present in activated concrete (Eu-152, 154, and 155). The results are listed in Table 11.

Table 11: Unit 2 Categorized Radionuclides of Concern

Radionuclide	Category	Half-Life (yrs)
Chromium-51	Gammas	7.6E-02
Manganese-54	Gammas	8.5E-01
Cobalt-57	Gammas	7.4E-01
Cobalt-58	Gammas	1.9E-01
Nickel-59	Gammas	1.0E+05
Iron-59	Gammas	1.2E-01
Cobalt-60	Gammas	5.3E+00
Zinc-65	Gammas	6.7E-01
Niobium-95	Gammas	9.6E-02
Zirconium-95	Gammas	1.8E-01
Silver-110m	Gammas	6.8E-01
Tin-113	Gammas	3.2E-01
Antimony-124	Gammas	1.6E-01
Antimony-125	Gammas	2.8E+00
Cesium-134	Gammas	2.1E+00
Cesium-137	Gammas	3.0E+01
Cerium-144	Gammas	7.8E-01
Europium-152[b]	Gammas	1.3E+01

Radionuclide	Category	Half-Life (yrs)
Europium-154[b]	Gammas	8.6E+00
Europium-155[b]	Gammas	4.8E+00
Carbon-14	HTD&Betas	5.7E+03
Iron-55	HTD&Betas	2.7E+00
Nickel-63	HTD&Betas	1.0E+02
Strontium-89	HTD&Betas	1.4E-01
Strontium-90	HTD&Betas	2.9E+01
Technetium-99	HTD&Betas	2.1E+05
Iodine-129[a]	HTD&Betas	1.6E+07
Hydrogen-3	Tritium	1.2E+01
Plutonium-238	TRUs	8.8E+01
Plutonium-239	TRUs	2.4E+04
Plutonium-240	TRUs	6.6E+03
Americium-241	TRUs	4.3E+02
Plutonium-241	TRUs	1.4E+01
Curium-242	TRUs	4.5E-01
Curium-243	TRUs	2.9E+01
Curium-244	TRUs	1.8E+01
[a] = I-129 was not identified in site samples but is a required 10CFR20 App. G waste stream analyte		
[b] = EU-152,154 & 155 were not identified in site samples but are typically identified in activated concrete		

In summary, when analyzing samples for the presence of radioactivity, the ROCs listed in Table 11, should be requested analytes, based on the origin of the samples. Given that Units 2 and 3 are still operating, there may be a lengthy period between the time of completion of this HSA and initiation of decommissioning activities. With regard to the ultimate list of ROCs for the facility, radionuclide half-life should be considered to eliminate those radionuclides that would have decayed to negligible quantities at the time of decommissioning.

The potential presence of any of these ROCs will be denoted by their respective assigned category for the remainder of the HSA.

<u>Radionuclides of Concern Supporting Documents</u>

2015 Annual Radioactive Eff. Release Rpt.pdf
2016 Annual Radioactive Eff. Release Rpt.pdf
2017 Annual Radioactive Eff. Release Rpt.pdf
Unit 2 DAW - 2014.pdf

Unit 2 DAW - 2016.pdf
Unit 2 DAW - 2018.pdf
Unit 2 LWS Resin 2016.pdf
Unit 2 LWS Resin 2018 data from 2014-2018.pdf
Unit 2 LWS Resin 2018.pdf
Unit 2 SRST Resin 2015.pdf
Unit 2 SRST Resin 2017.pdf
Unit 2 SRST Resin 2018.pdf

6.4.2.2 Building or Structure

6.4.2.2.1 U2 Boric Acid Evaporator Building

Description and Historical Use

The Boric Acid Evaporator Building (Figure 3A, Cell B6) is a seismic Class I reinforced concrete structure supported by the roof slab of the Unit 2 waste hold-up tank pit. The exterior walls are of concrete and concrete block construction. The roof over the concrete block portion is light weight roofing over metal decking and a concrete slab is provided above the concrete wall portion.

The building contains the boric acid evaporator, gas stripper, and associated equipment (i.e. pumps, tanks, filters/demineralizers, etc.). There are also three monitor tanks mounted outside the structure.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- SSCs

Preliminary Classification

The Boric Acid Evaporator Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the station operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior walls and roof
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps
- Radiological analysis of roofing material samples to determine volumetric contamination

6.4.2.2.2 U2 Containment Building

Description and Historical Use

The Unit 2 Reactor Containment Building (Figure 3A, Cell B6) is a steel-lined reinforced concrete cylinder with a hemispherical dome and a flat base. The containment is designed to withstand the internal pressure accompanying a loss-of-coolant accident, is virtually leak tight, and provides adequate radiation shielding for both normal operation and accident conditions.

The Containment Building houses the reactor pressure vessel, steam generators, reactor coolant pumps, pressurizer and all the SSCs associated with these major components.

Table 12: Unit 2 Containment Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
RB	Reactor Sump	40	*1,600/240
RB	Fuel Transfer Canal	24 - 720	*1200/720
RB Cavity	Core Exit Thermocouple Nozzle Assemblies (CETNA)	200	*850/350
RB Cavity	Cavity floor and CETNA	8 - 44	*780/350
RB Cavity	Cavity floor	10 - 260	400
RB	Top of Pressurizer	3 - 80	*160/80
RB 46'	21 Reactor Coolant Pump (RCP)	1 - 20	*120/50
RB 46'	22 RCP	4 - 30	*200/90
RB 46'	23 RCP	1.5 - 30	*125/80
RB 46'	24 RCP lower platform	12 - 150	*380/150
RB 46'	21/22 Steam Generator (SG) Platform	1.2 - 15	15
RB 46'	23/24 SG Platform	1 - 20	*25/20
RB 46'	Inside Containment Wall (ICW)	0.3 - 60	60
RB 46'	Outside Containment Wall (OCW)	0.3 - 15	15
RB 46'	Recirc Pump Room	1.2 - 12	30
RB 68'	OCW General Area	0.2 - 2	10
RB 68'	RHR Room	5	*250/60
RB 80'	Incore Detector Boxes	3 - 25	310
RB 95'	General Area	0.3 - 15	*30/15
RB 95'	Bedsprings with steel still installed	5 - 100	*250/100
Note: *#/# is contact/30 cm			

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, TRUs, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- SSCs

Preliminary Classification

The Containment Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior walls and dome
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

U2 Reactor Building surveys.pdf
Unit 2 Steam Generator Tube Failure Lessons Learned Report Oct 2000.pdf

6.4.2.2.3 U2 Control Building

Description and Historical Use

The IP2 control building is adjacent to the Unit 2 Turbine Generator Building on the west and the Superheater and Administration Building on the south (Figure 3A, Cell B5). The IP2 Control Building contains both the Unit 1 and Unit 2 control rooms and is a multi-story Class I steel framed structure with the north and east exterior wall consisting of insulated metal-sandwich panels. Floor slabs are composite type construction, concrete over steel beam. The Control Building houses the central control room; cable spreading room and other safety-related equipment and components.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- SSCs

Preliminary Classification

The Control Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

6.4.2.2.4 U2 Emergency Diesel Generator Building

Description and Historical Use

The Emergency Diesel Generator Building (Figure 3A, Cell B5) is constructed of a prefabricated rigid-frame with a solid corrugated metal roof and insulated, protected metal siding. The building houses the three emergency diesel generators, along with the associated switchgear and auxiliaries.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Emergency Diesel Generator Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.4.2.2.5 U2 Fuel Storage Building

Description and Historical Use

The Fuel Storage Building (Figure 3A, Cell B6) for Indian Point Unit 2 contains the spent fuel pit constructed of reinforced concrete and founded on rock. The steel superstructure above the pit encloses the pit and supports the fuel cask handling crane. This superstructure was designed as a Class III structure.

On May 7, 1992, a technician performing a walkdown of the yard outside of the Unit 2 Fuel Storage Building (FSB) noticed white powdery streaks on the exterior of the east wall of the building. Analysis of the material showed that it was boron and it contained radioactive materials, mostly Antimony (Sb-124 and Sb-125) and some Cesium (Cs-137). It was determined that in 1990, diving personnel performing cutting operations on the fuel racks perforated the Spent Fuel Pool liner.

Soil outside the building around the area where water in which the boron had been dissolved had flowed into the ground was dug up and placed into 55 gallon drums (approximately 100 drums). The maximum activity of the soil was approximately 10 pCi/g, mostly Antimony. The depth of soil removed to achieve the environmental lower limit of detection (LLD) was about 8 feet.

In September 2005, A hairline crack several feet in length was found at approximately the 60-foot level of the Unit 2 spent fuel pool south wall on the loading bay side. The crack was found during excavation associated with the dry cask storage project. In October 2005, a groundwater sample from monitoring well MW-111, located in the IP-2 Transformer Yard, indicated high levels of tritium. These events resulted in a two-year comprehensive hydrogeologic site investigation of the Indian Point Energy Center conducted by GZA GeoEnvironmental, Inc. (GZA) [8].

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, TRUs, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Fuel Storage Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

Adolph to Sandler memo 1992.pdf
CR-IP2-2005-03557, Hairline Crack 60' level of Unit 2 SFP South Wall.pdf
CR-IP2-2007-00921, Water Dripping from the Pipe Cap of PW-612 or PW-613, Primary Water in the IP-2 FSB.pdf
IP2 Safety Eval No. 92-163-TR.pdf
IP2 Safety Eval No. 92-165-DE.pdf
Lucius Pitkin Report - Eval of IP2 SFP walls 1993.pdf
May132008InsepctionReportML081340425 (1).pdf
Photos of SFP Investigation.pdf
U2 SFP HX leak in FSB Truck Bay 6-15-16.pdf
US NRC Inspection Report No. 50-247_92-16.pdf

6.4.2.2.6 U2 Maintenance Outage Building

Description and Historical Use

The Maintenance Outage Building (MOB) (Figure 3A, Cell B6) is a two-story structure used by maintenance and outage personnel as well as the security force. The building is located east of the Unit 2 Containment Building, north of the U2 Primary Auxiliary Building and adjacent to the U2 Fuel Storage Building. The building contains an elevated passageway that provides access to the U2 PAB. The south end of the building near the bridge at the connection of the MOB to the PAB contains safety-related conduit.

In 1986, the U2 Waste Holding Tank backed up into the MOB drain on the 80’ elevation resulting in flooding of the entire floor. Clean up resulted in removal of most of the contamination. However, several areas needed to be scabbled to achieve less than 100 cpm activity.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Maintenance Outage Building is preliminarily classified as a MARSSIM Class 1 structure due to the event discussed above, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

MOB 80' 50.75(g) Notebook Entry.pdf

6.4.2.2.7 U2 Original Steam Generator Storage Facility

Description and Historical Use

The Unit 2 Original Steam Generator Storage Facility (OSGSF) (Figure 3C, Cell A5) is a reinforced concrete structure measuring approximately 150' by 54' constructed to house the four original steam generators. The location is within the Owner Controlled Area but outside of the Protected Area. The structure is constructed of cast-in-place concrete with the exception of the south wall, which consists of pre-cast stackable concrete blocks. The roof is covered with a single-ply membrane roofing system.

On February 15, 2000, operators determined that a steam generator tube rupture occurred and manually tripped the reactor. As a result of this event, all four (4) original steam generators were replaced and stored in the OSGSF by the end of 2000.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Original Steam Generator Storage Facility is preliminarily classified as a MARSSIM Class 2 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

Supporting Documents

Rad Surveys of U2 Original SG Storage Facility.pdf

6.4.2.2.8 U2 Primary Auxiliary Building

Description and Historical Use

The Unit 2 Primary Auxiliary Building (Figure 3A, Cell B5) is a concrete structure and is located adjacent to the Containment Building. This structure contains all support systems for reactor operations that are not located in the Containment Building. The building houses most of the auxiliary and safety systems associated with the reactor, such as radioactive waste systems, chemical and volume control systems, and emergency cooling water systems.

Table 13: Unit 2 Primary Auxiliary Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
PAB 15’	21 RHR Pump Cell	3 – 80	80
PAB 15’	RHR Piping and Valves	5 - 35	35
PAB 15’	22 RHR Pump Cell	5 - 10	*12/7
PAB 51'	Pipe Pen Catwalk	0.1 - 5	15
PAB 51'	Pipe Pen - Section 1	<0.1 - 1	1
PAB 51'	Pipe Pen - Section 2	1 - 15	*90/30
PAB 51'	Pipe Pen - Section 3	<1 - 3	*10/3
PAB 51'	Pipe Pen - Section 4	2 - 5	*10/5
PAB 51'	Pipe Pen - Section 5	4 - 30	*100/30
PAB 51'	Pipe Pen - Section 6	0.5 - 12	*35/25
PAB 59'	Ion Exchange Valve Gallery	4 - 1,200	*38,000/2,600
PAB 59'	Safety Injection Pumps	0.2 – 2	2
PAB 68'	Component Cooling Pumps	<0.2 - 0.8	0.8
PAB 80'	22 Charging Pump	0.5 - 1.6	2
PAB 80'	23 Charging Pump	1 -3	5
PAB 98'	Volume Control Tank & Valve Corridor	0.5 - 80	*150/80
PAB 98'	Non-Regenerative Heat Exchanger	2 - 45	50
Note: *#/# is contact/30 cm			

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Primary Auxiliary Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

U2 CCW leak 12-20-17.pdf
U2 PAB surveys.pdf
U2 RHR Valve Gallery Leak 4-1-18.pdf

6.4.2.2.9 U2 Turbine Generator Building

Description and Historical Use

The Unit 2 Turbine Generator Building (Figure 3A, Cells B5 and B6) houses the Unit 2 Turbine Generator and associated auxiliaries, the Condenser, Condensate and Feedwater Systems, switchgear, the Turbine Building crane, and other auxiliary equipment. The Turbine Building is a rigid steel and concrete structure.

Due to the steam generator tube rupture in February of 2000, contamination was transported to various systems within the Turbine Building.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Turbine Generator Building and all SSCs within are preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of sediment samples of building sumps

6.4.2.3 Exterior Area

6.4.2.3.1 U2 Fuel Storage Building Alleyway

Description and Historical Use

On May 7, 1992, a technician performing a walkdown of the yard outside of the Fuel Storage Building (FSB) (Figure 3A, Cell B6) noticed white powdery streaks on the exterior of the east wall of the building. Analysis of the material showed that it was boron and it contained radioactive materials, mostly Antimony (Sb-124 and Sb-125) and some Cesium (Cs-137).

Soil outside the building around the area where the water had flowed into the ground was dug up and placed into 55-gallon drums (approximately 100 drums). The maximum activity of the soil was approximately 13 pCi/g, mostly Antimony. The depth of soil removed to achieve the environmental lower limit of detection (LLD) was about 8 feet [NRC Inspection Report No: 50-247/92-16].

On April 14, 2006 during multiple system tests of the Supplemental Spent Fuel Pool Cooling System, about 200 gallons of secondary side water containing approximately 20,000 pCi/L of tritium overflowed from the cooling tower. The water overflowed out of the secondary side tower basin on to the asphalt and concrete area in the FSB Alleyway, and some runoff also went into the soil and storm drain located across the alleyway. The overflow was caused by stopping the secondary side pumps, which allowed the dead leg of the return line water to empty into the tower basin without being pumped back out [CR-IP2-2006-01896].

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil
- Concrete
- Gravel

Preliminary Classification

The Fuel Storage Building Alleyway is preliminarily classified as a MARSSIM Class 1 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion

Supporting Documents

CR-IP2-2006-01896 SFPBUHX overflow to yard and storm drains.pdf
CR-IP2-2014-02441, Small Leak of Cont. Water from BUSFPC System Filter Housing.pdf
TID-03-008, PAB Alleyway Outside Drumming Room.pdf

6.4.2.3.2 U2 Retired RAM Pen

Description and Historical Use

The Retired RAM Pen (Figure 3C, Cell C6), also referred to as the City Water Tank RMSA, is a grassy area surrounded by chain link fence near, but physically separated from, the City Water Tank. The area was used for the storage of contained radioactive material. The Retired RAM Pen is located within the Owner Controlled Area but outside of the Protected Area. During site tours conducted in December 2018, the pen was observed to be empty.

A radiological survey, located in the 50.75g file, contained the results of a soil sample taken from the area in 1994. The analysis of the sample identified Co-60 (2.6 pCi/g) and Cs-137 (0.7 pCi/g).

During interviews it was stated that the RAM Pen is no longer used, however, radiological postings are still in place on the fence surrounding the area.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Soil

Preliminary Classification

The Retired RAM Pen is preliminarily classified as a MARSSIM Class 2 area, based on the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of soil samples taken in a systematic fashion

Supporting Documents

City Water Tank RMSA Soil Notebook Entry.pdf
TID-04-006, Retired RAM Pen Soil Samples.pdf

6.4.2.3.3 U2 Transformer Yard

Description and Historical Use

The Unit 2 Transformer Yard (Figure 3A, Cell B5) contains the 21 and 22 Main Transformers, Station Auxiliary Transformer and Unit Auxiliary Transformer.

In 1992, the Electrical Tunnel deluge line to the Transformer Yard was contaminated by an Evaporator overflow. Surface samples and scrapes near the outlet identified both Cs-137 and Co-60, with values ranging from approximately 1 pCi/g to 100 pCi/g. In 1994, the PAB wall was disassembled to remove motors from the RHR pumps. At that time, several composite samples were obtained outside the RHR door and at the edge of the storm drain, near the hydrant. Both Cs-137 and Co-60 were identified, with values ranging from approximately 0.1 pCi/g to 3 pCi/g.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil
- Concrete
- Gravel

Preliminary Classification

The areas identified above are preliminarily classified as a MARSSIM Class 1 based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria. For planning purposes, the Class 1 portion of the yard should extend out 5 meters from the entire length of the PAB west wall and 5 meters from the Control Building north wall up to the 22 Main Transformer. The balance of the Transformer Yard is preliminarily classified as a MARSSIM Class 2 area, based on the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion

Supporting Documents

Elec. Tunnel Deluge to XFRMR Yard Notebook Entry.pdf
U2 Transformer Yard at RHR Wall 50.75(g) Notebook Entry.pdf
U2 Transformer Yard ET Deluge Line 50.75(g) Notebook Entry.pdf
U2 Transformer Yard Soil Samples.pdf
XFRMR Yard Soil Notebook Entry.pdf

6.4.2.4 Storage Tanks

6.4.2.4.1 U2 Condensate Storage Tank CST

Description and Historical Use

The Unit 2 Condensate Storage Tank (CST) (Figure 3A, Cell B6) is a 600,000-gallon storage tank which is constructed of carbon steel with a phenolic liner and has a floating diaphragm on the surface of the water to exclude air.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Condensate Storage Tank and associated SSCs are preliminarily classified as a MARSSIM Class 3 SSC based on the radioactive content of the water it was designed to store, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.4.2.4.2 U2 Monitor Tanks

Description and Historical Use

The Unit 2 Monitor Tanks, (Figure 3A, Cell C5) located adjacent to and south of the Boric Acid Evaporator Building, were used to store water that had been processed through the evaporators. The water would be circulated and monitored for radioactivity and other chemical parameters prior to discharge. As with the evaporator system, the monitor tanks were retired in the early 1980s.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Monitor Tanks and associated SSCs are preliminarily classified as a MARSSIM Class 2 SSC based on the radioactive content of the water they were designed to store, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the interior of the tanks
- Direct measurements and contamination surveys of the exterior of the tanks

6.4.2.4.3 U2 Primary Water Storage Tank PWST

Description and Historical Use

The Unit 2 Primary Water Storage Tank (PWST) (Figure 3A, Cell C5) is a 165,000-gallon tank constructed of Type 304 stainless steel with a floating diaphragm to exclude air. The main purpose of the PWST is to store water of a suitable quality for make-up to the primary coolant system.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Primary Water Storage Tank is preliminarily classified as a MARSSIM Class 3 SSC based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.4.2.4.4 U2 Refueling Water Storage Tank RWST

Description and Historical Use

The Unit 2 Refueling Water Storage Tank (RWST) (Figure 3A, Cell C5) has a nominal capacity of 395,000 gallons of borated water. The purpose of the tank is to supply borated water to the refueling canal for refueling operations and to the safety injection pumps, the residual heat removal pumps, and the containment spray pumps for accidents requiring safety injection. Following refueling operations, water from the refueling canal is pumped back into the RWST.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Refueling Water Storage Tank and associated SSCs are preliminarily classified as a MARSSIM Class 1 SSC based on the radioactive content of the water it was designed to store, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.5 Unit 3 Impacts

6.5.1 Non-Radiological Impacts

6.5.1.1 Building or Structure

6.5.1.1.1 U3 Auxiliary Feedwater Pump Building

Description and Historical Use

The Unit 3 Auxiliary Feedwater Pump Building is located adjacent to the northwest quadrant of the Unit 3 Containment Building (Figure 3A, Cell B4). The building houses four feedwater pumps each containing approximately 200 gallons of lubricating oil. No record of a release of hazardous material from the Unit 3 Auxiliary Feedwater Pump Building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 3 Auxiliary Feedwater Pump Building and the volume of lubricating oil that could be released from the Auxiliary Feedwater Pumps a preliminary classification of NR Isolated is assigned to the building.

Recommended Future Investigation Activities

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.1.2 U3 Circulation Water Pump Building

Description and Historical Use

The Unit 3 Circulation Water Pump Building is part of the Unit 3 Intake Structure, located next to the Hudson River, west of the Unit 3 Turbine Generator Building (Figure 3A, Cells A3 to A4). The building houses Circulating Water and Service Pumps containing a total of approximately 600 gallons of lubricating oil. No record of a release of hazardous material from the Unit 3 Circulation Water Pump Building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and RCRA Metals.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 3 Circulation Water Pump Building and the volume of lubricating oil that could be released from the Circulation Water and Service Pumps a preliminary classification of NR Isolated is assigned to the building.

Recommended Future Investigation Activities

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.1.3 U3 Emergency Diesel Generator Building

Description and Historical Use

The Unit 3 Emergency Diesel Generator Building houses three Emergency Diesel Generators, each containing approximately 150 gallons of lubricating oil. The building is located north of the Unit 3 Outage Support Building (Figure 3A, Cell B3). No record of a release of hazardous material from the Unit 3 Emergency Diesel Generator Building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 3 Emergency Diesel Generator Building and the volume of lubricating oil that could be released from the Emergency Diesel Generators a preliminary classification of NR Isolated is assigned to the building.

Recommended Future Investigation Activities

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.1.4 U3 Intake Structure

Description and Historical Use

The Unit 3 Intake Structure (Figure 3A, Cells A3 to A4) is the location of the station water intake components including the trash racks, traveling screens and pumps for the circulation water, service water and fire protection systems.

Sodium hypochlorite is stored in two fiberglass above ground storage tanks and is injected into the circulating water to limit biofouling of the condenser and into the service water to limit biofouling of heat exchangers. No record of a release of hazardous material from the Intake Structure has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil, RCRA Metals, and Sodium Hypochlorite. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 3 Intake Structure and the volume of lubricating oil and sodium hypochlorite that could be released from the pumps and tanks a preliminary classification of NR Isolated is assigned to the building.

Recommended Future Investigation

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.1.5 U3 Radioactive Machine Shop

Description and Historical Use

The Unit 3 Radioactive Machine Shop (RAMS) (Figure 3A, Cell C3) contains various machining tools such as lathes, saws and drill presses. Lubricating and cutting oils are used in the shop in relatively small volumes. No record of a release of hazardous material from the shop has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil, Cutting Oil, Hydraulic Oil, Lubricating Oil, RCRA Metals, and Spent Solvents. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Tools

Preliminary Classification

Based on their location within the Unit 3 Radioactive Machine Shop and the volume of hazardous materials that could be released a preliminary classification of NR Isolated is assigned to the Shop.

Recommended Future Investigation Activities

Inspect the concrete floor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.1.6 U3 Turbine Generator Building

Description and Historical Use

The Unit 3 Turbine Generator Building (Figure 3A, Cells B3 to B4) houses the Unit 3 Turbine Generator and associated auxiliaries, the Condenser, Condensate and Feedwater Systems, switchgear, the Turbine Building crane, and other auxiliary equipment. The Turbine Generator Building is a rigid steel and concrete structure.

Structural steel members in the building are assumed to be coated with lead-based paint. Various components such as pump and valve gaskets and pipe wrap may contain asbestos. Other components such as electrical switches, relays, thermostats and gauges may contain mercury.

As discussed in Subsection 4.2.2.1, in 1989 3,500 gallons of lubricating oil was released from a corroded return line beneath the Unit 3 Turbine Generator Building [23]. Oil also was released from the R4D4 Sludge Tank to the Unit 3 Turbine Generator Building floor and the Discharge Canal in 1991 (SOR-91-3-109).

In 1995 oil was detected issuing from floor drains of the Unit 3 Turbine Generator Building 5-foot elevation and seeping into the Discharge Canal (CR-IP3-1995-00524). The oil was removed from the floor drains and the drains were repaired. An investigation by Foster Wheeler, a hydrogeologic consultant, could not provide a definitive solution to the contamination event without performing additional studies [24].

As of spring of 1998 no additional oil was evident and no seepage into the discharge canal had been detected. Buried safety-related utilities are located in the area where oil had been detected and further subsurface investigation there would have risked damage to vital plant equipment. Because of this condition, the absence of further evidence of oil seepage into the canal and the apparent low risk of environmental impact, inspectors from the NYSDEC agreed that there was no benefit to be gained from additional investigation. A monitoring program in nearby groundwater monitoring wells was established [20] [24].

Known and Potential Contaminants

The non-radiological contaminants are Asbestos, Lead, Lubricating Oil, Waste Oil, and RCRA Metals.

Potentially Contaminated Media

- Building Materials (Floor)
- Floor Drains
- Lead Paint
- Asbestos
- Mercury
- Soil
- Groundwater
- Sumps

Preliminary Classification

Because of the known release of Lubricating Oil from the Unit 3 Turbine Generator Building and the potential that residual oil may remain beneath the building, a preliminary classification of NR Class 1 is assigned to the building.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants.

Supporting Documents

Memo from NYPA re Status of T.H. 5' Remediation Project 4-20-99.pdf
Memo to ENZ re IP3 TB Oil Plume Investigation 11-24-99.PDF
Memo to P.Gauron, PC and C.Wells re NYPA Acquisiton .PDF
SOR 91-3-109 U3 Oil Spill to Turbine Building and Discharge Canal 5-25-1991.pdf
SOR 91-3-144 Follow up to SOR-91-3-144 U3 Turbine Lube Oil Separator Overflow.pdf
TLG's Draft Report - Radiological and Hazardous Condition Assessment of ....pdf

6.5.1.2 Chemical and Drum Storage Areas

6.5.1.2.1 U3 Hazardous Waste Storage Building

Description and Historical Use

Because Units 2 and 3 have separate permits to generate hazardous waste in accordance with provisions of the U.S. Resource Conservation and Recovery Act (RCRA), each Unit must store their hazardous waste separately. However, Universal Wastes from both Unit 2 and Unit 3 are stored in the Unit 3 Hazardous Waste Storage Building.

As a Large Quantity Generator, Unit 3 stores no more than 1,000 kilograms per month in its Hazardous Waste Storage Building, located north of the Training Fire Pump Diesel Storage Tank (Figure 5, Cell C3). No record of a release of hazardous material in this building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Acids-Bases, Batteries, Lead, Mercury, Spent Solvents, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the wastes are contained within an enclosed structure, the Unit 3 Hazardous Waste Storage Building is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the floor of the Unit 3 Hazardous Waste Storage Building for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

Chemical and Drum Storage Areas Supporting Documents

EN-EV-106__007.pdf
IP3 CBS_PBS and RCRA LQG & TSD Applications.pdf
IP3 Mixed Waste TSDF Permits 6-8-2000.pdf
IPEC Haz. Waste Inventory.pdf

6.5.1.3 Exterior Area

6.5.1.3.1 U3 Soil Pile Posted as Lead Hazard

Description and Historical Use

As discussed in Subsection 4.2.2.1, an approximately six-foot high pile of soil posted as a lead hazard was identified in 2000 in a lay-down area southwest of the Training Center and north of the U3 Original Steam Generator Storage Facility (Figure 3B, Cell B4) [20]. Unit 3 staff identified the area as one where equipment presumably coated with lead-based paint was sandblasted. The soil pile has been removed from the station.

Known and Potential Contaminants

The non-radiological contaminants are Lead and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Although the soil pile has been removed, because it was in an open lay-down area and no documentation of its removal or remediation has been found, the Unit 3 Soil Pile Posted as Lead Hazard is assigned a preliminary classification of NR Class 3.

Recommended Future Investigation Activities

Collect surface soil samples in the area of the former soil pile and analyze the samples for the Potential Contaminants.

6.5.1.3.2 U3 Transformer Yard

Description and Historical Use

The Unit 3 Transformer Yard (Figure 5, Cell B7) contains the 31 and 32 Main Transformers, Unit Auxiliary Transformer and Station Auxiliary Transformer.

As discussed in Subsection 4.2.2.1, oil staining was observed on the 31 and 32 Main Transformers, their concrete footings and surrounding soil in 2000 during a radiological and hazardous condition assessment of the Unit 3 Site ([20].

A bushing failure in the 31 Main Transformer in 2007 resulted in a 5-gallon release of transformer oil (CR-IP3-2007-01844; NYSDEC Spill Report 700825).

An internal fault and fire in 2015 in a replacement 31 Main Transformer resulted in an oil release to soil and the Discharge Canal. (CR-IP3-2015-02916; NYSDEC Spill Report 1501459); [16] [17] [21] [22]. The deluge system that automatically engaged to extinguish the fire released a large volume of fire-suppression foam and water. As a result, water and transformer oil overflowed the berm containing the transformer, infiltrated surrounding soil, entered the local storm drain and flowed to the Discharge Canal. The contaminated trap rock within the berm was removed, an impermeable liner was applied to the berm floor and walls, clean trap rock was placed in the berm and a replacement 31 Main Transformer was installed.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater
- Concrete
- Trap Rock

Preliminary Classification

The Unit 3 Transformer Yard is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants.

Supporting Documents

31 Main Transformer Spill, etc Closeout.pdf
CR-IP3-1997-02006, 5 gallons of hydraulic oil spilled to ground from fork lift.pdf

6.5.1.4 Oil-Filled Mechanical Equipment

6.5.1.4.1 U3 Appendix R Diesel Generator

Description and Historical Use

The Unit 3 Appendix R Diesel Generator is located north of the Unit 3 Containment Building (Figure 5, Cell B7) and contains approximately 100 gallons of lubricating oil. No record of a release of hazardous material from the Unit 3 Appendix R Diesel Generator enclosure has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 Appendix R Diesel Generator is located within an enclosure it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the Generator have caused gross contamination of soil or groundwater. The Generator is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the floor of the Unit 3 Appendix R Diesel Generator enclosure for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.4.2 U3 Building Elevators

Description and Historical Use

An elevator in the Unit 3 Administration Building contains an approximately 50-gallon reservoir of hydraulic oil. No record of a release of hazardous material from this elevator has been found.

Known and Potential Contaminants

The non-radiological contaminants are Hydraulic Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Concrete

Preliminary Classification

Because the Unit 3 Administration Building Elevator is contained within the building it serves, it is not likely that releases that may have occurred from the hydraulic oil reservoir have caused gross contamination of soil or groundwater. This building elevator is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the hydraulic oil reservoir and the bottom of the elevator shaft for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.4.3 U3 Circulation Water Pump Motors

Description and Historical Use

The Unit 3 Circulation Water Pumps are located in the Unit 3 Intake Structure (Figure 3A, Cells A3 to A4), downstream from the trash rack and traveling screens. Each pump motor contains approximately 100 gallons of lubricating oil. No record of a release of lubricating oil from the pump motors has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location in the Intake Structure it is not likely that releases of Lubricating Oil that may have occurred from the Unit 3 Circulating Water Pump Motors have caused gross contamination of soil or groundwater. The Circulating Water Pump Motors are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Circulation Water Pump Motors for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.4.4 U3 Condensate Pump Motors

Description and Historical Use

The Unit 3 Condensate Pumps are located in the Unit 3 Turbine Generator Building (Figure 3A, Cells B3 to B4). All drains from the Turbine Generator Building flow to Radwaste for treatment and to ensure that no oil or unmonitored radioactivity leaves the building. The pump motors contain a total of approximately 300 gallons of lubricating oil. No record of a release of lubricating oil from the pump motors has been found.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 3 Turbine Generator Building it is not likely that releases of Lubricating Oil that may have occurred from the Pump Motors have caused gross contamination of soil or groundwater. The Unit 3 Condensate Pump Motors are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Condensate Pump Motors for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.4.5 U3 Diesel Fire Pump Motor

Description and Historical Use

The Unit 3 Diesel Fire Pump is located in a building next to the Unit 3 Fire Water Storage Tanks (Figure 5, Cell B7). The pump motor contains approximately 100 gallons of lubricating oil. No record of a release of lubricating oil from the pump motor has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on its location within a small building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the Unit 3 Diesel Fire Pump Motor has caused gross contamination of soil or groundwater. A preliminary classification of NR Isolated is assigned to the Pump Motor.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Diesel Fire Pump Motor for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.4.6 U3 Emergency Diesel Generators

Description and Historical Use

The Unit 3 Emergency Diesel Generators are located in the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). Each of the three generators contain approximately 150 gallons of lubricating oil. No record of a release of lubricating oil from the Unit 3 Emergency Diesel Generators has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on their location within the Unit 3 Emergency Diesel Generator Building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the Generators has caused gross contamination of soil or groundwater. The Unit 3 Emergency Diesel Generators are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Emergency Diesel Generators for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.4.7 U3 Technical Support Center Emergency Diesel Generator

Description and Historical Use

The Unit 3 Technical Support Center Emergency Diesel Generator is located at the south end of the Unit 3 Turbine Generator Building (Figure 5, Cell B3). The generator contains approximately 100 gallons of diesel fuel and lubricating oil. No record of a release of diesel fuel or lubricating oil from the Unit 3 Technical Support Center Emergency Diesel Generator has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Based on its location within the Unit 3 Turbine Generator Building it is not likely that releases of Diesel Fuel or Lubricating Oil that may have occurred from the generator has caused gross contamination of soil or groundwater. The Unit 3 Technical Support Center Emergency Diesel Generator is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Technical Support Center Emergency Diesel Generator for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5 Storage Tanks

6.5.1.5.1 U3 31 Emergency Diesel Generator Day Tank DD1

Description and Historical Use

The Unit 3 31 Emergency Diesel Generator Day Tank is a 175-gallon steel above ground tank located in the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 31 Emergency Diesel Generators Day Tank is located inside the Unit 3 Emergency Diesel Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 31 Emergency Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.2 U3 31 Emergency Diesel Generator Storage Tank 31EDG

Description and Historical Use

The Unit 3 31 Emergency Diesel Generator Storage Tank is a 7,700-gallon steel underground tank located adjacent to the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 31 Emergency Diesel Generator Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.

Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.3 U3 31 Main Boiler Feed Pump Oil Accumulator Tank 31LOA

Description and Historical Use

Unit 3 31 Main Boiler Feed Pump Oil Accumulator Tank 31LOA is an 80-gallon above ground storage tank containing lubricating oil and is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A6). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because Unit 3 31 Main Boiler Feed Pump Oil Accumulator Tank 31LOA is located inside the Unit 3 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Unit 3 31 Main Boiler Feed Pump Oil Accumulator Tank 31LOA for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.4 U3 32 Emergency Diesel Generator Day Tank DD2

Description and Historical Use

The Unit 3 32 Emergency Diesel Generator Day Tank is a 175-gallon steel above ground tank located in the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 32 Emergency Diesel Generators Day Tank is located inside the Unit 3 Emergency Diesel Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 32 Emergency Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.5 U3 32 Emergency Diesel Generator Storage Tank 32EDG

Description and Historical Use

The Unit 3 32 Emergency Diesel Generator Storage Tank is a 7,700-gallon steel underground tank located adjacent to the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 32 Emergency Diesel Generator Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.

Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.6 U3 32 Main Boiler Feed Pump Oil Accumulator Tank 32LOA

Description and Historical Use

Unit 3 32 Main Boiler Feed Pump Oil Accumulator Tank 32LOA is an 80-gallon above ground storage tank containing lubricating oil and is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A6). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because Unit 3 32 Main Boiler Feed Pump Oil Accumulator Tank 32LOA is located inside the Unit 3 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Unit 3 32 Main Boiler Feed Pump Oil Accumulator Tank 32LOA for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.7 U3 33 Emergency Diesel Generator Day Tank DD3

Description and Historical Use

The Unit 3 33 Emergency Diesel Generator Day Tank is a 175-gallon steel above ground tank located in the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 33 Emergency Diesel Generators Day Tank is located inside the Unit 3 Emergency Diesel Generator Building with secondary containment, a release of diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 33 Emergency Diesel Generator Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.8 U3 33 Emergency Diesel Generator Storage Tank 33EDG

Description and Historical Use

The Unit 3 33 Emergency Diesel Generator Storage Tank is a 7,700-gallon steel underground tank located adjacent to the Unit 3 Emergency Diesel Generator Building (Figure 5, Cell B6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 33 Emergency Diesel Generator Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.9 U3 Fire Pump Diesel Tank FPD

Description and Historical Use

The Unit 3 Fire Pump Diesel Storage Tank is a 350-gallon above ground tank containing diesel fuel for the Unit 3 Fire Pump. The pump and tank are located east of the Unit 3 Refueling Water Storage Tank (Figure 5, Cell B7). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 Fire Pump Diesel Storage Tank is located inside a building with secondary containment, a release of Diesel fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Fire Pump Diesel Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.10 U3 Appendix R Diesel Storage Tank APR

Description and Historical Use

The Unit 3 Appendix R Diesel Storage Tank is a 4,000-gallon steel underground storage tank containing diesel fuel for the Appendix R Diesel Generator. The tank is contained in a vault filled with gravel and is located at the northwest quadrant of the Unit 3 Containment Building (Figure 5, Cell B7). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 Appendix R Diesel Storage Tank is an underground tank storing a large volume of diesel fuel that could be released due to undetected leakage or overfilling during deliveries, a preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.11 U3 Clean Oil Storage Tank COST

Description and Historical Use

The Unit 3 Clean Oil Storage Tank is a 23,500-gallon steel above ground tank containing lubricating oil for the Turbine Generator. The tank is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 Clean Oil Storage Tank is located inside the Unit 3 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Clean Oil Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.12 U3 Dirty Oil Storage Tank DOST

Description and Historical Use

The Unit 3 Dirty Oil Storage Tank is a 23,500-gallon steel above ground tank containing waste lubricating oil from the Turbine Generator. The tank is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of waste lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 Dirty Oil Storage Tank is located inside the Unit 3 Turbine Generator Building with secondary containment, a release of lubricating oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Dirty Oil Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.13 U3 House Service Boiler Day Tank HSB

Description and Historical Use

The Unit 3 House Service Boiler Day Tank is a 275-gallon above ground tank containing fuel oil for the Unit 3 House Service Boiler. The tank is located in the House Service Boiler Annex at the north end of the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of fuel oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Fuel Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 House Service Boiler Day Tank is located inside the House Service Boiler Annex Building with secondary containment, a release of fuel oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this AST is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 House Service Boiler Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.14 U3 Main Boiler Feed Pump Lube Oil Reservoir MBR

Description and Historical Use

The Unit 3 Main Boiler Feed Pump Lube Oil Reservoir is a 1,400-gallon above ground reservoir containing Lubricating Oil for the Unit 3 Main Boiler Feed Pump. The reservoir is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of lubricating oil from this reservoir has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 Main Boiler Feed Pump Lube Oil Reservoir is located inside the Unit 3 Turbine Generator Building, a release of Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this reservoir is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Main Boiler Feed Pump Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.15 U3 Main Lube Oil Reservoir MLO

Description and Historical Use

The Unit 3 Main Lube Oil Reservoir is a 15,000-gallon above ground reservoir containing lubricating oil for the Unit 3 Turbine Generator. The reservoir is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7).

As discussed in Subsection 4.2.2.1 in 1989 3,500 gallons of turbine lubricating oil was released from a corroded return pipeline under the Turbine Generator Building [23]. Following the clean-up, oil was detected issuing from floor drains of the Unit 3 Turbine Generator Building 5-foot elevation and seeping into the Discharge Canal. The oil was removed from the floor drains and the drains were repaired. An investigation by Foster Wheeler, a hydrogeologic consultant, could not provide a definitive solution without performing additional studies (SOR 91-3-109); [24].

As of spring of 1998 no additional oil was evident and no seepage into the discharge canal had been detected. Buried safety-related utilities are located in the area where oil had been detected and further subsurface investigation there would have risked damage to vital plant equipment. Because of this condition, the absence of further evidence of oil seepage into the canal and the apparent low risk of environmental impact, inspectors from the NYSDEC agreed that there was no benefit to be gained from additional investigation. A monitoring program in nearby groundwater monitoring wells was established [24] [20].

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

The Unit 3 Main Lube Oil Reservoir is located inside the Unit 3 Turbine Generator Building. However, a large release of lubricating oil in 1991 resulted in contamination of soil and groundwater. The area of this reservoir is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

- Inspect the area of the Unit 3 Main Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

- Collect samples of soil and groundwater from the area of contamination and analyze the samples for constituents of lubricating oil to determine the current environmental conditions in the area.

6.5.1.5.16 U3 Main Turbine Generator Bearing Oil Drain Tank BODT

Description and Historical Use

The Unit 3 Main Turbine Generator Bearing Oil Drain Tank is a 120-gallon above ground tank containing waste oil from the Unit 3 Turbine Generator bearings. The tank is located in the Unit 3 Turbine Generator Building. (Figure 5, Cell A7). No record of a release of waste lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 Main Turbine Generator Bearing Oil Drain Tank is located inside the Unit 3 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Main Turbine Generator Bearing Oil Drain Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.17 U3 Main Turbine Generator Loop Seal Vapor Extractor Drain Tank LSVEDT

Description and Historical Use

The Unit 3 Main Turbine Generator Loop Seal Vapor Extractor Drain Tank is a 120-gallon above ground tank containing waste oil. The tank is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of waste lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 Main Turbine Generator Loop Seal Vapor Extractor Drain Tank is located inside the Unit 3 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Main Turbine Generator Loop Seal Vapor Extractor Drain Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.18 U3 Main Turbine Generator Oil Reservoir Vapor Extractor Drain Tank RVEDT

Description and Historical Use

The Unit 3 Main Turbine Generator Oil Reservoir Vapor Extractor Drain Tank is a 120-gallon above ground tank containing waste oil. The tank is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of waste lubricating oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 Main Turbine Generator Oil Reservoir Vapor Extractor Drain Tank is located inside the Unit 3 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Main Turbine Generator Oil Reservoir Vapor Extractor Drain Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.19 U3 Meteorological System Diesel Storage Tank MET

Description and Historical Use

The Unit 3 Meteorological System Diesel Storage Tank is a double-walled 240-gallon above ground tank containing diesel fuel for the Meteorological Tower Equipment Building. The tank is located near the Meteorological Tower (Figure 5, Cell D1). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

While the Unit 3 Meteorological System Diesel Storage Tank is a double-walled tank, it is not located within a building or other containment structure. A preliminary classification of NR Class 2 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Meteorological System Diesel Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.20 U3 Portable Diesel Storage Tank TC3

Description and Historical Use

The Unit 3 Portable Diesel Storage Tank is a 995-gallon double-walled tank containing diesel fuel for use in station vehicles. The tank normally is staged at the Salt Barn (Figure 5, Cell D6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

While the Unit 3 Portable Diesel Storage Tank is a double-walled tank, it is not located within a building or other containment structure. There is a potential for releases either while filling the tank or while dispensing fuel from the tank. A preliminary classification of NR Class 2 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Portable Diesel Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.21 U3 Portable Kerosene Storage Tank TC2

Description and Historical Use

The Unit 3 Portable Kerosene Storage Tank is a 495-gallon double-walled tank containing kerosene for use in station space heaters and fork lifts. The tank normally is staged at the Salt Barn (Figure 5, Cell D6). No record of a release of kerosene from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is kerosene. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

While the Unit 3 Portable Kerosene Storage Tank is a double-walled tank, it is not located within a building or other containment structure. There is a potential for releases either while filling the tank or while dispensing fuel from the tank. A preliminary classification of NR Class 2 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Portable Kerosene Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.22 U3 R2D2 Lube Oil Sludge Tank R2D2ST

Description and Historical Use

The Unit 3 R2D2 Lube Oil Sludge Tank is a 250-gallon above ground tank containing lubricating oil sludge. The tank is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A6). No record of a release of lubricating oil sludge from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 R2D2 Lube Oil Sludge Tank is located inside the Unit 3 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 R2D2 Lube Oil Sludge Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.23 U3 R4D4 Lube Oil Sludge Tank R4S

Description and Historical Use

The Unit 3 R4D4 Lube Oil Sludge Tank is a 540-gallon above ground tank containing lubricating oil sludge. The tank is located in the Unit 3 Turbine Generator Building (Figure 5, Cell A7). In 1991 the tank overflowed twice, resulting in release of waste oil to the Discharge Canal (SOR 91-3-109; SOR 91-3-144).

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Sumps
- Concrete
- Floor Drains

Preliminary Classification

Because the Unit 3 R4D4 Lube Oil Sludge Tank is located inside the Unit 3 Turbine Generator Building, a release of waste Lubricating Oil from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 R4D4 Lube Oil Sludge Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.24 U3 Sewage Treatment Plant Diesel Storage Tank STP

Description and Historical Use

The Unit 3 Sewage Treatment Plant Diesel Storage Tank is a 270-gallon underground tank storing diesel fuel for the Sewage Treatment Emergency Diesel Generator. This generator provides back-up electric power to the lift station that pumps sewage from the station to the Buchanan sewage treatment plant [39]. The tank is located at the (retired) Sewage Treatment Plant (Figure 5, Cell A6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 Sewage Treatment Plant Diesel Storage Tank is an underground tank that cannot easily be inspected, there is the potential for a release due to undetected leakage or overfilling during deliveries. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.25 U3 Sewage Treatment Plant Fuel Oil Day Tank SPFODT

Description and Historical Use

The Unit 3 Sewage Treatment Plant Fuel Oil Day Tank is a 10-gallon underground tank storing diesel fuel for the Sewage Treatment Emergency Diesel Generator. This generator provides back-up electric power to the lift station that pumps sewage from the station to the Buchanan sewage treatment plant. The tank is located at the (retired) Sewage Treatment Plant (Figure 5, Cell A6). No record of a release of fuel oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 Sewage Treatment Plant Fuel Oil Day Tank is an underground tank that cannot easily be inspected, there is the potential for a release due to undetected leakage or overfilling during deliveries. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.26 U3 Station Outside Diesel Air Compressor Storage Tank ACD

Description and Historical Use

The Unit 3 Station Outside Diesel Air Compressor Storage Tank is a 100-gallon above ground tank located west of the Unit 3 Turbine Generator Building (Figure 5, Cell A7). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

The Unit 3 Station Outside Diesel Air Compressor Storage Tank is located within a secondary containment berm outside of the Unit 3 Turbine Generator Building. The tank is above ground and can easily be inspected. Because the tank is relatively small a release of Diesel Fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Station Outside Diesel Air Compressor Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.27 U3 Technical Support Center Diesel Day Tank TSD

Description and Historical Use

The Unit 3 Technical Support Center Diesel Day Tank is a 100-gallon above ground tank located in the Unit 3 Turbine Generator Building (Figure 5, Cell A6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 Technical Support Center Diesel Day Tank is located inside the Unit 3 Turbine Generator Building, a release of Diesel Fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Technical Support Center Diesel Day Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.5.1.5.28 U3 Technical Support Center Diesel Storage Tank TSC

Description and Historical Use

The Unit 3 Technical Support Center Diesel Storage Tank is a double-walled 4,000-gallon underground tank located adjacent to the Unit 3 Turbine Generator Building (Figure 5, Cell A6). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 Technical Support Center Diesel Storage Tank is an underground tank that cannot easily be inspected, there is the potential for a release due to undetected leakage or overfilling during deliveries. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminant to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.29 U3 Training Center Fuel Oil Storage Tank TC1

Description and Historical Use

The Unit 3 Training Center Fuel Oil Storage Tank is a double-walled 6,000-gallon fiberglass underground tank located outside the north side of the Training Center (Figure 5, Cell D3). No record of a release of fuel oil from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Unit 3 Training Center Fuel Oil Storage Tank is an underground tank that cannot easily be inspected, there is the potential for a release due to undetected leakage or overfilling during deliveries. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminant to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.5.1.5.30 U3 Training Fire Pump Diesel Storage Tank FP2

Description and Historical Use

The Unit 3 Training Fire Pump Diesel Storage Tank is a 250-gallon above ground tank located in a small building next to the Training Fire Water Storage Tank (Figure 5, Cell C3). No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Unit 3 Training Fire Pump Diesel Storage Tank is located inside the small building containing the Training Fire Pump, a release of Diesel Fuel from the tank is unlikely to result in gross contamination of soil or groundwater. The area of this tank is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Unit 3 Training Fire Pump Diesel Storage Tank for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

Storage Tanks Supporting Documents

Draft Order on Consent Re CBS 7-5-2000.pdf
IP3 2017 SPCC PLAN.pdf
IP3 CBS_PBS and RCRA LQG & TSD Applications.pdf

6.5.1.6 Transformers

The original transformers at the station were filled with PCB-containing dielectric fluid. All of the accessible original equipment containing PCBs have either been replaced or drained and refilled with non-PCB dielectric fluid during the early 1980s after the manufacture of PCBs was banned in 1979. Nevertheless, because the original transformers were provided with PCB-containing dielectric fluid, there is a potential that legacy contamination of soil or groundwater with PCBs could exist.

6.5.1.6.1 U3 31 Main Transformer

Description and Historical Use

The Unit 3 31 Main Transformer is located in the Unit 3 Transformer Yard (Figure 5, Cell B7) and contains 19,787 gallons of non-PCB dielectric fluid.

As discussed in Subsection 4.2.2.1, oil staining was observed on both the Unit 3 31 and 32 Main Transformers, their concrete footings and surrounding soil in 2000 during a radiological and hazardous condition assessment of the Unit 3 Site [20].

In 2005 several gallons of non-PCB transformer oil leaked from several of the transformer oil circulating pumps and their associated isolation valve gland nuts (CR-IP3-2005-01089).

A bushing failure in the 31 Main Transformer in 2007 resulted in a 5-gallon release of transformer oil (CR-IP3-2007-01844; NYSDEC Spill Report 700825). The transformer was replaced after this incident [16].

An internal fault and fire in 2015 in the replacement 31 Main Transformer resulted in an oil release to soil and the Discharge Canal. (CR-IP3-2015-02913; CR-IP3-2015-03259; NYSDEC Spill Report 1501459) [16] [17] [22]. The deluge system that automatically engaged to extinguish the fire released a large volume of fire-suppression foam and water. As a result, water and transformer oil overflowed the berm containing the transformer, infiltrated surrounding soil, entered the local storm drain and flowed to the Discharge Canal. The contaminated trap rock within the berm was removed, an impermeable liner was applied to the berm floor and walls, clean trap rock was placed in the berm and a replacement 31 Main Transformer was installed.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Because of the multiple releases of Dielectric Oil that have occurred from the Unit 31 Main Transformer and the potential for additional significant releases due to the large volume of Dielectric Oil contained in the unit, a preliminary classification of NR Class 1 is assigned to the Unit 3 31 Main Transformer.

Recommended Future Investigation Activities

- Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.
- Collect surface and subsurface soil samples in the area of the transformer to determine if residual dielectric oil remains in the soil. Sample groundwater from nearby monitoring wells to determine if dielectric oil has impacted the local groundwater.

6.5.1.6.2 U3 32 Main Transformer

Description and Historical Use

The Unit 3 32 Main Transformer is located in the Unit 3 Transformer Yard (Figure 5, Cell B7) and contains 27,900 gallons of non-PCB dielectric fluid.

As discussed in Subsection 4.2.2.1, oil staining was observed on both the Unit 3 31 and 32 Main Transformers, their concrete footings and surrounding soil in 2000 during a radiological and hazardous condition assessment of the Unit 3 Site [20].

The Unit 3 32 Main Transformer was replaced in 1981 following an isolation valve failure and was replaced again in 1986 due to an internal fault [16]. No record of a release of Dielectric Oil during either of these events has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 3 32 Main Transformer,

Recommended Future Investigation Activities

- The Unit 3 32 Main Transformer is located in the Unit 3 Transformer Yard, where a release of dielectric oil occurred in 2015.
- Inspect the Unit 3 32 Main Transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.
- Collect surface and subsurface soil samples in the area of the transformer to determine if residual dielectric oil remains in the soil. Sample groundwater from nearby monitoring wells to determine if dielectric oil has impacted the local groundwater.

6.5.1.6.3 U3 GT Turbine Transformer

Description and Historical Use

The Unit 3 Gas Turbine Transformer is located north of the Unit 3 Containment Building, adjacent to the Gas Turbine (Figure 5, Cell A8) and contains 3,800 gallons of non-PCB Dielectric Oil. No record of a release of Dielectric Oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Gas Turbine Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.5.1.6.4 U3 Spare Main Transformer

Description and Historical Use

The Unit 3 Spare Main Transformer is located on the Spare Transformer Pad near the Meteorological Tower (Figure 5, Cell C2) and contains 24,300 gallons of non-PCB Dielectric Oil. No record of a release of Dielectric Oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 3 Spare Main Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.5.1.6.5 U3 Spare Station Auxiliary Transformer

Description and Historical Use

The Unit 3 Spare Station Auxiliary Transformer is located on the Spare Transformer Pad near the Meteorological Tower (Figure 5, Cell C2) and contains 10,200 gallons of non-PCB Dielectric Oil. No record of a release of Dielectric Oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 3 Spare Station Auxiliary Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.5.1.6.6 U3 Station Auxiliary Transformer

Description and Historical Use

The Unit 3 Station Auxiliary Transformer is located in the Unit 3 Transformer Yard (Figure 5, Cell B7) and contains 9,207 gallons of non-PCB Dielectric Oil. No record of a release of Dielectric Oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 3 Station Auxiliary Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.5.1.6.7 U3 Unit Auxiliary Transformer

Description and Historical Use

The Unit 3 Unit Auxiliary Transformer is located in the Unit 3 Transformer Yard (Figure 5, Cell B7) and contains 6,210 gallons of non-PCB Dielectric Oil. No record of a release of Dielectric Oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Trap Rock

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 1 is assigned to the Unit 3 Unit Auxiliary Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

Transformers Supporting Documents

21 xfmr pcb results.jpg
31 Main Transformer Spill, etc Closeout.pdf
31 xfmr PCB results.jpg
CR-IP3-2005-01089, oil spill from main transformer.pdf
CR-IP3-2007-01844, 5 gallon oil spill from main transformer.pdf
CR-IP3-2008-00686, damaged transformer on downed power pole.pdf
CR-IP3-2008-00691, oil spill from damaged transformer on downed power pole.pdf
CR-IP3-2015-02913, main transformer fire.pdf
CR-IP3-2015-03259, oil spill from main transformer.pdf
Emails re PCB Search and Calculation .PDF
Indian Point Main Transformers.pdf
IP3 2017 SPCC PLAN.pdf
IPEC Transformer Failure and PCBs.docx
Main Transformer History.pdf
Memo to P.Gauron, PC and C.Wells re NYPA Acquisiton .PDF
Spill No.1501459, transformer oil to soil & surface water, 5-9-2015.pdf
Spill No.700825, 5 gallons dielectric fluid to soil, 4-20-2007.pdf
TLG's Draft Report - Radiological and Hazardous Condition Assessment of ....pdf
21 xfmr pcb results.jpg
31 xfmr PCB results.jpg
IPEC Transformer Failure and PCBs.docx

6.5.2 Radiological Impacts

6.5.2.1 Radionuclides of Concern

The following waste characterization analyses (which were performed to demonstrate compliance with 10 CFR Part 61) were reviewed to determine the primary Radionuclides of Concern (ROCs):

- Dry Active Waste Smears (2014, 2017)
- LWS Resin Samples (2015, 2017)
- SRST Resin Samples (2014, 2015, 2017, 2018)

In addition, a review of the Annual Radiological Effluent Release Reports (ARERRs) for 2015, 2016 and 2017 was performed.

A composite list of radionuclides identified as "positive" by IPEC's evaluation of the 10 CFR Part 61 analyses and ARERRs was produced and is included in Table 14 as a master list of ROCs. If the fraction remaining at any the time periods listed was less than 1.0E-6, the value at that time period was replaced with 0.0E+00.

Table 14: Unit 3 Composite List of Positively Identified Radionuclides

Radionuclide	Half-Life (yrs)	Fraction Remaining After			
		2 yrs	5 yrs	10 yrs	50 yrs
H-3	1.2E+01	8.9E-01	7.5E-01	5.7E-01	6.0E-02
C-14	5.7E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Cr-51	7.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mn-54	8.5E-01	2.0E-01	1.7E-02	3.0E-04	0.0E+00
Fe-55	2.7E+00	6.0E-01	2.8E-01	7.9E-02	3.2E-06
Co-57	7.4E-01	1.6E-01	9.5E-03	9.0E-05	0.0E+00
Co-58	1.9E-01	7.9E-04	0.0E+00	0.0E+00	0.0E+00
Co-60	5.3E+00	7.7E-01	5.2E-01	2.7E-01	1.4E-03
Ni-59	1.0E+05	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Ni-63	1.0E+02	9.9E-01	9.7E-01	9.3E-01	7.1E-01
Zn-65	6.7E-01	1.3E-01	5.6E-03	3.1E-05	0.0E+00
Sr-89	1.4E-01	4.4E-05	0.0E+00	0.0E+00	0.0E+00
Sr-90	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Nb-94	2.0E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Nb-95	9.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zr-95	1.8E-01	3.7E-04	0.0E+00	0.0E+00	0.0E+00
Tc-99	2.1E+05	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Ag-110m	6.8E-01	1.3E-01	6.3E-03	4.0E-05	0.0E+00
Sn-113	3.2E-01	1.2E-02	1.7E-05	0.0E+00	0.0E+00
Te-123m	3.3E-01	1.5E-02	2.6E-05	0.0E+00	0.0E+00
Sb-125	2.8E+00	6.0E-01	2.8E-01	8.1E-02	3.5E-06
I-129	1.6E+07	1.0E+00	1.0E+00	1.0E+00	1.0E+00

Radionuclide	Half-Life (yrs)	Fraction Remaining After			
		2 yrs	5 yrs	10 yrs	50 yrs
Te-132	8.8E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-134	2.1E+00	5.1E-01	1.9E-01	3.5E-02	0.0E+00
Cs-137	3.0E+01	9.6E-01	8.9E-01	7.9E-01	3.2E-01
Ba-133	1.1E+01	8.8E-01	7.2E-01	5.2E-01	3.7E-02
Ce-144	7.8E-01	1.7E-01	1.2E-02	1.4E-04	0.0E+00
Pu-238	8.8E+01	9.8E-01	9.6E-01	9.2E-01	6.7E-01
Pu-239	2.4E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-240	6.6E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Pu-241	1.4E+01	9.1E-01	7.9E-01	6.2E-01	8.9E-02
Am-241	4.3E+02	1.0E+00	9.9E-01	9.8E-01	9.2E-01
Cm-242	4.5E-01	4.5E-02	4.2E-04	0.0E+00	0.0E+00
Cm-243	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Cm-244	1.8E+01	9.3E-01	8.3E-01	6.8E-01	1.5E-01

This composite list was subsequently modified (via process knowledge and a realistic analysis of each ROC's respective half-life) and the ROCs were categorized into four distinct groups. These groups are the gamma emitters (Gammas), the Hard to Detect (HTD) and low energy beta emitters (HTD&Betas), tritium, and Transuranics (TRUs). Additionally, several ROCs were added because they are either required analytes by 10CFR20 App. G (I-129) or are expected to be present in activated concrete (Eu-152, 154, and 155). The results are listed in Table 15.

Table 15: Unit 3 Categorized Radionuclides of Concern

Radionuclide	Category	Half-Life (yrs)
Chromium-51	Gammas	7.6E-02
Manganese-54	Gammas	8.5E-01
Cobalt-57	Gammas	7.4E-01
Cobalt-58	Gammas	1.9E-01
Nickel-59	Gammas	1.0E+05
Cobalt-60	Gammas	5.3E+00
Zinc-65	Gammas	6.7E-01
Niobium-94	Gammas	2.0E+04
Niobium-95	Gammas	9.6E-02
Zirconium-95	Gammas	1.8E-01
Silver-110m	Gammas	6.8E-01
Tin-113	Gammas	3.2E-01
Antimony-125	Gammas	2.8E+00
Barium-133	Gammas	1.1E+01
Cesium-134	Gammas	2.1E+00

Radionuclide	Category	Half-Life (yrs)
Cesium-137	Gammas	3.0E+01
Cerium-144	Gammas	7.8E-01
Europium-152[b]	Gammas	1.3E+01
Europium-154[b]	Gammas	8.6E+00
Europium-155[b]	Gammas	4.8E+00
Carbon-14	HTD&Betas	5.7E+03
Iron-55	HTD&Betas	2.7E+00
Nickel-63	HTD&Betas	1.0E+02
Strontium-89	HTD&Betas	1.4E-01
Strontium-90	HTD&Betas	2.9E+01
Technetium-99	HTD&Betas	2.1E+05
Iodine-129[a]	HTD&Betas	1.6E+07
Hydrogen-3	Tritium	1.2E+01
Plutonium-238	TRUs	8.8E+01
Plutonium-239	TRUs	2.4E+04
Plutonium-240	TRUs	6.6E+03
Americium-241	TRUs	4.3E+02
Plutonium-241	TRUs	1.4E+01
Curium-242	TRUs	4.5E-01
Curium-243	TRUs	2.9E+01
Curium-244	TRUs	1.8E+01
[a] = I-129 was not identified in site samples but is a required 10CFR20 App. G waste stream analyte		
[b] = EU-152,154 & 155 were not identified in site samples but are typically identified in activated concrete		

In summary, when analyzing samples for the presence of radioactivity the ROCs listed in Table 15 should be requested analytes, based on the origin of the samples. Given that Unit 3 is still operating, there may be a lengthy period between the time of completion of this HSA and initiation of decommissioning activities. With regard to the ultimate list of ROCs for the facility, radionuclide half-life should be considered to eliminate those radionuclides that would have decayed to negligible quantities at the time of decommissioning.

The potential presence of any of these ROCs will be denoted by their respective assigned category for the remainder of the HSA.

<u>Radionuclides of Concern Supporting Documents</u>

2015 Annual Radioactive Eff. Release Rpt.pdf

2016 Annual Radioactive Eff. Release Rpt.pdf
2017 Annual Radioactive Eff. Release Rpt.pdf
Unit 3 DAW 2014.pdf
Unit 3 DAW 2017.pdf
Unit 3 LWS Resin 2015.pdf
Unit 3 LWS Resin 2017.pdf
Unit 3 SRST Resin 2015.pdf
Unit 3 SRST Resin 2014.pdf
Unit 3 SRST Resin 2017.pdf
Unit 3 SRST Resin 2018.pdf

6.5.2.2 Building or Structure

6.5.2.2.1 U3 Administration Building

Description and Historical Use

The Unit 3 Administration Building (Figure 3A, Cell A3 to B3) is located immediately south of the Unit 3 Turbine Generator Building. This building serves as office space for managers, engineers and administrative staff. The building contains a maintenance facility on the first floor as well as the Radiochemistry lab and HP count room. There are two laundry tanks that have been retired in place and a radiochemistry lab waste tank that collects waste water from various Reactor Coolant System sampling procedures. The waste water is auto-pumped to the Unit 3 waste hold up tank located in the Unit 3 PAB. A small portion of this building is posted as an RCA where personnel enter the PAB.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Unit 3 Administration Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

Supporting Documents

U3 RadioChem Lab leak in Admin Blgd 4-4-14.pdf

6.5.2.2.2 U3 Auxiliary Feedwater Pump Building

Description and Historical Use

The Unit 3 Auxiliary Feedwater Pump Building (Figure 3A, Cell B4) is located in the shield wall area between the shield wall and the Unit 3 Containment Building. The building also includes the shield wall area enclosure. The building is a multi-story reinforced concrete structure with a structural steel framed enclosure. The structure includes a concrete shield wall for protection of safety-related equipment in the area. The concrete shield walls are free-standing concrete walls that also support concrete floors and steel members in this area.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Auxiliary Feedwater Pump Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.3 U3 Circulation Water Pump Building

Description and Historical Use

The Unit 3 Circulation Water Pump Building (Figure 3A, Cell A3) is part of the Unit 3 Intake Structure, located next to the Hudson River, west of the Unit 3 Turbine Generator Building. The building houses Circulating Water and Service Water Pumps.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Circulation Water Pump Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.4 U3 Condensate Polisher Building

Description and Historical Use

The Unit 3 Condensate Polisher Building (Figure 3A, Cell A4) is located directly north of the Unit 3 Intake Structure. The Condensate Polishing System (CPS) is designed to remove dissolved and suspended solids from the condensate in order to maintain the feedwater quality required for the steam generators.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Condensate Polisher Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.5 U3 Containment Building

Description and Historical Use

The Unit 3 Containment Building (Figure 3A, cell B4) is a steel lined reinforced concrete cylinder with a hemispherical dome and a flat base. The Reactor Containment (also referred to as the Vapor Containment, or VC) completely encloses the entire reactor and Reactor Coolant System and ensures that essentially no leakage of radioactive materials to the environment would result even if gross failure of the Reactor Coolant System were to occur. The liner and penetrations were designed to prevent leakage through the containment. The structure provides biological shielding for both normal and accident situations.

Table 16: Unit 3 Containment Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
RB	Reactor sump	5 -125	*350/125
RB	Transfer Canal	20 - 900	*4,500/1,000
RB 46'	31/32 S/G Platform	3 -150	150
RB 46'	33/34 S/G Platform	6 -25	*250/100
RB 46'	S/G 31,32,33,34 Inserts	300 - 1,300	*5,500/1,300
RB 46'	S/G Diaphragms	440 - 600	*3,500/600
RB 46'	31 RCP General Area	1 -7	25
RB 46'	32 RCP General Area	3 - 30	50
RB 46'	33 RCP General Area	1 - 40	*100/40
RB 46'	ICW	1 -60	60
RB 46'	OCW	0.5 -3.5	3.5
RB 68'	Cavity gradient	6 - 16	18
RB 95'	G/A for initial entry @ S/D	<0.2 - 20	20
RB 95'	OCW & ICW G/A	0.2 - 40	40
RP 95'	Reactor head	5 - 250	250
RB 95'	Reactor head top at Insulation	10 - 450	600
RB 95'	Reactor head vent ducts	100	275
RB 121'	Pressurizer	5	*50/15
Note: *#/# is contact/30 cm			

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, TRUs, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- SSCs

Preliminary Classification

The U3 Containment Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the station operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior walls and dome
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

Reactor Building surveys.pdf

6.5.2.2.6 U3 Control Building

Description and Historical Use

The Unit 3 Control Building (Figure 3A, Cell B3) is a multi-story concrete structure, founded on bedrock, with concrete and concrete brick exterior. The west wall of the Control Building is adjacent to the Unit 3 Turbine Generator Building and the Emergency Diesel Generator Building boarders the south wall of the Control Building.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The U3 Control Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.7 U3 Emergency Diesel Generator Building

Description and Historical Use

The Unit 3 Emergency Diesel Generator Building (Figure 3A, Cell B3) is a seismic Class I reinforced concrete structure founded on bedrock. The diesel generators rest on reinforced concrete foundations supported by the structure's main slab. A concrete shield wall is located on the west side of the building to serve as missile protection between the control panel and diesel generators.

The building houses three safety-related diesel generators. Each diesel is supplied with separate underground storage vaults, integral to the building, containing fuel oil tanks.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Emergency Diesel Generator Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.8 U3 Fuel Storage Building

Description and Historical Use

The Unit 3 Fuel Storage Building (Figure 3A, Cell B4) is adjacent to, but separate from, the Unit 3 Containment Building on the west side and the Containment Access Facility Annex on the east side. The building contains both spent and new fuel and also provides support for the Class III spent fuel crane and other fuel handling equipment. The spent fuel pit located inside the structure is seismic Class I. The Fuel Storage Building is a seismic Class III building consisting of structural steel framing with an exterior composed of insulated metal siding. The internal structure is composed of a concrete spent fuel pit lined with stainless steel, concrete columns with infill masonry walls on the south and east faces and a concrete wall on the west face. The top of the spent fuel pit wall forms the north wall of this area.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, Tritium, and TRUs. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Fuel Storage Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the station operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

BUSFPCS leakage file with CR-IP3-2006-03818 12-5-06.pdf
U3 Crystalline material on outside wall of FSB DER 00-01894 7-31-2000.pdf

6.5.2.2.9 U3 Original Security Access Building

Description and Historical Use

The Unit 3 Original Security Access Building (Figure 3A, Cell A3) is located near the Unit 3 Administration Building. This building was the access point for Unit 3 when it was owned by New York Power Authority and was operated separately from Units 1 and 2.

Sealed sources of radioactive material (e.g. Ni-63, Cs-137, etc.) may have been used in security screening and RP monitoring devices used in the building, however, no events of releases from sources, were found in the records review. Due to its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Unit 3 Original Security Access Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.10 U3 Original Steam Generator Storage Facility

Description and Historical Use

The Unit 3 Original Steam Generator Storage Facility (Figure 3B, Cell B2 to C2) is a reinforced concrete and steel structure that was built to house the four (4) steam generators that were replaced during the Cycle 6/7 refueling outage in 1989. The four original steam generators are stored completely intact, with all openings sealed with welded steel closure plates or bolted steel covers. The storage facility also contains one original primary system elbow that was also replaced. The replaced primary elbow is also sealed at both ends with welded steel plates [Unit 3 FSAR].

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Original Steam Generator Storage Facility is preliminarily classified as a MARSSIM Class 2 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.11 U3 Outage Support Building

Description and Historical Use

The Unit 3 Outage Support Building (Figure 3A, Cell B3) was constructed to house engineering and craft personnel for the Unit 3 Steam Generator Replacement project.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials
- Roofing Materials

Preliminary Classification

The Unit 3 Outage Support Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.12 U3 Primary Auxiliary Building

Description and Historical Use

The Unit 3 Primary Auxiliary Building (Figure 3A, Cell B3) is a free-standing three story rectangular reinforced concrete structure located southeast of the Containment Building. The first floor on the eastern end of the structure is embedded in the ground on rock with the second story being at grade. Concrete caissons support portions of the structure. This structure contains all support systems for reactor operations that are not located in the Containment Building. The PAB houses most of the auxiliary and safety systems associated with the reactor, such as radioactive waste systems, chemical and volume control systems, and emergency cooling water systems.

Table 17: Unit 3 Primary Auxiliary Building Survey Summary (mR/h)

Location	Area or Component	Gen Area	Max
PAB 15'	Hallway & RHR Access	<0.5 - 1.5	1.5
PAB 15'	Seal Injection Filter Cell	0.2	*160/40
PAB 15'	31 RHR Cell	0.5 - 10	*45/10
PAB 15'	32 RHR Cell	0.2 - 10	*35/10
PAB 15'	Spare RHR Pump Cell	0.2	0.8
PAB 15'	RHR Valve Gallery	1.5 - 15	*20/10
PAB 15'	Sump Tank Cell	<0.2 - 110	*180/110
PAB 15'	Chem Drain Tank Cell	0.2 - 1.5	*520/110
PAB 15'	Large & Small Gas Decay Tank Cell	0.2	*27/3
PAB 15'	SG Blowdown Recovery Room	<0.5	<0.5
PAB 15'	RWST (Vacco) Filter Cell	0.3 - 0.5	0.5
PAB 34'	CVCS Tanks	<0.5 - 50	*140/50
PAB 34'	WHUT 31	6 - 50	*100/50
PAB 34'	WHUT 32 & 33	0.5 - 25	*100/25
PAB 34'	Hallway	<0.2	<0.2
PAB 34'	SI Pump Room	0.2 - 8	30
PAB 34'	Service Water Chase & Access	<0.5 - 4.5	*35/12
PAB 34'	Boron Injection Tank Room	<0.2 - 0.2	0.4
PAB 34'	Steam Generator Blowdown Tank Cell	0.2	0.2
PAB 34'	Waste Holdup Pump Room	1.5 - 5	5

Location	Area or Component	Gen Area	Max
PAB 41'	CCW Pump and Aux Cond Receiver Area	<0.2	<0.2
PAB 41'	Containment Spray Pump Area	<0.2 - 0.3	0.3
PAB 41'	Pipe Pen	<0.2 - 1.5	12
PAB 41'	Radio Chemistry Lab	0.2	0.2
PAB 41'	Hallway	0.3 - 1.4	1.4
PAB 41'	CP Leakoff Tank	<0.2	<0.2
PAB 41'	CCW Pump and Aux Cond Receiver Area	0.2	0.3
PAB 41'	Waste Holdup Access & Pipe Tunnel	0.2	10
PAB 55'	Hallway/Nitrogen & Air Receiver Tank Area	<0.2	<0.2
PAB 55'	Charging Pump Foyer	<0.2 - 0.2	0.2
PAB 55'	BATP/CCW Hx	<0.5	<0.5
PAB 55'	31 Charging Pump Cell	0.2 - 1	2
PAB 55'	32 Charging Pump Cell	0.2 - 1	1
PAB 55'	33 Charging Pump Cell	0.2 - 2.8	*6/2.8
PAB 55'	Waste Gas Compressor Cell	<0.2	<0.2
PAB 55'	Chem Sample Cell	0.3 - 10	10
PAB 55'	Drumming Station	0.2	3
PAB 73'	Hallway	<0.2	0.3
PAB 73'	Non-Regenerative Heat Exchanger Cell	1 - 75	*90/60
PAB 73'	Rx Coolant Filter Bypass Valves	<0.2 - 3	*6/3
PAB 73'	RX Coolant Filter Cell & Filter	<0.2 - 80	80
PAB 73'	Seal Water Heat Exchanger Room	<0.2 - 0.2	0.3
PAB 73'	Ops Storage	0.8	5
PAB 73'	VCT Cell & VCT Access Cell	2 - 6	*70/13
Note: *#/# is contact/30 cm			

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Primary Auxiliary Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the station operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building roof
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

Supporting Documents

PAB surveys.pdf
U3 PAB Heating Coils Leaking 12-17-17.pdf

6.5.2.2.13 U3 Radioactive Machine Shop

Description and Historical Use

The Unit 3 Radioactive Machine Shop (Figure 3A, Cell C3) contains various machining tools such as lathes, saws and drill presses.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Unit 3 Radioactive Machine Shop and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure due to the fact that the building has been an RCA throughout the station operating years, has a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building roof
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples of building sumps

6.5.2.2.14 U3 Retired Security Access Building

Description and Historical Use

The Unit 3 Retired Security Access Building (Figure 3A, Cell C3) is located near the Unit 3 Primary Water Storage Tank (PWST). This building was used for contractor access to Unit 3 during outages.

Sealed sources of radioactive material (e.g. Ni-63, Cs-137, etc.) may have been used in security screening and RP monitoring devices, however, no events of releases from sources, were found in the records review. Due to its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Unit 3 Retired Security Access Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.5.2.2.15 U3 Turbine Generator Building

Description and Historical Use

The Unit 3 Turbine Generator Building (Figure 3A, Cells B3 to B4) and heater bay is a seismic Class III structure and houses the turbine generator and associated auxiliaries. The building consists of structural steel framing with insulated metal siding and composite metal roof decking. The structure is on pier and slab foundations supported on bedrock. The Discharge Canal runs on the west side of the Unit 3 Turbine Generator Building and below the Turbine Generator Buildings for Units 1 and 2.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Unit 3 Turbine Generator Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof
- Radiological analysis of sediment samples of building sumps

6.5.2.3 Exterior Area

6.5.2.3.1 U3 302 Exemption Area

Description and Historical Use

The 10CFR20.302 Exemption Area (Figure 3B, Cells C1 to C2) is an area where contaminated soil from the Former Septic Leach Field was relocated for storage. The engineered containment cell that was excavated to accept the soil was constructed using a bentonite clay-like material with very low permeability for the liner and the cap. Four monitoring wells were installed to monitor groundwater quality and the area is surrounded by an 8' chain link fence with radiological postings.

In 1979, during construction of service facilities for the Unit 3 plant, it became necessary to remove the Former Septic Leach Field to allow for road and storm drainage construction activities to progress. At that time the Sewage Treatment Plant was retired in place and a pumping station was constructed nearby. The pumping station now conveys sewage collected from the station for treatment at the Buchanan sewage treatment plant [39].

Prior to excavation of the soils, samples were taken and analyzed for plant derived radioactivity. The samples (32 in total) contained varying levels of Co-60 (10.1 pCi/g average, 119 pCi/g max), Cs-134 (5.8 pCi/g average, 57.9 pCi/g max), and Cs-137 (54 pCi/g average, 533 pCi/g max). It was therefore decided to construct an area on-site to store this radioactive soil.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Soil

Preliminary Classification

The Unit 3 Exemption Area is preliminarily classified as a MARSSIM Class 1 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of soil samples taken in a systematic fashion

Supporting Documents

Map 8 - On Site Septic Disposal Area.pdf
On-Site Storage of Septic Material - May 1979.pdf
Relocate Filter Beds of Sewage Treatment Septic Fields.pdf

6.5.2.3.2 U3 Fuel Storage Building Alleyway

Description and Historical Use

During the first refueling outage of Indian Point 3 in July 1978 routine radiation surveys outside of the restricted (controlled) area in the area of the Unit 3 Fuel Storage Building Alleyway (Figure 3A, Cells B4 to C4) identified four separate instances of radioactive contamination of soil.

- A small area of contamination was found outside the east doors of the PAB.
- Piles of soil and rock removed from a drainage trench were found to be contaminated and an area where water ran from the RWST hill into the trench was also found to be contaminated.
- Soil at the wall of the FSB showed the presence of contamination.
- Contamination was found in an area between the FSB and VC buildings slightly south of the fuel transfer tube.

A special sampling program of the storm drain system at Unit 3 was initiated in June 1981 due to a resin spill in Unit 2. The conclusion, at that time, was that the activity in the storm drain system apparently was coming from 3 sources:

1. The BIT Cell draining directly onto the ground in the transformer yard.
2. Contamination in the FSB/VC Pit draining through corrugated metal drainage pipe to a storm drain.
3. Contamination from an unfinished room, which is under a portion of the electrical tunnel and the PAB, leaking through the PAB foundation into a storm drain.

In July 1990, an area of soil approximately 10 feet x 70 feet was found to be contaminated with Cs-137 at an average level of 3E-5 µCi/g. The location of the contaminated soil is near manhole A-3 on the north side of the access drive to the Unit 3 Fuel Storage Building and at the base of the adjoining hill. This area was the site of a cleanup effort in 1978.

A storm drainage system monitoring program was instituted on a regular basis as a result of the 1978 and 1981 investigations.

Cabrera Services performed *in-situ* gamma measurements in this area in February 2000 and detected Co-60 at 6.78 pCi/g and Cs-137 2.54 pCi/g.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil
- Concrete
- Gravel

Preliminary Classification

The Fuel Storage Building Alleyway is preliminarily classified as a MARSSIM Class 1 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion

Supporting Documents

Soil Contamination at Base of RWST Hill, 1996.pdf

6.5.2.3.3 U3 Transformer Yard

Description and Historical Use

The Unit 3 Transformer Yard (Figure 3A, Cell B7) contains the Unit 3 31 and 32 Main Transformers, Unit Auxiliary Transformer and Station Auxiliary Transformer.

The Unit 3 Transformer Yard was excavated in 1994. Samples of soil, rock and asphalt were analyzed with low levels of Cs-137 detected primarily in the rock and soil.

Cabrera Services performed *in-situ* gamma measurements in this area in February 2000 and detected Co-60 at 0.02 pCi/g.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil
- Concrete
- Gravel

Preliminary Classification

The U3 Transformer yard is preliminarily classified as a MARSSIM Class 3 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Supporting Documents

31 XFMER Rock-Soil 10-94.pdf

6.5.2.3.4 U3 VC-FSB-PAB Junction

Description and Historical Use

The Unit 3 VC/FSB/PAB Junction, more commonly referred to as the "Pigeon Pit", is a soil and grassy area at the confluence of the Containment Building, FSB and PAB (Figure 3A, Cell B4).

This area was subjected to some of the same events described in Section 0 regarding the FSB Alleyway.

One source of contamination in this area was identified as the PAB to VC expansion joint. The activity migrated to the storm drain system from the PAB pipe penetration floor through the expansion joint into the transformer yard. Repair of the expansion joint was performed in September of 1991.

This area was filled with debris which was contaminated with low level activity. The contamination apparently was spread by runoff in the area that was increased because of a plugged curtain drain.

A significant effort was made to clean this area. The cleanup removed approximately 30 cubic feet of contaminated soil. The curtain drain was unplugged and inspected. The surface of the area was sealed to minimize further radionuclide transport.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Soil

Preliminary Classification

The VC/FSB/PAB is preliminarily classified as a MARSSIM Class 1 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion

6.5.2.4 Storage Tanks

6.5.2.4.1 U3 Condensate Polishing Facility Process Tanks CPFPT

Description and Historical Use

The U3 Condensate Polishing Facility Process Tanks (Figure 3A, cell A4), associated with the Condensate Polishing Facility contained resin regeneration chemicals utilized during system backwashes and resin regeneration operations.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Unit 3 Condensate Polishing Facility Process Tanks and associated SSCs are preliminarily classified as a MARSSIM Class 3 SSC based on the chance of any backflow between the tanks and the resin tanks within the building, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

Supporting Documents

Fire Water Storage Tank Base of 95' Hill.pdf
Monitor Tank Line Insulation 12-94.pdf

6.5.2.4.2 U3 Condensate Storage Tank CST

Description and Historical Use

The Unit 3 Condensate Storage Tank (CST) (Figure 3A, Cell B4) is a 600,000-gallon storage tank which is constructed of carbon steel with a phenolic liner and has a floating diaphragm on the surface of the water to exclude air.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Unit 3 Condensate Storage Tank and associated SSCs are preliminarily classified as a MARSSIM Class 3 SSC based on the radioactive content of the water it was designed to store, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.5.2.4.3 U3 Monitor Tanks

Description and Historical Use

The Unit 3 Monitor Tanks (Figure 3A, Cell C3), located adjacent to and directly east of the U3 PAB, are components of the U3 liquid radioactive waste system. The waste water is circulated and monitored for radioactivity and other chemical parameters prior to discharge.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Unit 3 Monitor Tanks and associated SSCs are preliminarily classified as a MARSSIM Class 2 SSC based on the radioactive content of the water they were designed to store, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.5.2.4.4 U3 Primary Water Storage Tank PWST

Description and Historical Use

The Unit 3 Primary Water Storage Tank (PWST) (Figure 3A, Cell C3) is a 165,000-gallon tank constructed of Type 304 stainless steel with a floating diaphragm to exclude air. The main purpose of the PWST is to store water of a suitable quality for make-up to the primary coolant system.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The U3 Primary Water Storage Tank is preliminarily classified as a MARSSIM Class 3 SSC based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.5.2.4.5 U3 Refueling Water Storage Tank RWST

Description and Historical Use

The Unit 3 Refueling Water Storage Tank (RWST) (Figure 3A, Cell C4) has a nominal capacity of 355,000 gallons of borated water. The purpose of the tank is to supply borated water to the refueling canal for refueling operations and to the safety injection pumps, the residual heat removal pumps, and the containment spray pumps for accidents requiring safety injection. Following refueling operations, water from the refueling canal is pumped back into the RWST.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Unit 3 Refueling Water Storage Tank and associated SSCs are preliminarily classified as a MARSSIM Class 1 SSC based on the radioactive content of the water it was designed to store, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

6.6 Impacts to Facilities Common to Multiple Units

6.6.1 Non-Radiological Impacts

6.6.1.1 Building or Structure

6.6.1.1.1 COMMON Discharge Canal

Description and Historical Use

The Discharge Canal (Figure 3A, Cells A1 to A4) discharges circulating water, service water and liquid radiological waste from the combined three units at IPEC to the Hudson River. Eight outfalls of the station Storm Drain System, which conveys drainage from roads, parking areas, roof drains and grassy surfaces throughout the station, also flow to the Discharge Canal.

The North Curtain Drain at the perimeter of the Unit 1 Fuel Storage Building and Chemical Systems Building formerly emptied into the station Storm Drain System and ultimately into the Discharge Canal. Low levels of PCBs and tritium were detected in the discharge from the North Curtain Drain in 1994 [13]. Since that time water collected in the North Curtain Drain has been routed to the sphere foundation (Containment Building annulus) drain sump, where it is treated through carbon filtration before discharge directly to the Discharge Canal.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil, PCBs and RCRA Metals.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because of the potential for residual contamination from Storm Drain System effluents the Discharge Canal is assigned a preliminary classification of NR Class 3.

Recommended Future Investigation Activities

Collect samples of bottom sediment in the Discharge Canal and analyze them for the Potential Contaminants.

Supporting Documents

CR-IP3-1995-00524, Oil in discharge canal.pdf
Memo to ENZ re IP3 TB Oil Plume Investigation 11-24-99.PDF
SOR 91-3-109 U3 Oil Spill to Turbine Building and Discharge Canal 5-25-1991.pdf
SOR 91-3-144 Follow up to SOR-91-3-144 U3 Turbine Lube Oil Separator Overflow.pdf
Spill No.1008306, 100 gallons transformer oil to soil & surface water, 11-8-2010.pdf
Spill No.1110316, unknown petroleum to surface water, 11-19-2011.pdf

Spill No.1113561, unknown petroleum to surface water, 3-3-2012.pdf
Spill No.1216119, lube oil to surface water, 3-6-2013.pdf
Spill No.1501459, transformer oil to soil & surface water, 5-9-2015.pdf
Spill No.1606485, lube oil to surface water, 9-30-2016.pdf
Spill No.708071, petroleum to discharge canal, 10-23-2007.pdf

6.6.1.1.2 COMMON FLEX Building

Description and Historical Use

The Flex Building (Figure 3B, Cell B6) contains pumps, hoses, generators, air compressors and related equipment for use in responding to severe accidents caused by natural disasters or other events that are beyond the plant licenses basis. No record of a release of hazardous material from this building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel and Lubricating Oil.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the equipment stored in the FLEX Building is shielded from processes, such as precipitation, wind, runoff, infiltration and seepage that would facilitate transport of contaminants to the natural environment, a release of Diesel Fuel or Lubricating Oil from the equipment is unlikely to result in gross contamination of soil or groundwater. The Flex Building and the equipment it contains is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the interior and exterior of the Flex Building for indications of staining, cracks or openings that could release the Potential Contaminant to the environment.

6.6.1.1.3 COMMON Gas Turbines 2 & 3

Description and Historical Use

Gas Turbines 2 and 3 (Figure 3C, Cell D2) formerly provided electrical power to Unit 2 and Unit 3 in the event of loss of off-site power. The turbines do not comply with current air emissions standards and are not in service but can provide peaking power to the electrical grid if needed. No record of a release of hazardous material from Gas Turbines 2 or 3 has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel, Lubricating Oil and Hydraulic Oil. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because Gas Turbines 2 and 3 are located inside their respective buildings a release of diesel fuel or lubricating oil from the turbines is unlikely to result in gross contamination of soil or groundwater. The area of the turbines is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Gas Turbines 2 and 3 for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.6.1.1.4 COMMON ISFSI Heavy Hauler Storage Building

Description and Historical Use

The ISFSI Heavy Hauler Storage Building (Figure 3A, Cell B7) contains the large vehicle used to transport spent fuel casks from the Unit1, Unit 2 or Unit 3 Fuel Storage Buildings to the Independent Spent Fuel Storage Installation. The vehicle is powered by a diesel engine and is operated with hydraulic controls. No record of a release of hazardous material from the ISFSI Heavy Hauler Storage Building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel and Hydraulic Oil. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the ISFSI Heavy Hauler is stored inside its Storage Building, release of diesel fuel or hydraulic oil from the Heavy Hauler is unlikely to result in gross contamination of soil or groundwater. The ISFSI Heavy Hauler Storage Building is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of ISFSI Heavy Hauler Storage Building for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.6.1.1.5 COMMON Maintenance Training Facility

Description and Historical Use

The Maintenance Training Facility (Figure 3C, Cell B2) contains large pumps, motors, valves, compressors and other equipment used to train maintenance personnel how to service and maintain them. Although the equipment is not in service, it may contain lubricating oil.

No record of a release of hazardous material from the Maintenance Training Facility has been found. However, as discussed in Subsection 4.2.2.1 a release of fuel oil from an underground storage tank outside of the south wall of the building occurred in 1996.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the equipment that may contain lubricating oil is stored inside the Maintenance Training Facility, release of lubricating oil from the MTF is unlikely to result in gross contamination of soil or groundwater. The Maintenance Training Facility is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Maintenance Training Facility for indications of staining, cracks or openings that could release the Potential Contaminant to the environment.

6.6.1.1.6 COMMON Receiving Warehouse

Description and Historical Use

The Receiving Warehouse (Figure 3C, Cells C3 to C4) is also referred to as the Buchanan Service Center and is the point of entry for equipment, parts and supplies entering the station. These items are stored here and screened by Security prior to entry into the Protected Area. Various pieces of equipment such as pipes, cable spools, insulators and metal stock are staged in the yard at the south end of the building.

The building also stores approximately sixteen 55-gallon drums of virgin diesel fuel and lubricating oil. No record of a release of hazardous material from the Receiving Warehouse has been found.

Known and Potential Contaminants

The non-radiological contaminants are Batteries, Laboratory Chemicals, Petroleum Products, and Solvents. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

The equipment, parts and supplies, including petroleum products, that are stored inside the Receiving Warehouse are shielded from processes such as precipitation, wind, runoff, infiltration and seepage that would facilitate transport of contaminants to the natural environment. Therefore, release of Potential Contaminants from the Receiving Warehouse is unlikely to result in gross contamination of soil or groundwater. The Receiving Warehouse is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Receiving Warehouse for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.6.1.1.7 COMMON Salt Barn

Description and Historical Use

The Salt Barn (Figure 3C, Cell A4) is where salt is stored for deicing station roads. No record of a release of hazardous material from the Salt Barn has been found.

Known and Potential Contaminants

The non-radiological contaminant is Road Salt

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Road Salt is stored under cover inside the Salt Barn and is shielded from processes such as precipitation, wind, runoff, infiltration and seepage that would facilitate transport of contaminants to the natural environment. However, loading of trucks has the potential to distribute salt onto the pavement in front of the salt barn where it would be subject to infiltration and seepage into groundwater. Therefore, the Salt Barn is assigned a preliminary classification of NR Class 3.

Recommended Future Investigation Activities

Inspect the area of Salt Barn for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.6.1.1.8 COMMON Waterfront Warehouse

Description and Historical Use

The Waterfront Warehouse (Figure 3A, Cells A1 to A2) is also known as the Unit 3 Receiving Warehouse. This warehouse is where equipment, parts and supplies are stored after they have entered the Protected area. No record of a release of hazardous material from the Waterfront Warehouse has been found.

Known and Potential Contaminants

The non-radiological contaminants are Batteries, Laboratory Chemicals, Petroleum Products, Solvents and Cleaning Agents. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

The equipment, parts and supplies, that are stored inside the Waterfront Warehouse are shielded from processes such as precipitation, wind, runoff, infiltration and seepage that would facilitate transport of contaminants to the natural environment. Therefore, release of Potential Contaminants from the Waterfront Warehouse is unlikely to result in gross contamination of soil or groundwater. The Waterfront Warehouse is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Waterfront Warehouse for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.6.1.2 Chemical and Drum Storage Areas

6.6.1.2.1 COMMON Hazardous Material Storage Building

Description and Historical Use

The Hazardous Material Storage Building (Figure 5, Cell C3) stores hazardous materials from all units at the station. No record of a release of hazardous material from this building has been found.

Known and Potential Contaminants

The non-radiological contaminants are Acids-Bases, Batteries, Waste Glycol, RCRA Metals, Universal Wastes, and Waste Oil. If handled properly, these materials are not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

The hazardous materials that are stored inside the Hazardous Material Storage Building are shielded from processes such as precipitation, wind, runoff, infiltration and seepage that would facilitate transport of contaminants to the natural environment. Therefore, release of Potential Contaminants from the Hazardous Material Storage Building is unlikely to result in gross contamination of soil or groundwater. The Hazardous Material Storage Building is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of Hazardous Material Storage Building for indications of staining, cracks or openings that could release the Potential Contaminants to the environment.

6.6.1.3 Oil-Filled Mechanical Equipment

6.6.1.3.1 COMMON Building Elevators

Description and Historical Use

Elevators in the Generation Support Building and Training Building each contain approximately 50 gallons of hydraulic oil in their operating machinery. No record of a release of hazardous material from these elevators has been found.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)
- Concrete

Preliminary Classification

Because the Generation Support Building and Training Building Elevators are contained within the buildings they serve, it is not likely that releases that may have occurred from the hydraulic oil reservoirs have caused gross contamination of soil or groundwater. These building elevators are assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the hydraulic oil reservoirs and the bottom of the elevator shafts for indications of staining, cracks or openings that could release the Potential Contaminant to the environment.

6.6.1.4 Storage Tanks

6.6.1.4.1 COMMON Former Buchanan Service Center USTs

Description and Historical Use

As discussed in Subsection 4.2.2.1, a fueling station for IPEC vehicles was formerly located in the southeast portion of the Buchanan Service Center Yard (Figure 4, Cell D3). Four underground storage tanks (USTs) containing petroleum products were removed from this area in 1998. Two 4,000-gallon tanks contained gasoline, one 4,000-gallon tank contained diesel fuel and one 275-gallon tank contained waste oil [14]. A chemical waste storage area was located in the area and also has been removed.

Soil samples from three soil borings and groundwater samples from two monitoring wells were collected for chemical analysis in 2000 during a subsurface investigation of the area. Results of the sample analysis indicated soil and groundwater contamination in the area of the removed underground storage tanks [14]. In January 2001 Con Edison proposed to the NYSDEC a program of semi-annual monitoring of groundwater from the two monitoring wells [15].

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents, Spent Solvents, Waste Oil, and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because of the known contamination of soil and groundwater in the area of the Former Buchanan Service Center USTs, the area of the former fueling station is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

Collect additional samples of soil and groundwater in the area of interest and analyze the samples for the Potential Contaminants to determine the current environmental conditions in the area.

6.6.1.4.2 COMMON Gas Turbine 2 Lube Oil Reservoir GT2LOR

Description and Historical Use

The Gas Turbine 2 Lube Oil Reservoir (Figure 4, Cell E3) is a 1,500-gallon above ground tank containing lubricating oil for Gas Turbine 2. No record of a release of hazardous material from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Gas Turbine 2 Lube Oil Reservoir is contained within the Gas Turbine 2 Building, it is not likely that releases that may have occurred from the lubricating oil reservoir has caused gross contamination of soil or groundwater. This reservoir is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Gas Turbine 2 Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminant to the environment.

6.6.1.4.3 COMMON Gas Turbine 2 Used Oil Tank GT2LFST

Description and Historical Use

The Gas Turbine 2 Used Oil Tank (Figure 4, Cell E3) is a 275-gallon underground tank containing unburned diesel fuel from Gas Turbine 2.

As discussed in Subsection 4.2.2.1, in 2000 1.1 ppm of an unidentified petroleum constituent was detected in a groundwater sample from a monitoring well near the Gas Turbine 2 Used Oil Tank [14].

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because groundwater contamination was detected in a monitoring well near the Gas Turbine 2 Used Oil Tank and the tank is an underground tank that cannot easily be inspected, there is the potential for a release due to undetected leakage or overfilling. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminants to the environment.

Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.6.1.4.4 COMMON Gas Turbine 2&3 Storage Tank GT2&3FOT

Description and Historical Use

The Gas Turbine 2 and 3 Storage Tank (Figure 4, Cell E2) is a 213,840-gallon above ground tank within a lined secondary containment dike, containing diesel fuel originally for Gas Turbines 2 and 3. No record of a release of hazardous material from this tank has been found.

Gas Turbines 2 and 3 do not comply with current air emissions standards and are not in service. Their Diesel Storage Tank is now used to provide a 7-day fuel supply for the Unit 2 and Unit 3 Emergency Diesel Generators.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater
- Tank Interior

Preliminary Classification

The Gas Turbine 2 and 3 Storage Tank stores a large volume of fuel and groundwater contamination was detected in a monitoring well near the tank [14]. There is the potential for a release due to undetected leakage or overfilling during deliveries. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

Inspect the area surrounding the fill port for the tank for indications of a release of the Potential Contaminant to the environment.

Collect subsurface soil samples from the area of the tank and analyze the samples for constituents of diesel fuel.

6.6.1.4.5 COMMON Gas Turbine 3 Lube Oil Reservoir GT3LOR

Description and Historical Use

The Gas Turbine 3 Lube Oil Reservoir (Figure 4, Cell E3) is a 1,700-gallon above ground tank containing lubricating oil for Gas Turbine 3. No record of a release of hazardous material from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. If handled properly, this material is not expected to pose a risk of contamination to environmental media such as soil or groundwater.

Potentially Contaminated Media

- Building Materials (Floor)

Preliminary Classification

Because the Gas Turbine 3 Lube Oil Reservoir is contained within the Gas Turbine 3 Building, it is not likely that releases that may have occurred from the lubricating oil reservoir have caused gross contamination of soil or groundwater. This reservoir is assigned a preliminary classification of NR Isolated.

Recommended Future Investigation Activities

Inspect the area of the Gas Turbine 3 Lube Oil Reservoir for indications of staining, cracks or openings that could release the Potential Contaminant to the environment.

6.6.1.4.6 COMMON Gas Turbine 3 Used Oil Tank GT3LFST

Description and Historical Use

The Gas Turbine 3 Used Oil Tank (Figure 4, Cell E3) is a 275-gallon underground tank containing unburned diesel fuel from Gas Turbine 2. No record of a release of hazardous material from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminants are Waste Oil and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the Gas Turbine 3 Used Oil Tank is an underground tank that cannot easily be inspected, there is the potential for a release due to undetected leakage or overfilling. A preliminary classification of NR Class 1 is assigned to the tank.

Recommended Future Investigation Activities

- Inspect the area surrounding the tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the tank grave when the tank is removed and analyze the samples for constituents of diesel fuel.

6.6.1.4.7 COMMON Maintenance Training Facility Tank MTF02

Description and Historical Use

The Maintenance Training Facility Tank is a 1,000-gallon above ground steel tank containing fuel oil for heating the Maintenance Training Facility. The tank is located outside on the south side of the building (Figure 5, Cell E4).

As discussed in Subsection 4.2.2.1, Fuel oil was released from an underground storage tank on the south side of the Maintenance Training Facility in 1996 (CR-IP3-1996-02113). The tank and contaminated soil were removed, and the tank was replaced with a 1,000-gallon above ground storage tank.

Two soil borings were advanced in the area of the UST in 2000. Low levels of petroleum constituents were detected in two soil samples collected from one of the soil borings. No petroleum constituents were detected in groundwater samples collected from monitoring wells installed in the soil borings [14].

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Remediation of soil contaminated with fuel oil was completed when a release from the original underground storage tank occurred in 1996. Because of the known contamination of soil, the area of the Unit 3 Maintenance Training Facility Tank is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

- Inspect the area of the Unit 3 Maintenance Training Facility Tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the area of the tank and analyze the samples for constituents of Fuel Oil.

6.6.1.4.8 COMMON Security Diesel Storage Tank SDFT

Description and Historical Use

The Security Diesel Storage Tank is a 550-gallon underground tank packed in sand within a vault at the Security Facility (Figure 4, Cell B5). The tank contains diesel fuel for the security generator. No record of a release of diesel fuel from this tank has been found.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

The Security Diesel Storage Tank is an underground tank that cannot be inspected easily. The area of this UST is assigned a preliminary classification of NR Class 1.

Recommended Future Investigation Activities

- Inspect the area of the Security Diesel Storage Tank for indications of a release of the Potential Contaminants to the environment.
- Collect soil samples from the area of the tank and analyze the samples for constituents of Diesel Fuel.

6.6.1.5 Transformers

6.6.1.5.1 COMMON Buchanan Service Center Transformer

Description and Historical Use

The Buchanan Service Center Transformer is a pad-mounted transformer containing less than 500 gallons of non-PCB dielectric oil (Figure 4, Cell D3). The transformer is not in service. No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 2 is assigned to the Buchanan Service Center Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.6.1.5.2 COMMON GT2 Auxiliary Power Transformer Auxiliary Supply

Description and Historical Use

The GT2 Auxiliary Power Transformer Auxiliary Supply (Figure 4, Cell E3) is a pad-mounted transformer next to the Gas Turbine 2 Building and contains less than 500 gallons of non-PCB dielectric Oil. No record of a release of hazardous material from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 2 is assigned to the GT2 Auxiliary Power Transformer Auxiliary Supply.

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.6.1.5.3 COMMON GT2 Auxiliary Power Transformer Normal Supply

Description and Historical Use

The GT2 Auxiliary Power Transformer Normal Supply (Figure 4, Cell E3) is a pad-mounted transformer next to the Gas Turbine 2 Building and contains less than 500 gallons of non-PCB dielectric Oil. No record of a release of hazardous material from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 2 is assigned to the GT2 Auxiliary Power Transformer Normal Supply.

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.6.1.5.4 COMMON Substation C Transformer

Description and Historical Use

The Substation C Transformer is a pad-mounted transformer located near the Unit 3 Condensate Storage Tank (Figure 4, Cell B4). The transformer serves both Unit 2 and Unit 3. The transformer contains less than 500 gallons of non-PCB dielectric oil. No record of a release of dielectric oil from this transformer has been found.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Transformer bushings and gaskets commonly develop small releases with age due to thermal expansion and fatigue as the temperature of the dielectric fluid varies between periods of operation and periods of outage. Based on the volume of dielectric fluid that could be released a preliminary classification of NR Class 2 is assigned to the Substation C Transformer,

Recommended Future Investigation Activities

Inspect the transformer and surrounding area for indications of a release of the Potential Contaminant to the environment.

6.6.2 Radiological Impacts

6.6.2.1 Building or Structure

6.6.2.1.1 COMMON Protected Area Cafeteria

Description and Historical Use

The Protected Area Cafeteria (Figure 3A, Cell A5) is located immediately west of the Unit 1 Turbine Generator Building.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Building Materials

Preliminary Classification

The Cafeteria is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.2 COMMON Discharge Canal

Description and Historical Use

The Discharge Canal (Figure 3A, Cells A1 toA4) discharges circulating water, service water and liquid radiological waste from the combined three units at IPEC to the Hudson River. Eight outfalls of the station Storm Drain System, which conveys drainage from roads, parking areas, roof drains and grassy surfaces throughout the station, also flow to the Discharge Canal.

The north curtain drain at the perimeter of the Unit 1 Fuel Storage Building and Chemical Systems Building empties into the station Storm Drain System and ultimately into the Discharge Canal.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete

Preliminary Classification

The Discharge Canal is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the canal structural surfaces
- Direct measurements and contamination surveys of the discharge piping
- Radiological analysis of sediments, if available, to determine volumetric contamination

6.6.2.1.3 COMMON FLEX Building

Description and Historical Use

Formerly the Interim Radwaste Storage Facility for Unit 3, the FLEX Building (Figure 3B, Cell B6) contains pumps, hoses, generators, air compressors and related equipment for use in responding to severe accidents caused by natural disasters or other events that are beyond the plant licenses basis.

While in use as the Interim Radwaste Storage Facility, the building was treated as an RCA. However, no records of the facility becoming contaminated were found during the records review. Prior to conversion to the FLEX Building, a radiological survey was performed to release the building as an RCA.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The FLEX Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.4 COMMON Gas Turbines 2 & 3

Description and Historical Use

Gas Turbines 2 and 3 (Figure 3C, Cell D2) formerly provided electrical power to Unit 2 and Unit 3 in the event of loss of off-site power. The turbines do not comply with current air emissions standards and are not in service but can provide peeking power to the electrical grid if needed.

Radioactive material was not used or stored in either of these buildings, but because of their proximity to the power block, there is the potential that trace levels of contamination may have accumulated in these buildings, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials
- SSCs

Preliminary Classification

The Gas Turbine Buildings are preliminarily classified as MARSSIM Class 3 structures based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interiors
- Direct measurements and contamination surveys of the building exteriors and roofs

6.6.2.1.5 COMMON ISFSI Heavy Hauler Storage Building

Description and Historical Use

The ISFSI Heavy Hauler Storage Building (Figure 3A, Cell B7) contains the large vehicle used to transport spent fuel casks from the Unit 1, Unit 2 or Unit 3 Fuel Storage Buildings to the Independent Spent Fuel Storage Installation.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The ISFSI Heavy Hauler Storage Building is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.6 COMMON Former Con Edison Visitor Center

Description and Historical Use

The Former Con Edison Visitor Center (Figure 3A, Cell C6) is located northwest of the Generation Support Building. The building now houses a health center with exercise equipment and offices.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Former Con Ed Visitor Center is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.7 COMMON Outage Contractor Offices

Description and Historical Use

The Outage Contractor Offices (Figure 3A, Cell C3) are located immediately east of the Unit 3 Monitor Tanks. The offices consist of a series of trailer-like structures and are supported by the concrete roof atop the U3 Waste Holdup Tank Pit.

Radioactive material was not used or stored in these buildings, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Outage Contractors Offices are preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.8 COMMON Protected Area Access Facility

Description and Historical Use

The Protected Area Access Facility (Figure 3A, Cell C5) is located northwest of the Unit 2 Simulator Building. This facility provides for access to and egress from the Protected Area.

Sealed sources of radioactive material (e.g. Ni-63, Cs-137, etc.) may have been used in security screening and RP monitoring devices in the facility. However, no events of releases from sources used in the building, were found in the records review. Due to its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Protected Area Access Facility is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.9 COMMON Retired Sewage Treatment Plant

Description and Historical Use

The Retired Sewage Treatment Plant (Figure 3A, Cell B2) is located east of the Former Septic Leach Field.

In 1979, during construction of service facilities for the Unit 3 plant, it became necessary to remove the Former Septic Leach Field to allow for road and storm drainage construction activities to progress. At that time, the Sewage Treatment Plant was retired in place and a pumping station was constructed nearby. The pumping station now conveys sewage collected from the station for treatment at the Buchanan sewage treatment plant [39].

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Retired Sewage Treatment Plant is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

Supporting Documents

Map 8 - On Site Septic Disposal Area.pdf
On-Site Storage of Septic Material - May 1979.pdf

6.6.2.1.10 COMMON Security Facility

Description and Historical Use

The Security Facility (Figure 3A, Cell C4) is located south of the Protected Area Access Facility and southwest of the Unit 2 Simulator.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Security Facility is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.1.11 COMMON Waterfront Warehouse

Description and Historical Use

The Waterfront Warehouse (Figure 3A, Cell A1) is also known as the Unit 3 Receiving Warehouse. This warehouse is where equipment, parts and supplies are stored after they have entered the Protected area.

Radioactive material was not used or stored in this building, but because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated in this building, primarily from airborne deposition on the roof and from the routine movement of personnel and equipment between buildings.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- Concrete
- Building Materials
- Roofing Materials

Preliminary Classification

The Waterfront Warehouse is preliminarily classified as a MARSSIM Class 3 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building exterior and roof

6.6.2.2 Exterior Area

6.6.2.2.1 COMMON ISFSI Pad

Description and Historical Use

The ISFSI Pad (Figure 3A, Cell B7) is located at the north end of the station. The ISFSI Pad was constructed in 2005 and is approximately 100 feet by 200 feet. Entergy uses the Holtec International HI-STORM 100 Cask System for dry storage of spent nuclear fuel. The first dry fuel storage cask was placed on the Pad on January 11, 2008. By the end of 2017, there were 41 dry fuel storage casks on the Pad (5 from Unit 1, 23 from Unit 2 and 13 from Unit 3).

Because of its proximity to the power block, there is the potential that trace levels of contamination may have accumulated on the Pad, primarily from airborne deposition.

This pad will not be decommissioned until a final repository for the fuel has been determined and the fuel is removed from site. The pad is discussed in this HSA because it is a prominent site feature.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Concrete
- Soil

Preliminary Classification

The ISFSI Pad is preliminarily classified as a MARSSIM Class 3 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

After the fuel has been removed and the site decides to terminate the Part 72 license, direct measurements and contamination surveys of the pad surface should be performed.

6.6.2.2.2 COMMON Plant Yard

Description and Historical Use

The Plant Yard is a catch all feature for ground surfaces within the Protected Area that are not otherwise addressed in this report. The area includes all of the areas paved with asphalt and/or concrete, landscaped/grassy areas and areas of bare soil or crushed rock. This area includes the Sally Port used by site security for screening vehicles and accessing / egressing the PA.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Concrete
- Gravel
- Soil

Preliminary Classification

The majority of the Plant Yard is preliminarily classified as a MARSSIM Class 3 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

There are several areas within the Plant Yard that have been specifically called out in this report and assigned their own sections and classifications. Other discrete areas listed in Table 18 are preliminarily classified as Class 1 or Class 2 areas because radioactive contamination has been identified there in the past.

Table 18: Additional Plant Yard Areas

Area	Location	Preliminary MARSSIM Classification
UU2 ABFP Alleyway	Figure 8A, B6	1
U2 MOB/FSB Alleyway	Figure 8A, B6	1
U2 RWST Area	Figure 8A, C5	1
U3 Appendix R D/G Area	Figure 8A, B4	1
U3 Monitor Tank Pad / WHU Area	Figure 8A, C3	2
U3 PWST Area	Figure 8A, C3	1
U3 RWST Area	Figure 8A, C4	1

Although the Plant Yard has been preliminarily classified as a MARSSIM Class 3 area, those areas surrounding Class 1 areas identified in the report will need to be treated as MARSSIM Class 2 buffer areas. These Class 2 buffer areas have not been specifically identified in this report.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion
- Direct measurements and contamination surveys of concrete and asphalt surfaces

Supporting Documents

ABFP Alleyway 15' Notebook Entry.pdf
Cabrera ISOCS Assessment of U1 & 2 Yard Areas.pdf
Cabrera ISOCS Assessment of U1_U2 Exterior Areas.pdf
Contaminated Soil Around U3 PWST, 1993.pdf
CR-IP2-1998-09527, Areas Outside U1 RCA contain RAM.pdf
CR-IP3-2005-00641, Yellow Painted Wrench Found Outside the RCA.pdf
CR-IP3-2005-02486, 95' Hill Radioactive Material.pdf
CRs and CAs for U3 underground steam leaks.pdf
CWTS.pdf
DAQ Review of Cabrera ISOCS Assessment.pdf
DAQ Review of Cabrera Report.pdf
File 20 - SOR 93-371 PWST Event.pdf
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U2 ABFP Alleyway 50.75(g) Notebook Entry.pdf
U2 Diesel Generator Alleyway Soil and Water Sample Results.pdf
U2 Diesel Generator Alleyway Soil Sample Results.pdf
U2 Diesel Generator Rocks and Fill 50.75(g) Notebook Entry.pdf
U2 Doghouse and Hill RMSA 50.75(g) Notebook Entry.pdf
U2 RWST Area Soil Sample Results Notebook Entry.pdf
U2 RWST Rock Pad and Fill 50.75(g) Notebook Entry.pdf
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U3 PWST Soils.pdf
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U3 Soils and Remediation Plan.pdf
US NRC Inspection Report No. 50-247_92-16.pdf

6.6.2.2.3 COMMON Radioactive Material Pen 1

Description and Historical Use

Radioactive Material (RAM) Pen 1 (Figure 3B, Cell B6) is an outdoor area surrounded by a chain link fence and located west of the Training Building and immediately south of the Hazardous Material Storage Building. RAM Pen 1 is primarily used for storage of LSA boxes and Sea-Land containers.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil

Preliminary Classification

Radioactive Material Pen 1 is preliminarily classified as a MARSSIM Class 2 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion
- Direct measurements and contamination surveys of concrete and asphalt surfaces

6.6.2.2.4 COMMON Radioactive Material Pen 2

Description and Historical Use

Radioactive Material (RAM) Pen 2 (Figure 3B, Cell C4) is an outdoor area surrounded by a chain link fence and located southwest of the Training Building and south of Radioactive Material Pen 1. RAM Pen 2 is primarily used for storage of Sea-Land containers.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil

Preliminary Classification

Radioactive Material Pen 2 is preliminarily classified as a MARSSIM Class 3 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed a small fraction of the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion
- Direct measurements and contamination surveys of concrete and asphalt surfaces

6.6.2.2.5 COMMON Yard 8

Description and Historical Use

Yard 8 (Figure 3A, Cell D2) is located immediately west of the two retired Bulk Oil Storage Tanks. The boundary of Yard 8 is defined by a chain link fence. The area contains a large storage shed. This area is a former outside Rad Material Storage Area.

Known and Potential Contaminants

The ROCs are those categorized as Gammas and HTD&Betas. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Asphalt
- Soil

Preliminary Classification

Yard 8 is preliminarily classified as a MARSSIM Class 2 area based on the discussion above, and the presumption that if residual radioactivity is present, its concentration will not exceed the acceptance criteria.

Recommended Future Investigation Activities

- Gamma walkover survey to identify any areas with elevated activity
- Radiological analysis of media samples taken in a systematic fashion
- Direct measurements and contamination surveys of concrete and asphalt surfaces

Supporting Documents

CR-IP3-2005-02426, Yard 8 Steel Plates.pdf
CR-IP3-2005-02428, Yard 8.pdf
TID-04-009, Yard 8 Soil Sample Evaluation.pdf

6.6.2.3 Storage Tanks

6.6.2.3.1 COMMON Waste Distillate Tanks

Description and Historical Use

The Waste Distillate Tanks (Figure 3A, Cell C5), located adjacent to and directly east of the U1 Fuel Storage Building, are components of the U1 and U2 Integrated Liquid Waste System (ILWS). Waste water in the tanks is circulated and monitored for radioactivity and other chemical parameters prior to discharge.

Known and Potential Contaminants

The ROCs are those categorized as Gammas, HTD&Betas, and Tritium. The ROCs may be revised based upon more definitive data collected during site characterization activities.

Potentially Contaminated Media

- Steel
- SSCs

Preliminary Classification

The Waste Distillate Tanks and associated SSCs are preliminarily classified as a MARSSIM Class 1 SSC based on the radioactive content of the water they were designed to store, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Recommended Future Investigation Activities

- Direct measurements and contamination surveys of the tank interior
- Direct measurements and contamination surveys of the tank exterior

7 Conclusions

This HSA has been completed in accordance with guidance provided in NUREG-1575 (MARSSIM). As expected, operational activities at IPEC from initial power generation of Unit 1 in August of 1962 to the present have resulted in areas that have been impacted with radiological and/or non-radiological contaminants. A general conclusion that can be drawn from the record reviews, personnel interviews, and site walk-downs that were part of HSA development is that IPEC had an excellent operating history in that operations have resulted in very low radiological and non-radiological potential impacts to the environment beyond the PA. No identified areas of contamination are a current or expected threat to human health or the environment that would warrant immediate corrective action.

The information developed by this HSA indicates that the areas and SSCs with a high probability of requiring remediation of radiological contaminants (Class 1) are located within Radiologically Controlled Areas (RCA). Migration of surface contamination from the RCA appears to be limited, as has been determined from frequent site surveys conducted inside the Protected Area (PA).

Ordinarily, historic events that resulted in contamination were remediated immediately at the time of their discovery. Some incidents of radiological contamination could not be completely remediated at the time of discovery; in those instances, a sealant or additional asphalt was used to contain the contamination. These instances are specifically identified in the report discussion regarding the event.

It should be noted that the HSA reflects the current radiological and non-radiological status of the site. Because decommissioning may be a lengthy and iterative process, information in the HSA should be evaluated with respect to the impact of the elapsed time between the completion of this report and decommissioning (due to radioactive decay or natural attenuation) on the intended use of the information. The following conclusions are presented for consideration and to clearly state important observations.

- Known incidents of contamination have been remediated and none of the impacted areas or SSCs are an imminent threat to human health or the environment.
- Historic releases at the station have been managed in accordance with applicable radiological and non-radiological regulations.
- Each area identified as potentially impacted will require further characterization as it becomes more accessible during decommissioning to determine the extent to which it may have been impacted, if at all.
- No new impacted areas that were not previously known have been identified by this HSA.
- Where lead-based paint, ACM, or components containing mercury or PCBs are present, the areas are located within buildings, are not exposed to the environment and are being managed in accordance with site procedures. The current management practices for these areas are sufficient to ensure the safety of site workers until the materials of concern are permanently removed from the station.
- Soil containing residual contamination of oil remains in the area between the Unit 1 Turbine Building and the Gas Turbine 1 Generator Building, where the fill manifold

for the Gas Turbine 1 fuel oil storage tanks is located. This contaminated soil cannot be excavated safely while the plant remains operational because nuclear safety-related subsurface utilities are located there. Instead, with the concurrence of the NYSDEC a semi-annual program of groundwater monitoring, removal of free-phase oil from surrounding monitoring wells (if present) and reporting to the regulator has been initiated.

- In 1989 3,500 gallons of lubricating oil was released from a corroded pipeline beneath the Unit 3 Turbine Generator Building. Oil periodically issued from floor drains on the 5-foot elevation of the building and from a crack in the east wall of the Discharge Canal. Buried safety-related utilities are located in the area where oil had been released and further subsurface investigation there would have risked damage to vital plant equipment. A monitoring program in nearby groundwater monitoring wells was established at the request of the NYSDEC.
- A fueling station for IPEC vehicles was formerly located in the southeast portion of the Buchanan Service Center Yard. Four underground storage tanks containing petroleum products were removed from the area in 1998. Soil and groundwater samples collected during a 2000 subsurface investigation of the area identified soil and groundwater contamination. A program of semi-annual monitoring of groundwater from two installed monitoring wells was required by the NYSDEC.
- A release of approximately 80,000 gallons of No.6 fuel oil from Tank 11 (2,350,000-gallon capacity) occurred in 1980. Surrounding contaminated soil was removed and a lined berm was constructed around the tank. In 1993 both Tank 11 and adjacent Tank 12 were drained. Tank 12 was retired from service at that time and Tank 11 began to store No. 2 fuel oil. Tank 11 was retired from service in 2006. Low levels of petroleum constituents were detected in soil and groundwater samples near the tanks in 2000.
- Areas where legacy soil contamination from historical releases of petroleum products may remain have been classified NR Class 1 to indicate that contaminant levels may exceed site closure criteria. Not all of the areas are contained within the PA. Accessible contaminated soil was removed at the time of discovery of each release and the impacted areas are now managed under the direction of the NYSDEC. The areas pose no imminent threat to human health or the environment that would warrant immediate corrective action.
- Several containers of Mixed Waste are stored in the Unit 1 Containment Building. On September 5, 2001 NYSDEC issued a Consent Order to Con Edison for improper storage of the Mixed Waste. On September 6, 2001 Entergy acknowledged in a letter to NYSDEC that it is successor in title to Con Edison relative to Indian Point Units 1 and 2, and that it accepts the obligations of the terms and conditions of the Consent Order. Entergy was granted authorization to continue on-site storage of the Mixed Waste so long as it is stored "in a manor protective of the public health, safety and welfare and of the environment and in accordance with the requirements of the Nuclear Regulatory Commission pertaining to mixed waste storage and treatment".
- All accessible transformers and large electrical components have been sampled and tested to confirm that they do not contain PCB dielectric fluid.

- Fires in the Main Transformers at both Unit 2 (2010) and Unit 3 (2015) resulted in release of non-PCB dielectric fluid to the bermed transformer containments and nearby storm drains that flow to the Discharge Canal. The bermed concrete containments at both units have been emptied, cleaned, an impermeable liner applied and refilled with clean trap rock.
- IPEC has implemented the guidance prescribed by NEI 07-07 (the Industry Groundwater Protection Initiative) and has established an on-going groundwater monitoring program.
- Groundwater is not used as a source of drinking water on or near the station.
- A two-year comprehensive hydrogeological investigation of the IPEC site was conducted by GZA GeoEnvironmental, Inc starting in 2005. Radiological contaminant plumes from both Units 1 and 2 as well as the groundwater flow patterns at the station have been fully characterized by that investigation. Ongoing periodic sampling of the extensive network of monitoring wells and other sampling locations that are integral to the long-term groundwater monitoring program confirm that natural attenuation of the existing contaminant plumes is progressing and will provide timely detection of potential future releases associated with plant operations, should they occur.
- Groundwater flow beneath the station is primarily within the Inwood Marble, a fractured crystalline carbonate rock. The horizontal component of groundwater flow is to the west, discharging to the Hudson River. Knowledge of groundwater flow patterns at the station supports future decommissioning planning in terms of both managing groundwater intrusion to deep excavations and in evaluating the potential migration of plant-related contaminants.
- The two primary radionuclide contaminants in groundwater are Tritium (H-3) and Strontium-90 (Sr-90). Other contaminants, including Cesium-137 (Cs-137), Cobalt-60 (Co-60) and Nickel-63 (Ni-63), have been found in a subset of groundwater samples, but always in conjunction with H-3 and/or Sr-90. These contaminants enter the Hudson River within an approximately 150-foot long reach in the area between the Unit 1 Screenwell House and the Unit 2 Intake Structure. Where they enter the river, their concentrations are a small fraction of the limits permitted by the station’s operating licenses and present no risk to public health, safety or the environment.

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9 Appendices

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B. Summary Table of Potentially Impacted Non-Radiological Areas

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
Common Site-Wide Impacts			
Asbestos-Containing Material	Not Shown	Asbestos	NR Isolated
Lead and Lead-Based Paint	Not Shown	Lead	NR Isolated
Mercury-Containing components	Not Shown	Mercury, Laboratory Chemicals	NR Isolated
PCB-Containing Components	Not Shown	PCB-Containing Dielectric Oil	NR Class 3
Storm Drain System	6	Oil and Grease, Petroleum Constituents, RCRA Metals	NR Class 3
Common Building or Structure			
COMMON Discharge Canal	3A, cells A1 to A4	Diesel Fuel, Lubricating Oil, PCBs, RCRA Metals	NR Class 3
COMMON FLEX Building	3B, cell B6	Diesel Fuel, Lubricating Oil	NR Isolated
COMMON Gas Turbines 2 & 3	3C, cell D2	Diesel Fuel, Lubricating Oil	NR Isolated
COMMON ISFSI Heavy Hauler Storage Building	3A, cell B7	Diesel Fuel, Hydraulic Oil	NR Isolated
COMMON Maintenance Training Facility	3C, cell B2	Lubricating Oil	NR Isolated
COMMON Receiving Warehouse	3C, cells C3 to C4	Batteries, Laboratory Chemicals, Petroleum Products, Solvents, Cleaning Agents	NR Isolated
COMMON Salt Barn	3C, cell A4	Road Salt	NR Class 3
COMMON Waterfront Warehouse	3A, Cells A1 to A2	Batteries, Laboratory Chemicals, Petroleum Products, Solvents, Cleaning Agents	NR Isolated
Common Chemical and Drum Storage Areas			
COMMON Hazardous Material Storage Building	5, cell C3	Acids-Bases, Batteries, Waste Glycol, RCRA Metals, Universal Wastes, Waste Oil	NR Isolated
Common Oil-Filled Mechanical Equipment			

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
COMMON Building Elevators	Not Shown	Hydraulic Oil	NR Isolated
Common Storage Tanks			
COMMON Former Buchanan Service Center USTs	4, cell D3	Petroleum Constituents, Spent Solvents, Waste Oil, RCRA Metals	NR Class 1
COMMON Gas Turbine 2 Lube Oil Reservoir GT2LOR	4, cell E3	Lubricating Oil	NR Isolated
COMMON Gas Turbine 2 Used Oil Tank GT2LFST	4, cell E3	Waste Oil, RCRA Metals	NR Class 1
COMMON Gas Turbine 2&3 Storage Tank GT2&3FOT	4, cell E2	Diesel Fuel	NR Class 1
COMMON Gas Turbine 3 Lube Oil Reservoir GT3LOR	4, cell E3	Lubricating Oil	NR Isolated
COMMON Gas Turbine 3 Used Oil Tank GT3LFST	4, cell E3	Waste Oil, RCRA Metals	NR Class 1
COMMON Maintenance Training Facility Tank MTF02	5, cell E4	Diesel Fuel	NR Class 1
COMMON Security Diesel Storage Tank SDFT	4, cell B5	Fuel Oil	NR Class 1
Common Transformers			
COMMON Buchanan Service Center Transformer	4, cell D3	Dielectric Oil	NR Class 2
COMMON GT2 Auxiliary Power Transformer Auxiliary Supply	4, cell E3	Dielectric Oil	NR Class 2
COMMON GT2 Auxiliary Power Transformer Normal Supply	4, cell E3	Dielectric Oil	NR Class 2
COMMON Substation C Transformer	4, cell B4	Dielectric Oil	NR Class 2
Unit 1 Building or Structure			
U1 Contractor Fabrication Shop	3A, cell C3	Cutting Oil, Petroleum Constituents, RCRA Metals, Fuel Oil	NR Class 2
U1 Gas Turbine 1 Generator Building	3A, cell B4	Petroleum Constituents	NR Class 1
U1 Monitor House and Utility Tunnel	3A, cell D4	Petroleum Constituents	NR Isolated
U1 Turbine Generator Building	3A, cell B5	Cutting Oil, Petroleum Constituents, RCRA Metals	NR Isolated
Unit 1 Exterior Area			

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U1 Former Transformer Area	4, cell A5	Dielectric Oil, Petroleum Constituents, PCBs, RCRA Metals	NR Class 1
Unit 1 Oil-Filled Mechanical Equipment			
U1 Building Elevators	Not Shown	Hydraulic Oil, RCRA Metals	NR Isolated
Unit 1 Storage Tanks			
U1 Bulk Oil Storage Tanks 11 and 12	4, cell C3	Petroleum Constituents	NR Class 1
U1 Ignition Oil Tank 11IOT	4, cell B5	Fuel Oil	NR Isolated
U1 Ignition Oil Tank 12IOT	4, cell B5	Fuel Oil	NR Isolated
Unit 1 Transformers			
U1 138 kV Underground Cable	4, cell B5	Dielectric Oil, PCBs	NR Class 2
U1 Hellgate Transformer	4, cell B5	Dielectric Oil, PCBs, Petroleum Constituents	NR Class 2
Unit 2 Building or Structure			
U2 Emergency Diesel Generator Building	3A, cell B5	Diesel Fuel, Lubricating Oil	NR Isolated
U2 Intake Structure	3A, cells A5 to A6	Lubricating Oil, RCRA Metals, Sodium Hypochlorite	NR Class 3
U2 Turbine Generator Building	3A, cells B5 to B6	Asbestos, Lead, Lubricating Oil, Waste Oil, RCRA Metals, Dielectric Oil	NR Class 1
Unit 2 Chemical and Drum Storage Areas			
U2 Hazardous Waste Storage Bin	4, cell C3	Acids-Bases, Batteries, Lead, Mercury, Spent Solvents, RCRA Metals	NR Isolated
U2 Oil Storage Cabinets	4, cell A5	Diesel Fuel, Lubricating Oil	NR Isolated
Unit 2 Exterior Area			
U2 Transformer Yard	3A, cell B5	Dielectric Oil, RCRA Metals, Petroleum Constituents, PCB-Containing Dielectric Oil	NR Class 1
Unit 2 Oil-Filled Mechanical Equipment			
U2 Appendix R Diesel Generator	4, cell A5	Lubricating Oil, RCRA Metals, Diesel Fuel	NR Isolated

Potentially Impacted Area	**Figure Number**	**Potential Contaminants**	**Preliminary Classification**
U2 Circulation Water Pump Motors	3A, cells A5 to A6	Lubricating Oil, RCRA Metals	NR Isolated
U2 Condensate Pump Motors	3A, cells A5 to A6	Lubricating Oil, RCRA Metals	NR Isolated
U2 Diesel Fire Pump Motor	4, cell B5	Lubricating Oil, RCRA Metals, Diesel Fuel	NR Isolated
U2 Emergency Diesel Generators	3A, cell B5	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated
U2 Technical Support Center Emergency Diesel Generator	4, cell B5	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated
Unit 2 Storage Tanks			
U2 21 Emergency Diesel Generator Day Tank 21FODT	4, cell B5	Diesel Fuel	NR Isolated
U2 21 Emergency Diesel Generator Storage Tank 21FOST	4, cell B5	Diesel Fuel	NR Class 1
U2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATA	4, cell A5	Lubricating Oil	NR Isolated
U2 21 Main Boiler Feed Pump Oil Accumulator Tank 21OATB	4, cell A5	Lubricating Oil	NR Isolated
U2 22 Emergency Diesel Generator Day Tank 22FODT	4, cell B5	Diesel Fuel	NR Isolated
U2 22 Emergency Diesel Generator Storage Tank 22FOST	4, cell B5	Diesel Fuel	NR Class 1
U2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATA	4, cell A5	Lubricating Oil	NR Isolated
U2 22 Main Boiler Feed Pump Oil Accumulator Tank 22OATB	4, cell A5	Lubricating Oil	NR Isolated
U2 23 Emergency Diesel Generator Day Tank 23FODT	4, cell B5	Diesel Fuel	NR Isolated
U2 23 Emergency Diesel Generator Storage Tank 23FOST	4, cell B5	Diesel Fuel	NR Class 1
U2 Appendix R Diesel Generator Day Tank 2APPR	4, cell B5	Diesel Fuel	NR Isolated
U2 Boiler Feed Pump Oil Console BFOC	4, cell A5	Lubricating Oil	NR Isolated
U2 Boiler Feed Pump Turbine Oil Conditioner BFPTOC	4, cell A5	Lubricating Oil	NR Isolated
U2 Clean Lube Oil Storage Tank COST	4, cell A5	Lubricating Oil	NR Isolated
U2 Dirty Oil Storage Tank DOST	4, cell A5	Waste Oil, RCRA Metals	NR Isolated

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U2 Fire Pump Diesel Storage Tank DFPFOT	4, cell B5	Diesel Fuel	NR Isolated
U2 Gas Turbine 1 Fuel Oil Dump Tank GT1FODT	4, cell B5	Waste Oil, RCRA Metals	NR Class 1
U2 Gas Turbine 1 Lube Oil Reservoir GT1LOR	4, cell B5	Lubricating Oil	NR Isolated
U2 Gas Turbine 1 Storage Tank GT1FOT11	4, cell B5	Diesel Fuel	NR Class 1
U2 Gas Turbine 1 Storage Tank GT1FOT12	4, cell B5	Diesel Fuel	NR Class 1
U2 Hydrogen Seal Oil Reservoir HSOT	4, cell A5	Lubricating Oil	NR Isolated
U2 Main Boiler Feed Pump Lube Oil Reservoir MBR	4, cell A5	Lubricating Oil	NR Isolated
U2 Main Lube Oil Reservoir TLOR	4, cell A5	Lubricating Oil	NR Isolated
U2 Main Turbine Generator Bearing Oil Drain Tank BODT	4, cell A5	Waste Oil, RCRA Metals	NR Isolated
U2 Main Turbine Oil Conditioner MTOC	4, cell A5	Lubricating Oil	NR Isolated
U2 R2D2 Lube Oil Sludge Tank R2D2ST	4, cell A5	Waste Oil, RCRA Metals	NR Isolated
U2 Technical Support Center Diesel Tank TSCFODT	4, cell B5	Diesel Fuel	NR Isolated
U2 Westphalia Separator Sludge Tank LOSTSST	4, cell A5	Waste Oil, RCRA Metals	NR Isolated
Unit 2 Transformers			
U2 Main Transformer 21	4, cell B5	Dielectric Oil	NR Class 1
U2 Main Transformer 22	4, cell B5	Dielectric Oil	NR Class 1
U2 New Simulator L&P Transformer	4, cell C5	Dielectric Oil	NR Class 2
U2 Spare Station Auxiliary Transformer	4, cell A5	Dielectric Oil	NR Class 1
U2 Station Auxiliary Transformer	4, cell B5	Dielectric Oil	NR Class 1
U2 Substation A Transformer	4, cell B5	Dielectric Oil	NR Class 2
U2 Test Transformer (L & P Room)	Not Shown	Dielectric Oil	NR Isolated

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U2 Unit Auxiliary Transformer	4, cell B5	Dielectric Oil	NR Class 1
Unit 3 Building or Structure			
U3 Auxiliary Feedwater Pump Building	3A, cell B4	Lubricating Oil, RCRA Metals	NR Isolated
U3 Circulation Water Pump Building	3A, cell A3	Lubricating Oil, RCRA Metals	NR Isolated
U3 Emergency Diesel Generator Building	3A, cell B3	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated
U3 Intake Structure	3A, cells A3 to A4	Lubricating Oil, RCRA Metals, Sodium Hypochlorite	NR Isolated
U3 Radioactive Machine Shop	3A, cell C3	Waste Oil, Cutting Oil, Hydraulic Oil, Lubricating Oil, RCRA Metals, Spent Solvents	NR Isolated
U3 Turbine Generator Building	3A, cells B3 to B4	Asbestos, Lead, Lubricating Oil, Waste Oil, RCRA Metals	NR Class 1
Unit 3 Chemical and Drum Storage Areas			
U3 Hazardous Waste Storage Building	5, cell C3	Acids-Bases, Batteries, Lead, Mercury, Spent Solvents, RCRA Metals	NR Isolated
Unit 3 Exterior Area			
U3 Soil Pile Posted as Lead Hazard	3B, cell C4	Lead, RCRA Metals	NR Class 3
U3 Transformer Yard	5, cell B7	Dielectric Oil	NR Class 1
Unit 3 Oil-Filled Mechanical Equipment			
U3 Appendix R Diesel Generator	5, cell B7	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated
U3 Building Elevators	Not Shown	Hydraulic Oil, RCRA Metals	NR Isolated
U3 Circulation Water Pump Motors	3A, cells A3 to A4	Lubricating Oil, RCRA Metals	NR Isolated
U3 Condensate Pump Motors	3A, cells B3 to B4	Lubricating Oil, RCRA Metals	NR Isolated
U3 Diesel Fire Pump Motor	5, cell B7	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated
U3 Emergency Diesel Generators	5, cell B6	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U3 Technical Support Center Emergency Diesel Generator	5, cell A6	Diesel Fuel, Lubricating Oil, RCRA Metals	NR Isolated
Unit 3 Storage Tanks			
U3 31 Emergency Diesel Generator Day Tank DD1	5, cell B6	Diesel Fuel	NR Isolated
U3 31 Emergency Diesel Generator Storage Tank 31EDG	5, cell B6	Diesel Fuel	NR Class 1
U3 31 Main Boiler Feed Pump Oil Accumulator Tank 31LOA	5, cell A6	Lubricating Oil	NR Isolated
U3 32 Emergency Diesel Generator Day Tank DD2	5, cell B6	Diesel Fuel	NR Isolated
U3 32 Emergency Diesel Generator Storage Tank 32EDG	5, cell B6	Diesel Fuel	NR Class 1
U3 32 Main Boiler Feed Pump Oil Accumulator Tank 32LOA	5, cell A6	Lubricating Oil	NR Isolated
U3 33 Emergency Diesel Generator Day Tank DD3	5, cell B6	Diesel Fuel	NR Isolated
U3 33 Emergency Diesel Generator Storage Tank 33EDG	5, cell B6	Diesel Fuel	NR Class 1
U3 Appendix R Diesel Storage Tank APR	5, cell B7	Diesel Fuel	NR Class 1
U3 Clean Oil Storage Tank COST	5, cell A7	Lubricating Oil	NR Isolated
U3 Dirty Oil Storage Tank DOST	5, cell A7	Lubricating Oil	NR Isolated
U3 Fire Pump Diesel Tank FPD	5, cell B7	Diesel Fuel	NR Isolated
U3 House Service Boiler Day Tank HSB	5, cell A7	Fuel Oil	NR Isolated
U3 Main Boiler Feed Pump Lube Oil Reservoir MBR	5, cell A6	Lubricating Oil	NR Isolated
U3 Main Lube Oil Reservoir MLO	5, cell A7	Lubricating Oil	NR Class 1
U3 Main Turbine Generator Bearing Oil Drain Tank BODT	5, cell A7	Waste Oil, RCRA Metals	NR Isolated
U3 Main Turbine Generator Loop Seal Vapor Extractor Drain Tank LSVEDT	5, cell A6	Waste Oil, RCRA Metals	NR Isolated
U3 Main Turbine Generator Oil Reservoir Vapor Extractor Drain Tank RVEDT	5, cell A7	Waste Oil, RCRA Metals	NR Isolated
U3 Meteorological System Diesel Storage Tank MET	5, cell C1	Diesel Fuel	NR Class 2

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U3 Portable Diesel Storage Tank TC3	5, cell D6	Diesel Fuel	NR Class 2
U3 Portable Kerosene Storage Tank TC2	5, cell D6	kerosene	NR Class 2
U3 R2D2 Lube Oil Sludge Tank R2D2ST	5, cell A6	Waste Oil, RCRA Metals	NR Isolated
U3 R4D4 Lube Oil Sludge Tank R4S	5, cell A7	Waste Oil, RCRA Metals	NR Isolated
U3 Sewage Treatment Plant Diesel Storage Tank STP	5, cell A6	Diesel Fuel	NR Class 1
U3 Sewage Treatment Plant Fuel Oil Day Tank SPFODT	5, cell A6	Diesel Fuel	NR Class 1
U3 Station Outside Diesel Air Compressor Storage Tank ACD	5, cell A7	Diesel Fuel	NR Isolated
U3 Technical Support Center Diesel Day Tank TSD	5, cell A6	Diesel Fuel	NR Isolated
U3 Technical Support Center Diesel Storage Tank TSC	5, cell A6	Diesel Fuel	NR Class 1
U3 Training Center Fuel Oil Storage Tank TC1	5, cell D3	Diesel Fuel	NR Class 1
U3 Training Fire Pump Diesel Storage Tank FP2	5, cell C3	Diesel Fuel	NR Isolated
Unit 3 Transformers			
U3 31 Main Transformer	5, cell B7	Dielectric Oil	NR Class 1
U3 32 Main Transformer	5, cell B7	Dielectric Oil	NR Class 1
U3 GT Turbine Transformer	5, cell A8	Dielectric Oil	NR Class 1
U3 Spare Main Transformer	5, cell C2	Dielectric Oil	NR Class 1
U3 Spare Station Auxiliary Transformer	5, cell C2	Dielectric Oil	NR Class 1
U3 Station Auxiliary Transformer	5, cell B7	Dielectric Oil	NR Class 1
U3 Unit Auxiliary Transformer	5, cell B7	Dielectric Oil	NR Class 1

C. Summary Table of Potentially Impacted Radiological Areas

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
Common Site-Wide Impacts			
Sewage Collection System	Not Shown	Gammas, HTD&Betas	Class 3
Storm Drain System	6	Gammas, HTD&Betas	Class 2
Common Building or Structure			
COMMON Discharge Canal	3A, cells A1 to A4	Gammas, HTD&Betas, Tritium	Class 3
COMMON FLEX Building	3B, cell B6	Gammas, HTD&Betas	Class 3
COMMON Former Con Edison Visitor Center	3A, cell C6	Gammas, HTD&Betas	Class 3
COMMON Gas Turbines 2 & 3	3C, cell D2	Gammas, HTD&Betas	Class 3
COMMON ISFSI Heavy Hauler Storage Building	3A, cell B7	Gammas, HTD&Betas	Class 3
COMMON Outage Contractor Offices	3A, cell C3	Gammas, HTD&Betas	Class 3
COMMON Protected Area Access Facility	3A, cell C5	Gammas, HTD&Betas	Class 3
COMMON Protected Area Cafeteria	3A, cell A5	Gammas, HTD&Betas	Class 3
COMMON Retired Sewage Treatment Plant	3A, cell B2	Gammas, HTD&Betas	Class 3
COMMON Security Facility	3A, cell C4	Gammas, HTD&Betas	Class 3
COMMON Waterfront Warehouse	3A, cells A1 to A2	Gammas, HTD&Betas	Class 3
Common Exterior Area			
COMMON ISFSI Pad	3A, cell B7	Gammas, HTD&Betas	Class 3
COMMON Plant Yard	Not Shown	Gammas, HTD&Betas	Class 3
COMMON Radioactive Material Pen 1	3B, cell B6	Gammas, HTD&Betas	Class 2
COMMON Radioactive Material Pen 2	3B, cell B4	Gammas, HTD&Betas	Class 3
COMMON Yard 8	3A, cell D2	Gammas, HTD&Betas	Class 2
Common Storage Tanks			

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
COMMON Waste Distillate Tanks	3A, cell C5	Gammas, HTD&Betas, Tritium	Class 1
Unit 1 Building or Structure			
U1 Chemical Systems Building	3A, cell C4	Gammas, HTD&Betas, Tritium, TRUs	Class 1
U1 Containment Building	3A, cell C5	Gammas, HTD&Betas, Tritium, TRUs	Class 1
U1 Contractor Fabrication Shop	3A, cell C3	Gammas, HTD&Betas	Class 3
U1 Fuel Storage Building	3A, cell C5	Gammas, HTD&Betas, Tritium, TRUs	Class 1
U1 Gas Turbine 1 Generator Building	3A, cell B4	Gammas, HTD&Betas	Class 3
U1 Monitor House and Utility Tunnel	3A, cell D4	Gammas, HTD&Betas	Class 2
U1 Nuclear Service Building	3A, cell C4	Gammas, HTD&Betas, Tritium, TRUs	Class 1
U1 Screenwell House	3A, cell A5	Gammas, HTD&Betas	Class 3
U1 Superheater & Administration Building	3A, cell B5	Gammas, HTD&Betas	Class 3
U1 Turbine Generator Building	3A, cell B5	Gammas, HTD&Betas	Class 3
Unit 1 Exterior Area			
U1 Former Septic Leach Field	3A, cell A2	Gammas, HTD&Betas, Tritium	Class 1
Unit 2 Building or Structure			
U2 Boric Acid Evaporator Building	3A, cell C5	Gammas, HTD&Betas	Class 1
U2 Containment Building	3A, cell B6	Gammas, HTD&Betas, TRUs, Tritium	Class 1
U2 Control Building	3A, cell B5	Gammas, HTD&Betas	Class 3
U2 Emergency Diesel Generator Building	3A, cell B5	Gammas, HTD&Betas	Class 3
U2 Fuel Storage Building	3A, cell B6	Gammas, HTD&Betas, TRUs, Tritium	Class 1
U2 Original Steam Generator Storage Facility	3C, cell A5	Gammas, HTD&Betas	Class 2
U2 Maintenance Outage Building	3A, cell C6	Gammas, HTD&Betas, Tritium	Class 1

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U2 Primary Auxiliary Building	3A, cell B5	Gammas, HTD&Betas, Tritium	Class 1
U2 Turbine Generator Building	3A, cells B5 to B6	Gammas, HTD&Betas	Class 3
Unit 2 Exterior Area			
U2 Fuel Storage Building Alleyway	3A, cell C6	Gammas, HTD&Betas, Tritium	Class 1
U2 Retired RAM Pen	3C, cell C6	Gammas, HTD&Betas	Class 2
U2 Transformer Yard	3A, cell B5	Gammas, HTD&Betas	Class 1/2
Unit 2 Storage Tanks			
U2 Condensate Storage Tank CST	3A, cell B6	Gammas, HTD&Betas	Class 3
U2 Monitor Tanks	3A, cell C6	Gammas, HTD&Betas	Class 2
U2 Primary Water Storage Tank PWST	3A, cell C5	Gammas, HTD&Betas, Tritium	Class 3
U2 Refueling Water Storage Tank RWST	3A, cell C5	Gammas, HTD&Betas, Tritium	Class 1
Unit 3 Building or Structure			
U3 Administration Building	3A, cells A3 to B3	Gammas, HTD&Betas	Class 3
U3 Auxiliary Feedwater Pump Building	3A, cell B4	Gammas, HTD&Betas	Class 3
U3 Circulation Water Pump Building	3A, cells A3 to B3	Gammas, HTD&Betas	Class 3
U3 Condensate Polisher Building	3A, cell A4	Gammas, HTD&Betas	Class 3
U3 Containment Building	3A, cell B4	Gammas, HTD&Betas, TRUs, Tritium	Class 1
U3 Control Building	3A, cell B3	Gammas, HTD&Betas	Class 3
U3 Emergency Diesel Generator Building	3A, cell B3	Gammas, HTD&Betas	Class 3
U3 Fuel Storage Building	3A, cell B4	Gammas, HTD&Betas, Tritium, TRUs	Class 1
U3 Original Security Access Building	3A, cell A3	Gammas, HTD&Betas	Class 3
U3 Original Steam Generator Storage Facility	3B, cells B2 to C2	Gammas, HTD&Betas	Class 2

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
U3 Outage Support Building	3A, cell B3	Gammas, HTD&Betas	Class 3
U3 Primary Auxiliary Building	3A, cell B3	Gammas, HTD&Betas, Tritium	Class 1
U3 Radioactive Machine Shop	3A, cell C3	Gammas, HTD&Betas	Class 1
U3 Retired Security Access Building	3A, cell C3	Gammas, HTD&Betas	Class 3
U3 Turbine Generator Building	3A, cells B3 to B4	Gammas, HTD&Betas	Class 3
Unit 3 Exterior Area			
U3 302 Exemption Area	3B, cells C1 to C2	Gammas, HTD&Betas	Class 1
U3 Fuel Storage Building Alleyway	3A, cell C4	Gammas, HTD&Betas	Class 1
U3 Transformer Yard	3A, cell B7	Gammas, HTD&Betas	Class 3
U3 VC-FSB-PAB Junction	3A, cell B4	Gammas, HTD&Betas, Tritium	Class 1
Unit 3 Storage Tanks			
U3 Condensate Polishing Facility Process Tanks CPFPT	3A, cell A4	Gammas, HTD&Betas	Class 3
U3 Condensate Storage Tank CST	3A, cell B4	Gammas, HTD&Betas	Class 3
U3 Monitor Tanks	3A, cell C3	Gammas, HTD&Betas, Tritium	Class 2
U3 Primary Water Storage Tank PWST	3A, cell C3	Gammas, HTD&Betas, Tritium	Class 3
U3 Refueling Water Storage Tank RWST	3A, cell C4	Gammas, HTD&Betas, Tritium	Class 1

D. Document Figures

Figure 1: Location of the Indian Point Energy Center

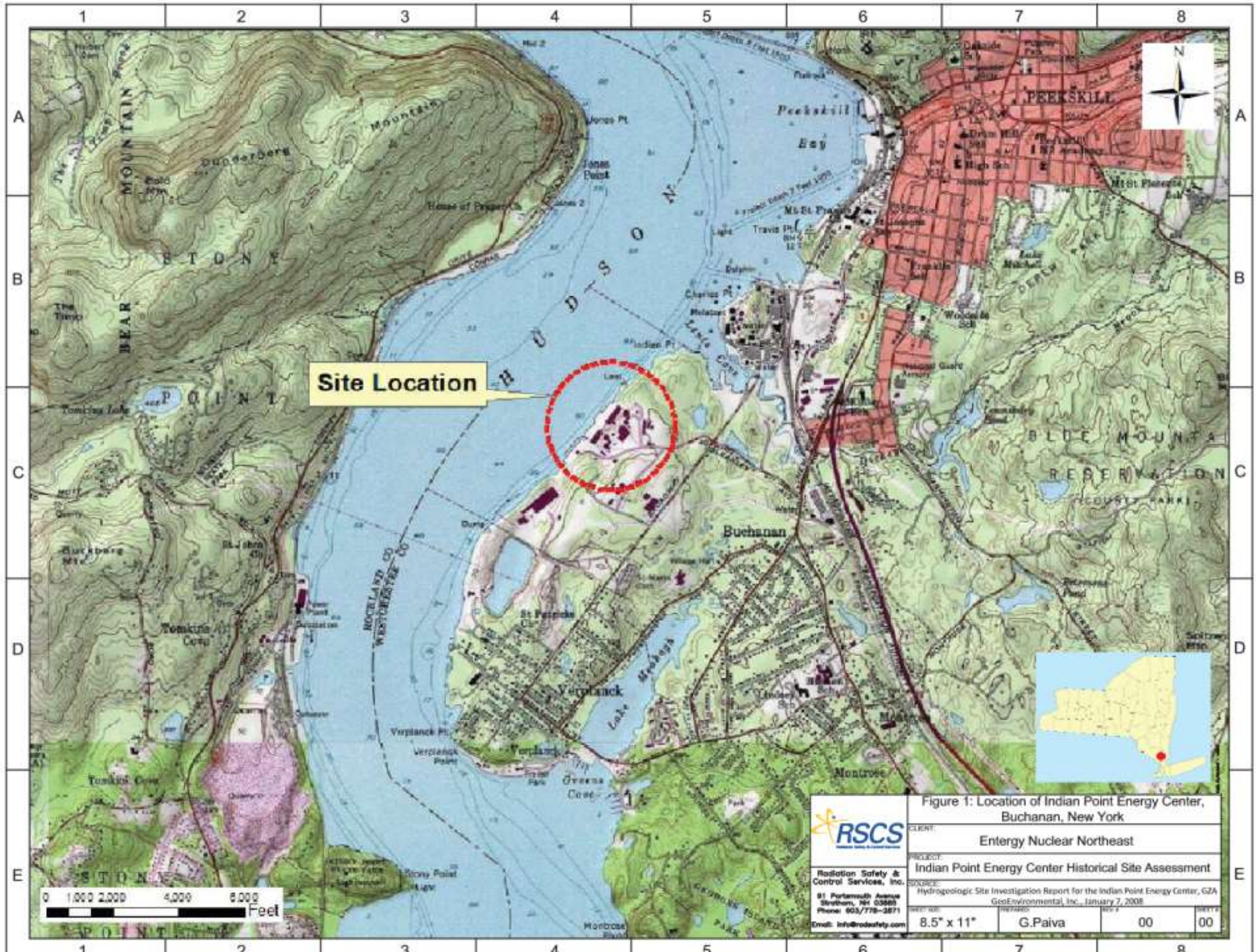

Figure 2: Location of Parcel Boundaries at the Indian Point Energy Center

Figure 3A: Locations of Facilities at the Indian Point Energy Center

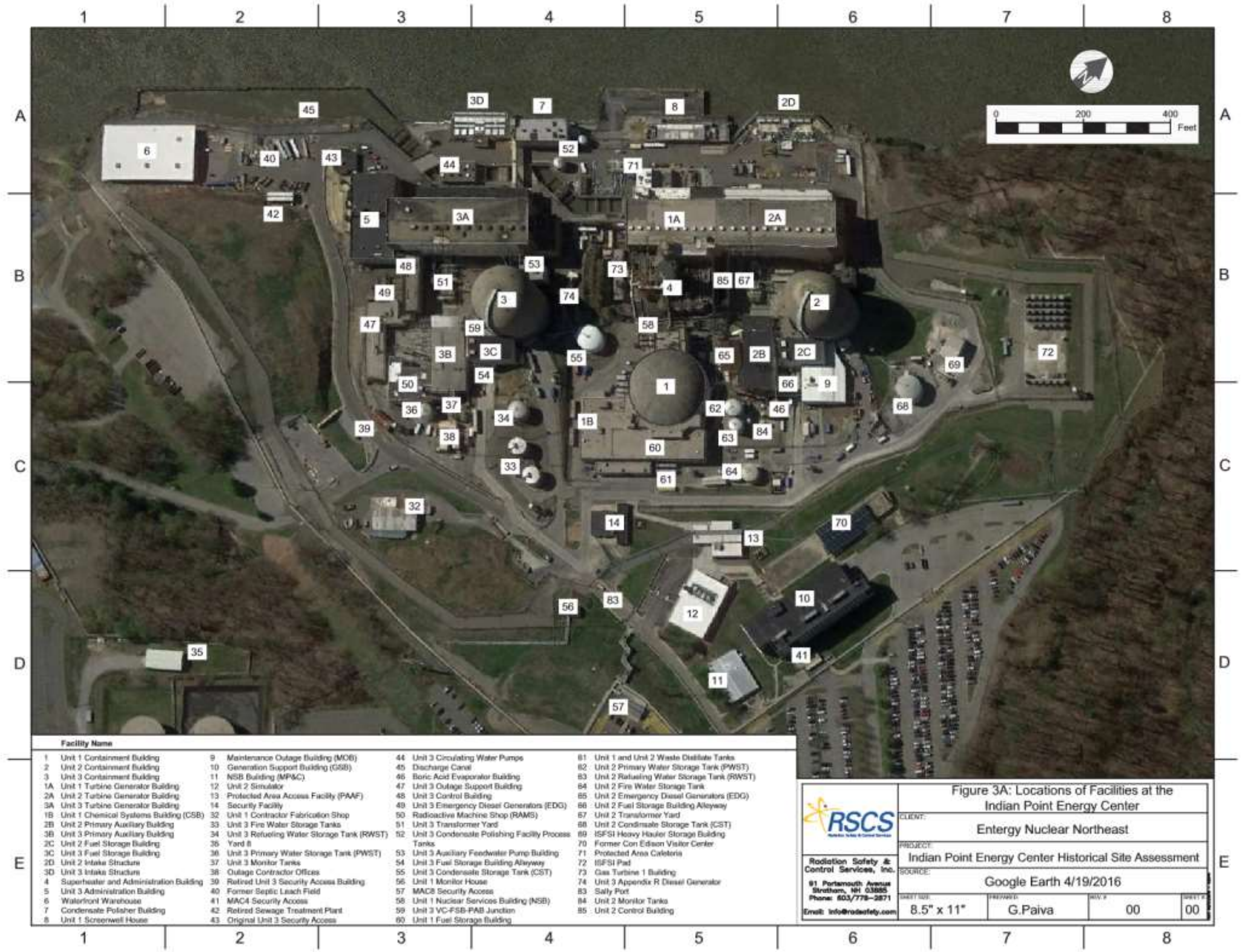

Figure 3B: Locations of Facilities at the Indian Point Energy Center

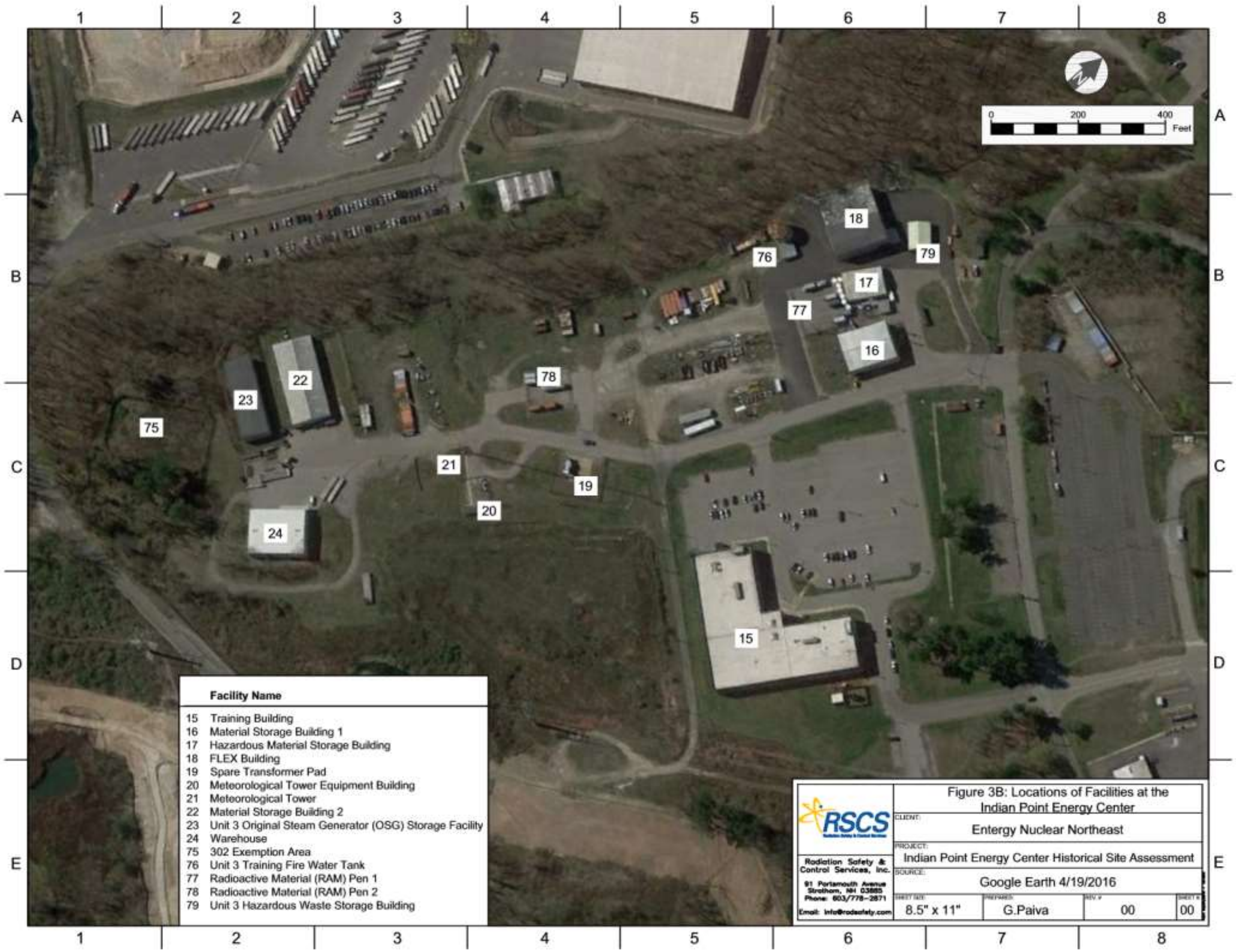

Figure 3C: Locations of Facilities at the Indian Point Energy Center

Figure 4: Locations and Preliminary Classifications of Hazardous Material Storage Areas and Transformers in the Area of Units 1 and 2 at Indian Point Energy Center

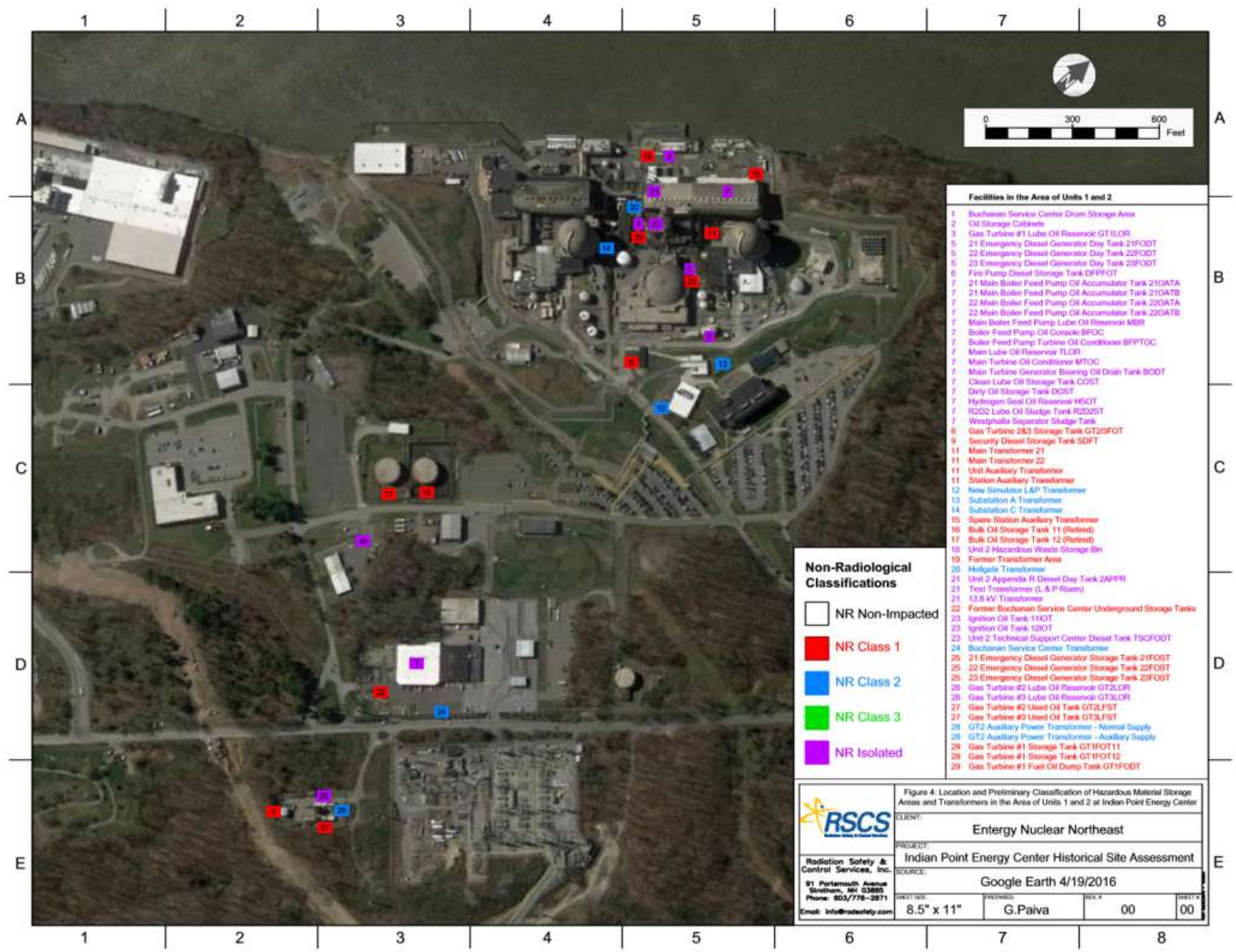

Figure 5: Locations and Preliminary Classifications of Hazardous Material Storage Areas and Transformers in the Area of Unit 3 at Indian Point Energy Center

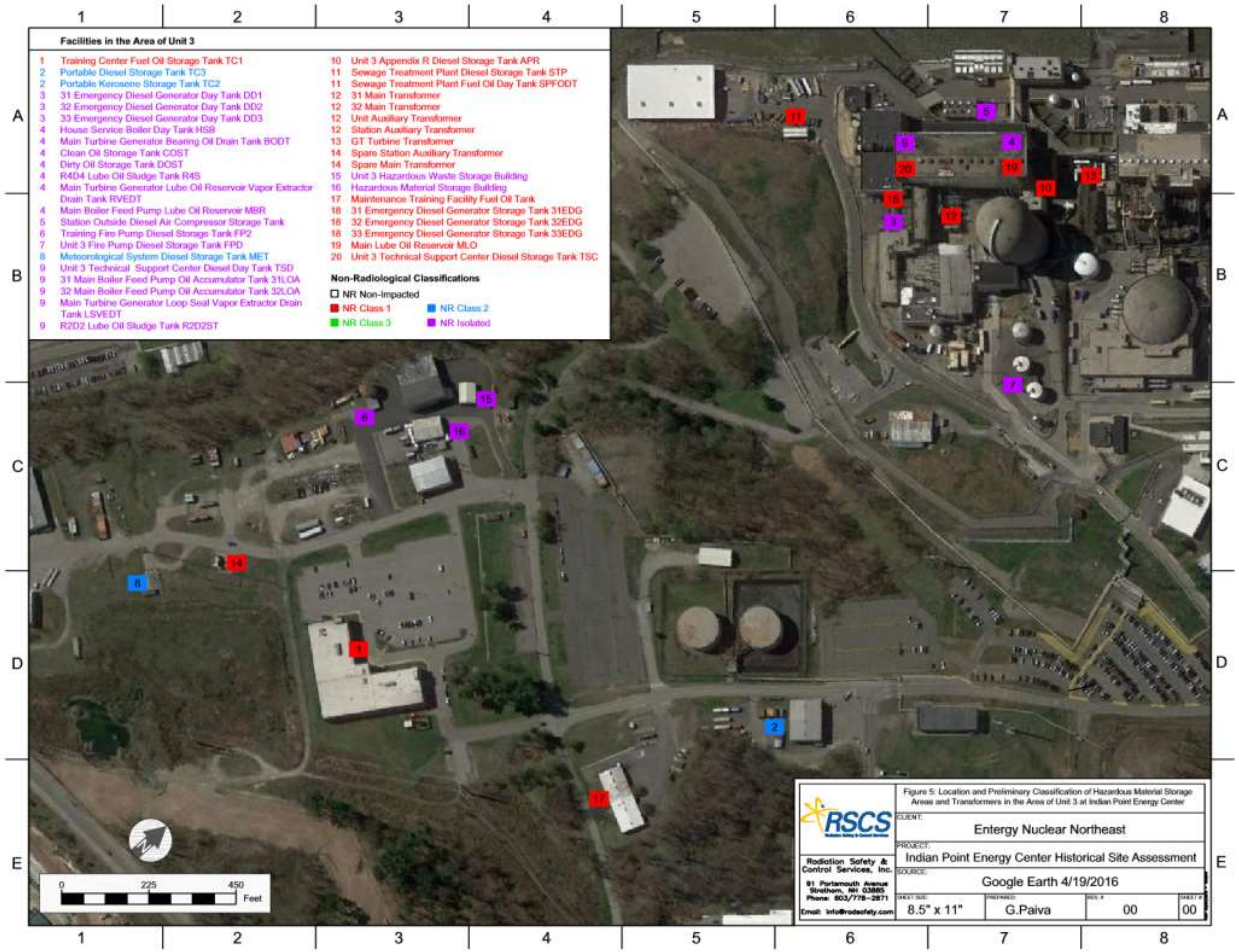

Figure 6: Preliminary Radiological and Non-Radiological Classifications of the Storm Drain System at the Indian Point Energy Center

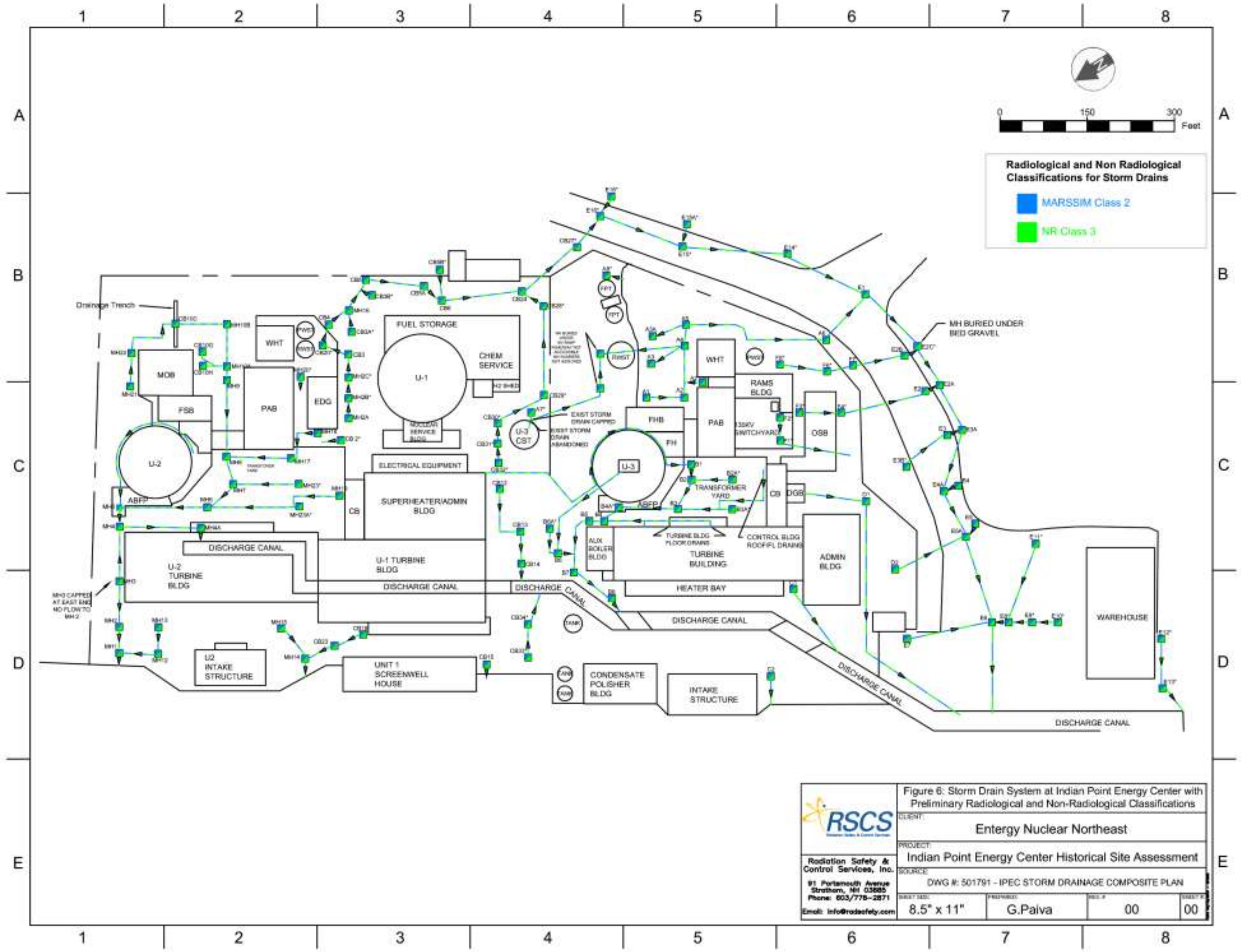

Figure 7A: Preliminary Non-Radiological Classifications of Facilities at the Indian Point Energy Center

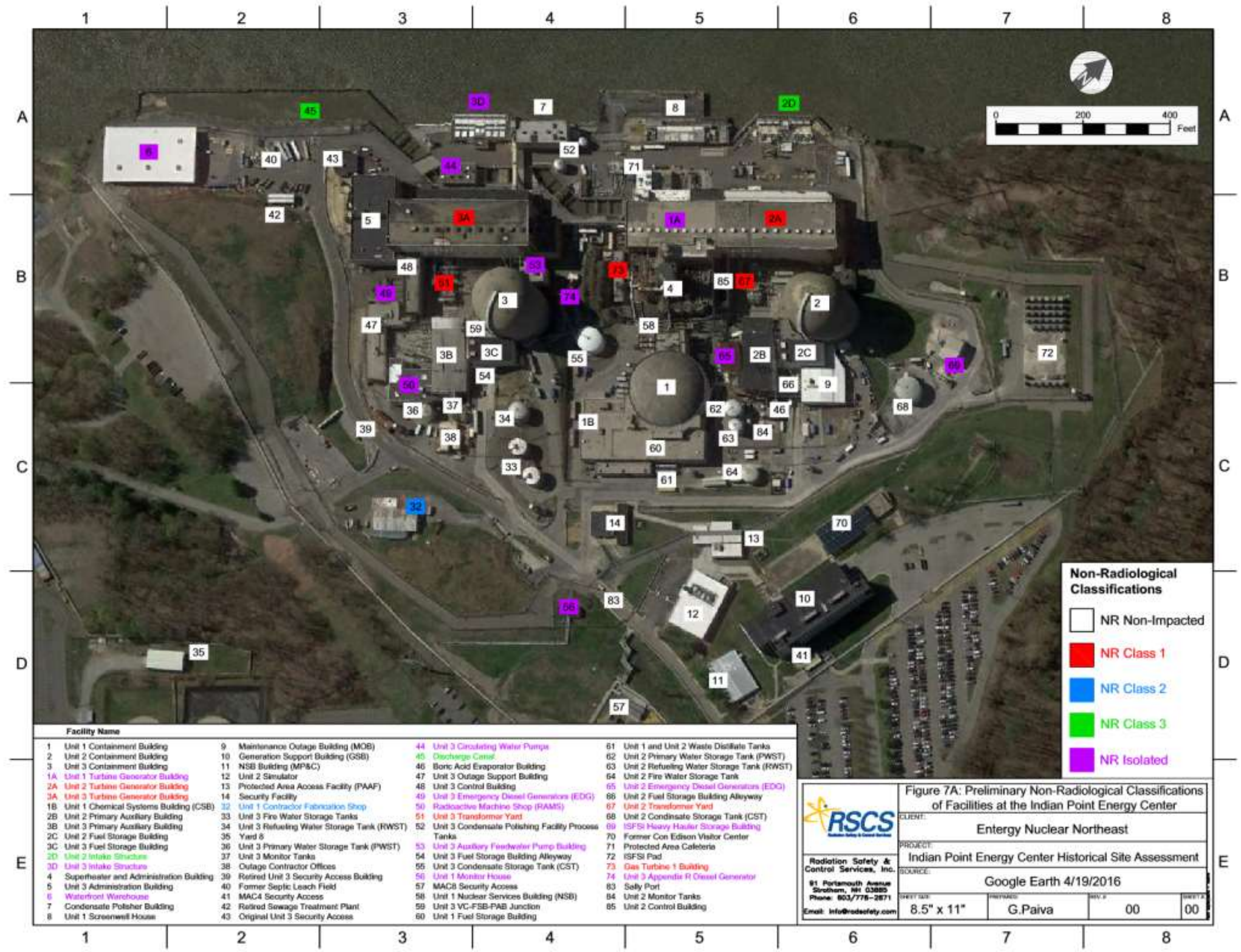

Figure 7B: Preliminary Non-Radiological Classifications of Facilities at the Indian Point Energy Center

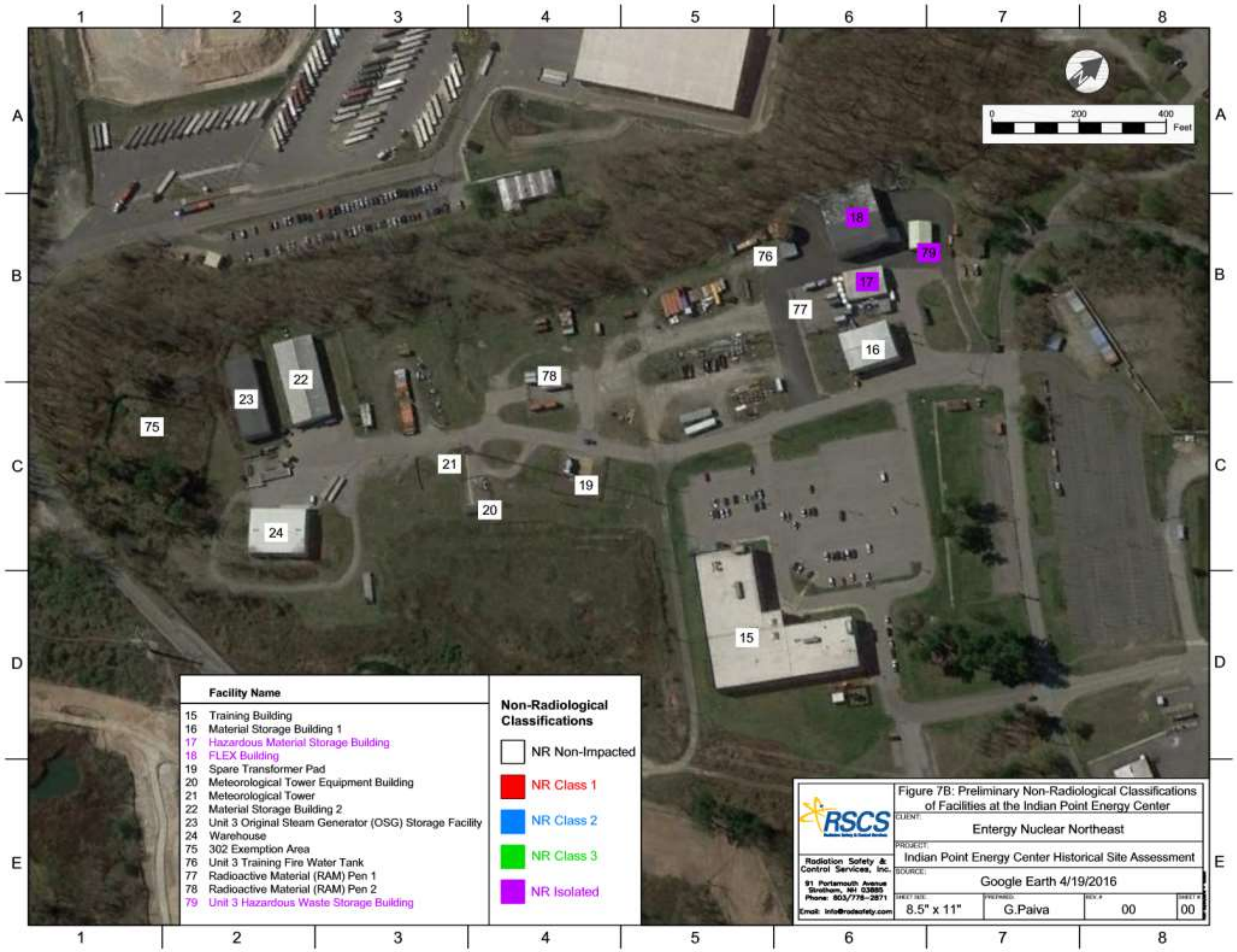

Figure 7C: Preliminary Non-Radiological Classifications of Facilities at the Indian Point Energy Center

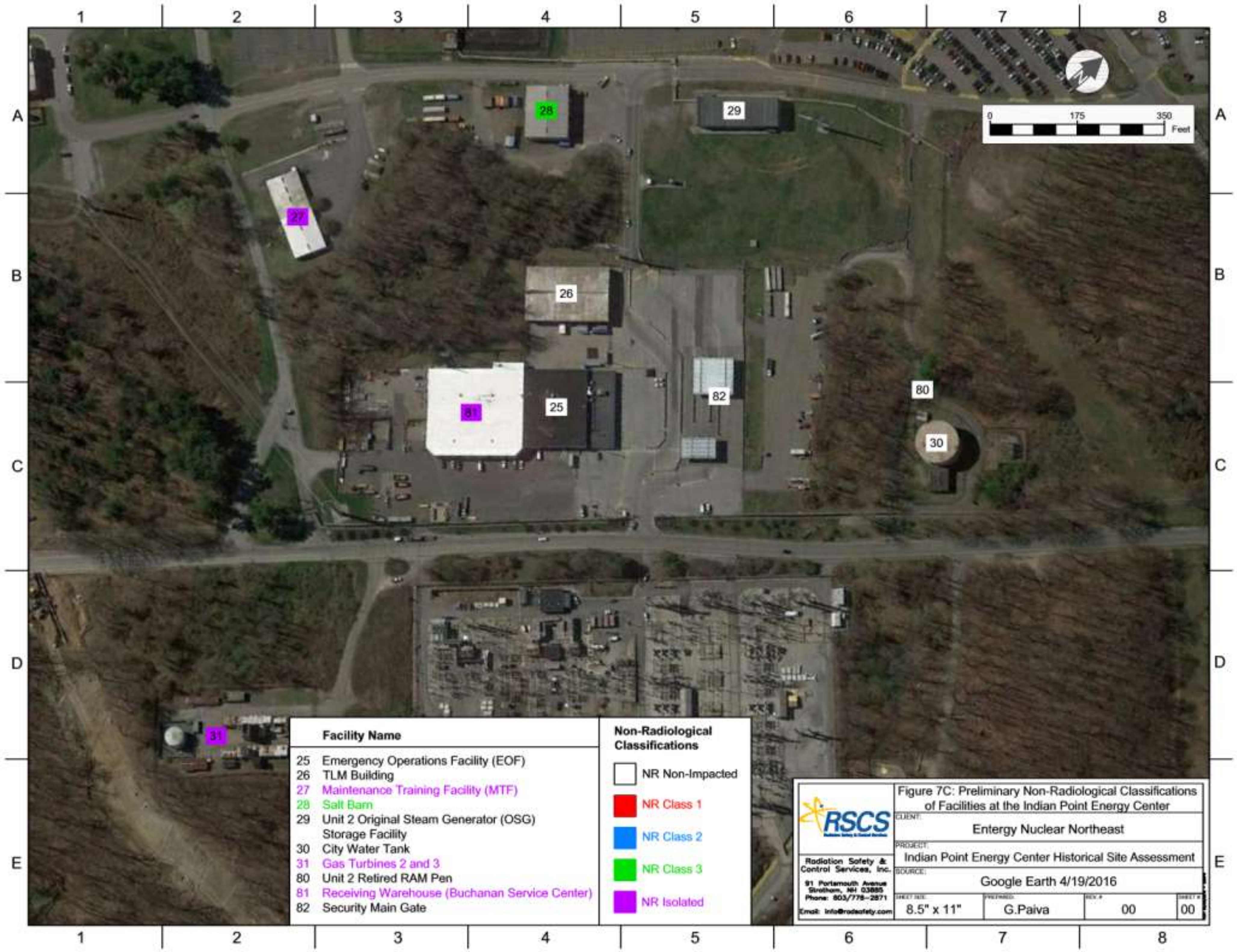

Figure 8A: Preliminary Radiological Classifications of Facilities at the Indian Point Energy Center

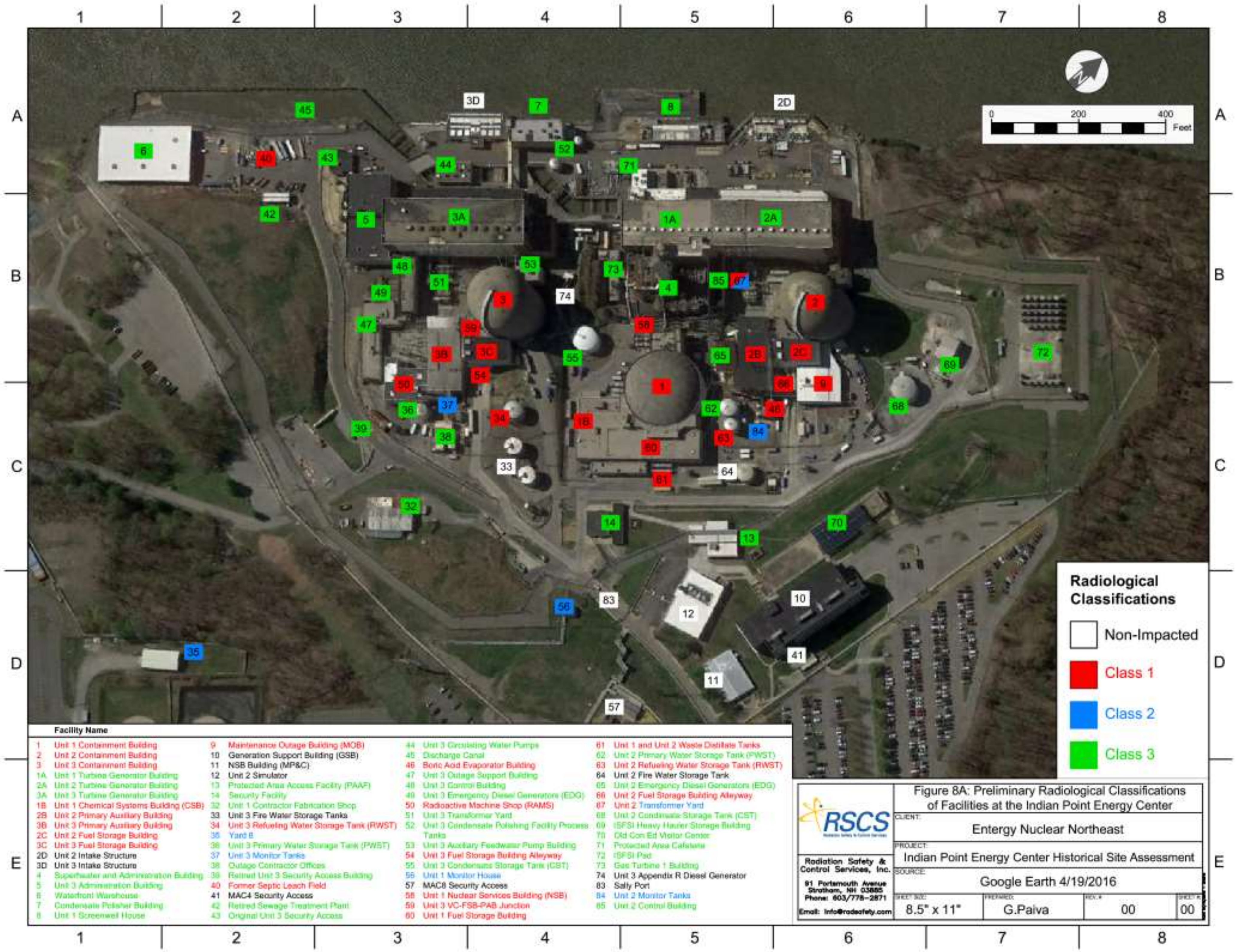

Figure 8B: Preliminary Radiological Classifications of Facilities at the Indian Point Energy Center

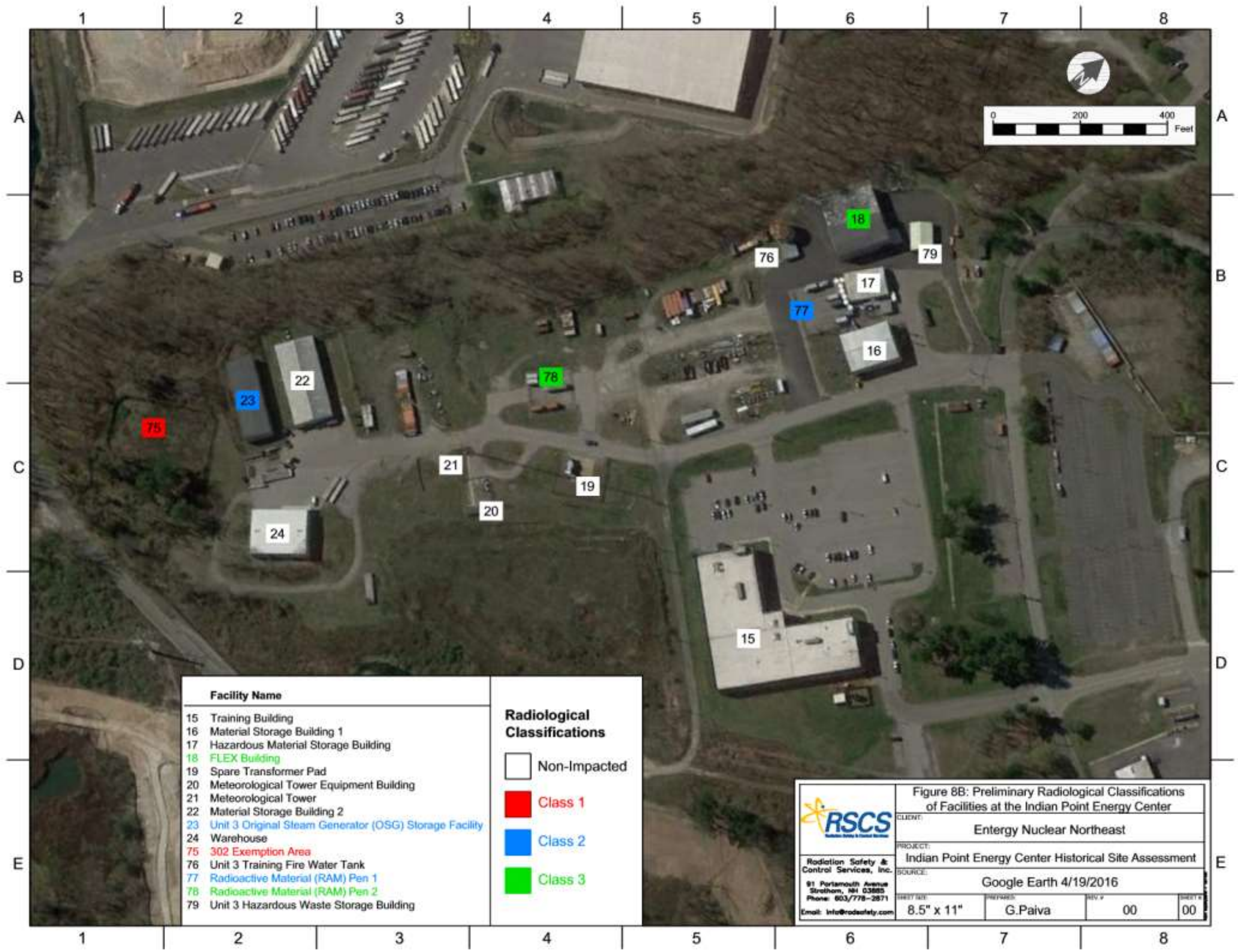

Figure 8C: Preliminary Radiological Classifications of Facilities at the Indian Point Energy Center