Historical Site Assessment for Crystal River 3

Technical Support Document No. 16-015 Rev 00.

Prepared by

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Radiation Safety & Control Services

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1 Executive Summary

This Historical Site Assessment (HSA) documents a comprehensive investigation that identifies and evaluates historical information pertaining to events that may have resulted in contamination during the operating history of the Crystal River 3 Nuclear Power Plant (CR3) owned by Duke Energy of Florida (DEF). The purpose of this assessment is to assist in planning for the decommissioning of the power plant. Given the current decommissioning strategy is the Safe Storage (SAFSTOR) option, use of the information in the HSA for future decommissioning planning will need to be evaluated with respect to the impact that the elapsed time has on the intended use of the information.

The information developed by this HSA differentiates impacted from non-impacted areas of the site. Areas determined to be impacted, based on preliminary information, have been further classified as Class 1, Class 2, or Class 3, in accordance with guidance provided in NUREG-1575, Rev. 1, "Multi-Agency Radiological Survey and Site Investigation Manual" (MARSSIM) [1]. Class 1 areas have the greatest potential for contamination to exceed applicable site closure criteria and, therefore, have received the highest degree of effort to adequately characterize them.

If operating experience suggests that an area is not likely impacted and data exist to confirm that the area is indeed non-impacted, no further characterization of the area is required because it has been demonstrated to have no plausible potential for residual contamination. If insufficient data are available to confirm a classification of non-impacted, the area has been classified conservatively as Class 3 until sufficient characterization data are obtained to support a classification of non-impacted. [1]

For purposes of classifying areas potentially impacted with non-radiological contaminants, the same methodology described in MARSSIM for radiological contaminants has been applied. For these non-radiological classifications, the Florida groundwater standards [2], federal maximum contaminant levels (MCLs) or risk-based concentrations (RBCs) have been substituted for MARSSIM's Derived Concentration Guideline Levels (DCGLs), which are the site-specific radiological criteria for release of an area for unrestricted use. These Non-Radiological classifications are differentiated from the radiological classifications by using an "NR" prefix.

All areas and structures with recognized conditions of concern have been given a preliminary classification based on available survey data, knowledge of historical site operations, and results of employee surveys and interviews. The classification of an area or subsection of an area 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 described in Section 5.2):

- interviews of long-tenured employees;
- records from the Florida Department of Environmental Protection (FDEP);
- incident files (ARs, NCORs, PCs, etc.);
- special survey and operational radiological survey records;
- HP and Operator logs;
- engineering reports of subsurface investigations;
- reports of station inspections by American Nuclear Insurers (ANI);
- the CR3 file maintained in compliance with federal regulation 10 CFR 50.75(g) [3], namely HPP0230;
- the CR3 Offsite Dose Calculation Manual (ODCM), Rev. 36;
- the CR3 Final Safety Analysis Report (FSAR), Rev. 35;
- the CR3 Spill Prevention, Control and Countermeasures (SPCC) Plan;
- the CR3 Storm Water Pollution Prevention Plan (SWPPP);
- the CR3 Annual Radioactive Effluent Release Reports; and
- the CR3 Annual Radiological Environmental Monitoring Reports

Beginning in 2013, a survey was distributed to long-tenured employees of CR3 prior to termination of their employment. Additionally, a few current and retired employees were interviewed in December of 2015. The intent of the employee survey and interviews was to capture the institutional knowledge of those familiar with plant operation before it was lost through reductions in force. This effort provided a means of identifying areas at the station where either radiological or non-radiological contamination may have occurred but that may not have been documented in plant records.

Employees who were at the station for many years, particularly during plant construction and/or early operation, were sought because spill reporting and documentation of contamination incidents during this period may not be as complete compared to the later years. For example, federal regulation 10 CFR 50.75(g), which requires compilation of records of contamination incidents that may have significance during decommissioning, did not exist prior to 1988.

Regulation 10 CFR 50.75(g) requires compilation of “records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site”. While the regulation does not explicitly distinguish between radiological and non-radiological contamination most operators of commercial nuclear power stations, including the operators of CR3, have interpreted it to refer exclusively to radiological contamination. For this reason, other forms of plant record-keeping, such as Condition Reports, Nonconforming Operations Reports, and Precursor Cards, as well as employee’s memories must be relied upon to identify historical incidents of non-radiological contamination. [3]

Based on responses to the employee survey and the discussions held in December 2015, there do not appear to be any undocumented incidents of contamination at the station that would be significant for its decommissioning. None of the identified impacted areas are an imminent threat to human health or the environment, or appear to present a significant challenge to the decommissioning process. When leaks or spills occurred they were immediately remediated by removal of the accessible contaminating material until sampling results indicated that the material was not detectable or remained at background levels. Nevertheless, in some locations inaccessible contamination may remain. It should be noted that operational surveys generally lack the rigor associated with the survey regimen associated with MARSSIM guidelines.

Most issues identified were the result of spills, leaks, or accumulation over time of low levels of radioactive material that were released from the facility at concentrations less than those that could be detected by real-time monitoring methods employed at the station. Those monitoring methods at the time were state-of-the-art and comparable to methods used throughout the nuclear industry.

The dominant plant-related radioactive contaminants identified in the Protected and Owner-Controlled Areas are Cobalt-60 (Co-60), Cesium-137 (Cs-137), and tritium (H-3). Contaminated media include primarily soil, sediment, water, concrete, asphalt and steel. Additionally, some components such as insulation, sealants, filters, and pipes conveying radioactive liquids or gases potentially may be contaminated.

The information developed by this HSA suggests that the areas and structures with a high probability of requiring remediation (Class 1) are located within the Radiation Control Area (RCA). The 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).

CR3 has implemented guidance prescribed by NEI 07-07, the Industry Groundwater Protection Initiative (GPI) [4]. A hydrogeological investigation was completed in 2007 to install thirteen groundwater monitoring wells and characterize groundwater flow gradients primarily within the power block area of the station.

The thirteen groundwater monitoring wells are sampled quarterly as part of the station Radiological Environmental Monitoring Program (REMP). The samples are analyzed for tritium, gamma-emitting radionuclides, and hard-to-detect radionuclides if gamma-emitters are detected. Very low levels of tritium have been detected in five of the monitoring wells. No gamma-emitting or hard-to-detect radionuclides have been detected, with the exception of trace levels of gross alpha, which is naturally occurring in the local limestone bedrock.

2 Glossary

AC: Alternating Current.
ACM: Asbestos Containing Material.
AEC: Atomic Energy Commission.
ALARA: As Low As Reasonably Achievable.
Am: Americium.
ANI: American Nuclear Insurers.
AR: Action Request.
AST: Aboveground Storage Tank.
AUP: Area Under Probe.
BEST: Backup Engineering Safeguards Transformer.
BWST: Borated Water Storage Tank.
CCB: Conference and Cafeteria Building.
CDT: Condensate Storage Tank.
CFS: Cubic Feet per Second.
Ci: Curie.
cm: Centimeter.
Co: Cobalt.
CPM: Counts Per Minute.
CR: Crystal River.
CR1/2: Crystal River Units 1 and 2.
CR3: Crystal River 3 Nuclear Power Plant.
CRDM: Control Rod Drive Mechanism.
CRDMSS: Control Rod Drive Mechanism Service Structure.
CREC: Crystal River Energy Center.
Cs: Cesium.
CSM: Conceptual Site Model.
CTMT: Containment.
DAW: Dry Active Waste.
DCGLs: Derived Concentration Guideline Levels.
DEF: Duke Energy Florida.
DMRs: Discharge Monitoring Reports.
DPM: Disintegrations Per Minute.
DQOs: Data Quality Objectives.
DRO: Diesel Range Organics.
EPA: Environmental Protection Agency.
EPRI: Electric Power Research Institute.
EU: Europium.
FDEP: Florida Department of Environmental Protection.
Fe: Iron.
FSAR: Final Safety Analysis Report.
FSS: Final Status Survey.
GPI: Groundwater Protection Initiative.

GTCC: Greater Than Class C.
GWS: Groundwater Standards.
H: Hydrogen.
H-3: Tritium.
HP: Health Physics.
HSA: Historical Site Assessment.
HTD: Hard to Detect.
ISFSI: Independent Spent Fuel Storage Installation.
kg: kilogram.
KVA: Kilovolt Amps.
LLD: Lower Limit of Detection.
LSA: Low Specific Activity.
MARSSIM: Multi-Agency Radiation Survey and Site Investigation Manual NUREG-1575.
MCL: Maximum Contaminant Level.
MDA: Minimum Detectable Activity.
mg: Milligram.
mph: Miles per Hour.
mrem: Millirem.
MSB: Maintenance Support Building.
MU: Makeup System.
MW: Megawatt.
MWt: MegaWatts thermal.
NAB: Nuclear Administration Building.
NCOR: Nonconforming Operations Reports.
NEI: Nuclear Energy Institute.
Ni: Nickel.
NSSI: Nuclear Service Seawater Intake Structure.
NR: Prefix denoting Non-Radiological classifications.
NRC: Nuclear Regulatory Commission.
NSOC: Nuclear Security Operations Center.
NSSS: Nuclear Steam Supply System.
ODCM: Off-site Dose Calculation Manual.
OTSG: Once Through Steam Generator.
PA: Protected Area.
PAB: Plant Administration Building.
PC: Precursor Card.
PCB: Polychlorinated Biphenyl.
ppm: Parts per Million
Pu: Plutonium.
PWR: Pressurized Water Reactor.
RAM: Radioactive Material.
RBC: Risk Based Concentration.
RCA: Radiation Control Area.
RCRA: Resource Conservation and Recovery Act.
REMP: Radiological Environmental Monitoring Program.

RMSW: Radioactive Material Storage Warehouse.
ROCs: Radionuclides of Concern.
RS: Radiological Survey.
RW: Radioactive Waste.
SAB: Site Administration Building.
SAFSTOR: Safe Storage.
SCTL: Soil Cleanup Target Levels.
SDT-1: Station Drain Tank.
SPCC: Spill Prevention, Control and Countermeasures.
SSCs: Systems, Structures, or Components.
SWPPP: Storm Water Pollution Prevention Plan.
TRU: Transuranic.
TSC: Technical Support Center.
UOER: Unusual Operating Event Report.
USAR: Updated Safety Analysis Report.
UST: Underground Storage Tank.
V&V: Verification and Validation.

3 Introduction

CR3 is a single-unit pressurized light-water reactor (PWR) supplied by Babcock & Wilcox. CR3 was initially licensed to operate at a maximum of 2,452 megawatt-thermal (MWt). In 1981, 2002, and 2007, the Nuclear Regulatory Commission (NRC) approved three requests to increase the licensed core power level to a maximum power level of 2,609 MWt. The reactor containment structure is a steel-lined, reinforced-concrete structure in the shape of a cylinder and capped with a shallow dome. The walls of the containment structure are approximately 3.5 feet thick. Cooling water for CR3 is drawn from and returned to the Gulf of Mexico.

A brief history of the major milestones related to CR3 construction and operational history is as follows:

- Construction Permit Issued: September 25, 1968
- Operating License Issued: December 3, 1976
- Commercial Operation: March 13, 1977
- Initial Operating License Expiration: December 3, 2016
- Final Reactor Shutdown: September 26, 2009
- Final Removal of Fuel from Reactor Vessel: May 28, 2011

On February 20, 2013, DEF provided the NRC with the certification required by 10 CFR 50.82(a)(1)(i) and (ii), that operation had permanently ceased and that all fuel had been permanently removed from the reactor vessel at CR3. Upon docketing of these certifications pursuant to 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for CR3 no longer authorized operation of the reactor or placement or retention of fuel in the reactor vessel. On March 13, 2013, the NRC acknowledged the DEF certification of permanent cessation of power operation and permanent removal of fuel from the vessel. [5]

The purpose of this Historical Site Assessment (HSA) is to identify and catalog existing information describing operational occurrences at CR3 that may have resulted in either radiological or non-radiological contamination. Any such occurrences will require characterization and possibly remediation before decommissioning of the station can be completed and the site operating license terminated. The scope of the HSA encompasses the site history from the beginning of site construction to present day. The HSA identifies potential, likely, and known sources of radioactive and non-radioactive contamination within systems, structures, components (SSCs), and environs based on existing or derived information.

The HSA provides an assessment of the likelihood of contaminant migration, information useful for scoping and characterization surveys, and initial impacted and non-impacted classifications. The classification process is guided by MARSSIM [1].

The information developed by this HSA has been evaluated to differentiate impacted from non-impacted areas of the site. The HSA provides preliminary classifications for each impacted area as Class 1, 2, or 3. The preliminary classifications of each SSC or environ is used to guide subsequent scoping, characterization, and remediation efforts. The level of effort required to complete the Final Status Survey (FSS) of each impacted SSC or environ is based upon the preliminary classification and the results of the scoping and characterization surveys. The HSA describes the site physical configuration, identifies contaminated media, and assesses the potential for migration of contaminants.

The HSA reflects the current radiological and non-radiological status of the site. Because the chosen decommissioning strategy is SAFSTOR, the information contained in the HSA will need to be re-evaluated with respect to the period of time that has elapsed when the next stages of decommissioning are initiated. As an example, the initial MARSSIM classification of SSCs and the bases for those classifications will need to be re-evaluated if characterization and FSS planning activities are initiated 40 years from now.

As part of this HSA effort, DEF requested some assistance in redefining the licensed portion of the property. Currently, the area of the site defined in the license is a circle of land with a radius of 4,400 feet from the centerline of the Reactor Building. This area encompasses all or portions of the four fossil plants on the site as well as major portions of the intake and discharge canals. A meeting was held on February 25, 2016 where this topic was discussed, and recommendations were presented. The specific structures and areas discussed in the meeting were:

- Settling Ponds located west of Units 1/2
- Radioactive Material Storage Warehouse (RMSW) ‘D’
- Units 1/2
- Sewage Treatment Plant
- RMSW ‘G’ and surrounding area
- Industrial Area located inside the Railroad Loop
- Once Through Steam Generator (OTSG) and Reactor Vessel Closure Head (RVCH) Storage Facilities
- R16 Storage Yard located between CR3 and Crystal River 4/5
- Unit 4 and 5 Coal Ash Storage Area
- Intake Structure
- Other structures and land areas located outside the CR3 PA

The conclusions and recommendations are presented in Sections 7 and 8 of this report, respectively. Summary tables, Table 8 and Table 9, are presented in Appendices A and B.

The HSA report methodology is discussed in Sections 4 and 5. The assessment findings are presented in Section 6 and are subdivided into information pertaining to non-radiological (Section 6.2) and radiological impacts (Section 6.3). The non-radiological and radiological findings are broken down by area wherever possible. Each section or area includes information source files under an additional subheading titled ‘Supporting Documents’. These files are provided as clickable hyperlinks (Ctrl + Mouse Click to open in a new window). In order for the hyperlinks contained within this document to properly link to the supporting documents, it is necessary that the installation process (following the prompts of the provided executable) be correctly followed and that no changes be made directly to either this document or the accompanying directory structure. That is, the folders and files within the directory structure must not be deleted, renamed, or moved. Additionally, sharing this report without providing the executable will render all hyperlinks contained herein unusable.

4 Property Identification

CR3 is located at 15760 West Powerline Street, Crystal River, Florida, 34428, with coordinates of latitude 28^{O} 57' 25.87" north and longitude 82^{O} 41' 55.95" west. The site is located approximately 7.5 miles northwest of the City of Crystal River, and 70 miles north of Tampa.

The station is part of the larger Crystal River Energy Center (CREC), which is located on the Gulf of Mexico in Citrus County, Florida. In addition to CR3, other structures on the CREC include four fossil-fueled power plants (Units 1, 2, 4 and 5), two large natural draft cooling towers, coal delivery and storage areas, ash storage areas, office buildings, warehouses, barge handling docks, and a railroad.

CR3 uses approximately 27 acres of previously disturbed land within the 1,062-acre developed portion of the 4,738-acre CREC site. The CREC site is surrounded by Freshwater Forested/Shrub and Estuarine and Marine wetlands designated in the U.S. Fish and Wildlife Service National Wetland Inventory [6]. Access to CREC is by way of an approximately 5-mile access road (West Powerline Street) that runs west from U.S. Route 19. The location of the CREC site is shown in Figure 1. Figure 2 identifies some of the principal features of the CREC and the location of CR3 within it. Figure 3 shows the locations of the CR3 facilities in and around the PA. A few CR3 facilities more distant from the PA are shown in Figure 2. Figure 4 shows the locations of Berm segments within the PA. Petroleum storage locations at CR3 are shown in Figure 5 and storm drain locations within the PA are shown in Figure 6. Figure 2 through Figure 6 are reproduced in Figure 7 through Figure 14 to show the distribution of radiological and non-radiological impacts across the site. Figure 7 shows the preliminary classifications of non-radiological impacts in the outlying areas of the station. Figure 8 shows the preliminary classifications of non-radiological impacts in the vicinity of the PA. Figure 9 shows the preliminary classifications of non-radiological impacts in the vicinity of the CR3 storage tanks and transformers. Figure 10 shows the preliminary classifications of non-radiological impacts in the storm drain system.

Figure 11 shows the preliminary classifications of radiological impacts in the outlying areas of the station. Figure 12 shows the preliminary classifications of radiological impacts in the vicinity of the PA. Figure 13 shows the preliminary classifications of radiological impacts in the berm areas. Figure 14 shows the preliminary classifications of radiological impacts in the storm drain system.

DEF is the majority owner of CR3 with minority ownership held by City of Alachua, City of Bushnell, City of Gainesville, City of Kissimmee, City of Leesburg, City of Ocala, Orlando Utilities Commission, Seminole Electric Cooperative, and City of New Smyrna Beach.

<u>Property Identification Supporting Documents</u>

Site Picture CR3 Buildings and Structures.pdf
Site Picture For Licensing Discussion.pdf
Site Picture Wetlands.pdf

4.1 Environmental Setting

4.1.1 Physiography

The following discussion is derived from "Geology of Citrus County, Florida", a Guidebook of the Southeastern Geological Society [7].

Florida lies entirely within the Coastal Plain Physiographic Province and is the only state in the United States that falls completely within the Coastal Plain. Much of the surface of Florida shows the influence of the marine processes that transported and deposited Tertiary, Quaternary and Holocene sediments. Fluvial processes, although more predominant in the panhandle, have helped sculpt the entire state, particularly during low stands of sea level during the Pleistocene, redistributing the marine sediments.

The Florida Platform extends southward from the continental United States, separating the Gulf of Mexico from the Atlantic Ocean. The exposed portion of the landform, the Florida Peninsula, constitutes approximately one-half of the Florida Platform measured between the 600-foot depth contour of the continental shelves. The axis of the platform extends northwest to southeast approximately along the present-day west coast of the peninsula. From the St. Mary's River to Key West the Florida Peninsula measures nearly 450 miles. From the Alabama-Florida line to the Atlantic coastline is approximately 370 miles.

Karst processes have had a dramatic effect on the Florida landscape due to the near-surface occurrence of soluble carbonate rocks. Middle Eocene to Pleistocene carbonate sediments are affected by karstification over large areas of the state, including the vicinity of CREC.

More than 700 springs are recognized in Florida, with the major springs occurring within the karstic areas of the state. Most of the springs are located in the Ocala Karst District (within which CR3 is located), the Central Lake District and the Dougherty Karst Plain District. Kings Bay Spring, whose outflow forms the Crystal River, is a first order spring (flow of greater than 100 cubic feet per second). Other large springs within several miles of CR3 include Homosassa Spring (first order), whose outflow forms the Homosassa River, and Citrus Blue Spring (second order spring flowing greater than 10 cubic feet per second), whose outflow enters the Withlacoochee River.

The general geomorphology of Florida is that of east-west trending highlands in the northern and western portions of the state and north-south trending highlands extending approximately two-thirds the length of the peninsula. Coastal lowlands occur between the highlands and the eastern and western coastlines. The highest point in the state, 345 feet above sea level, occurs in the Western Highlands near the Alabama-Florida state line in Walton County.

4.1.2 Climatology

The discussion in Subsections 4.1.2, 4.1.3 and 4.1.4 is derived from the CR3 FSAR [8]. The climate of the region around the Crystal River site is humid subtropical, which is characterized by relatively dry winters and rainy summers, a high annual percentage of sunshine, a long growing season, and high humidity. The terrain is generally flat and featureless with the Gulf of Mexico being the major climatic influence. Snowfall is virtually non-existent, but rainfall averages about 50 to 60 inches per year, with more than 50% of the total rainfall occurring during the months of June through September associated with thunderstorms.

Temperatures in the site region (modified by the waters of the Gulf of Mexico) seldom exceed 90°F or fall below 32°F. Fog has a high frequency of occurrence at night during the winter season. Prevailing winds are somewhat erratic because the coastal regions experience frequent local circulations caused by the land-sea breeze. The coastal location of the site also results in vulnerability to tropical storms and hurricanes. In addition, tornadoes occur quite frequently in this region.

4.1.3 Meteorology

The present onsite meteorological program, which began on January 1, 1975, consists of two meteorological towers on site with one tower designated as primary and the other as an alternate. The primary tower, approximately 195 feet in height, has sensors mounted at 33-foot and 175-foot elevations. The alternate tower, approximately 60 feet high, has sensors mounted at the 33-foot elevation.

Monthly and annual wind roses with associated average wind speeds for the 33-foot and 175-foot levels are provided in the CR3 FSAR. The wind roses were derived from onsite measurements for the period January 1, 1975 through December 31, 1975. The prevailing winds on an annual basis were from the east-northeast and east for both the 33-foot and 175-foot levels. These data are in good agreement with onsite wind data measured for the period January 1, 1972 through December 31, 1972.

For the period January 1, 1975 through December 31, 1975 the average wind speed for the on-site 33-foot and 175-foot levels was 7.9 and 11.6 mph, respectively. This compares to 7.1 mph for the 35-foot level and 10.4 mph for the 150-foot level for the period January 1, 1972 through December 31, 1972.

4.1.4 Hydrology

The major streams in the general vicinity of the site are the Withlacoochee River, the Homosassa River and the Crystal River. The Withlacoochee River is the major stream, having a drainage area at its entrance into the Gulf of Mexico of approximately 2,000 square miles. The discharge of the Withlacoochee due to rain runoff is augmented by a base flow of groundwater runoff and artesian spring discharges. The Crystal River is much smaller than the Withlacoochee River, with its major discharge consisting of artesian spring discharges.

The plant site is located approximately 3.8 miles south of the mouth of the Withlacoochee and about the same distance north of the mouth of the Crystal River. The Cross-Florida Barge Canal, which intersects with the Withlacoochee River inland, meets the Gulf about one mile southeast of the mouth of the Withlacoochee River and two miles northwest of the site. The average flow from the Withlacoochee drainage basin, a portion of which enters the Gulf via the Cross-Florida Barge Canal, is approximately 1,820 cubic feet per second (CFS). The average flow of the Crystal River is approximately 600 CFS.

Environmental Setting Supporting Documents

2010 MAPEP.docx
62-520.400 Florida Minimum Criteria for Groundwater.doc
62-520.410 Florida Groundwater Classifications.doc
62-520.430 Florida Standards for Class G-III Groundwater.doc
CR3 2010 Annual Radiological Environmental Operating Report.pdf
CR3 90% draft SPCC Plan 010715.docx
CR3 draft SPCC figures 010715.pdf
CR3 ODCM.pdf
CR3 SPCC 2011.pdf
CR3 SPCC 2012.pdf
Crystal River South - Stormwater Pollution Prevention Plan.pdf
Geology of Citrus County_SEGS_2014.pdf
REMP 2009 Graph.xlsx
REMP 2009_final.docx
REMP 2009_final.pdf
REMP 2010 graph.xlsx
REMP 2010_final.docx
REMP 2010_final.pdf
REMP 2011_final.pdf
REMP 2012_final.pdf
REMP 2013_final.pdf
REMP 2014 graph.xlsx
REMP 2014_final.docx
REMP 2014_final.pdf
SETTLING POND SOIL.pdf
Storm Water Pollution Prevention Plan_Engineering Change.pdf

4.2 Conceptual Site Model

As described in MARSSIM, the Conceptual Site Model (CSM) is essentially a visualization of the site indicating locations of known or suspected contamination, types and concentrations of radionuclides in impacted areas, potentially contaminated media, mechanisms for their transport, locations of potential receptors, and locations of potential reference (background) areas. The model includes the general layout of the site including buildings and property boundaries. The conceptual site model should be upgraded and modified as information becomes available throughout the decommissioning process. [1]

The CSM is used to assess the nature and the extent of contamination and to identify potential contaminant sources, release mechanisms, exposure and migration pathways, and potential human or environmental receptors. Furthermore, the CSM helps identify data gaps, determines media to be sampled, and assists in developing strategies for data collection. [1]

4.2.1 Geology

The CR3 site is adjacent to the Gulf of Mexico in a former marsh area that was reclaimed for plant site development. The entire area is one of very low relief (originally two to five feet above mean sea level) and is located within the Terraced Coastal Lowlands of the Coastal Plain of West Florida. All elevations hereafter mentioned are referenced to the Florida Power Corporation's Plant Datum (mean Gulf low water level equals plant datum 88 feet) [8].

The ground surface over the developed portion of the site is characterized as surface fill. The thickness of this surface fill is approximately three to five feet in the plant area. The natural soil cover beneath the fill consists of recent deposits of thinly laminated, organic sandy silts and clays, interspersed with a Pleistocene marine deposit known as the Pamlico Terrace Formation. These deposits blanket the site and have a variable but average thickness of approximately 4 feet. Beneath these soils is the residual limy soil unit derived from decomposition of the underlying bedrock.

The depth to bedrock at the site is approximately 20 feet beneath the ground surface throughout most of the plant (excluding the Berm Area). The shallow bedrock with significance to the engineering and groundwater geology of CR3 consists of biogenic carbonates of Tertiary Age. Two distinct Eocene formations have been identified at the site. The upper-most member is the Inglis Limestone Member of the Moodys Branch Formation. This unit overlies an unconformity consisting of very dense silt, sands, and organic clays of variable thickness which are the remnants of a formerly exposed erosional surface known as the Jackson-Claiborne Unconformity. The materials comprising this surface are derived, in part, from reworked residual soils, formed from the underlying sequence of carbonates known as the Avon Park Formation, which is the second Eocene formation of interest. The configuration of the unconformity can be represented as an undulatory surface in the area of the plant, ranging from an elevation of -10 feet to an elevation of +20 feet, with a thickness ranging from a few inches to approximately 10 feet in the area of the plant [8].

The Inglis Limestone is the principal foundation material at the site and is identified as a cream colored to occasionally tan, porous, granular, biogenic limestone, and dolomite deposited in a shallow marine environment. The unit is comprised of a matrix of carbonate pellet and skeletal detritus. This member forms the bedrock at the site and varies in thickness from approximately 70 feet to 90 feet, in the area studied. The unit is thinnest at the northern end of this area, and gradually thickens to the south [8].

Fracturing of the rock has occurred in response to the Ocala Uplift and consolidation of the thick sequence of Cretaceous and Tertiary sediments over a stable, competent Paleozoic basement. The sediments of both the Inglis Limestone and the Avon Park Formation are quite porous and have high interstitial permeabilities which have been secondarily augmented by fracturing. Within the Inglis Limestone, along these fractures, and in particular at the intersection of bedding planes and fractures, solution of the relatively soluble limestone has occurred, forming a network of essentially vertical solution channels which have been secondarily infilled with very fine quartz sands, organic silts and clays, and shells [8].

Because these rocks are inherently pervious and are broken by high angle fractures, infiltration of rain water and recharge to the groundwater table is relatively rapid. Atmospheric carbon dioxide within the rain water forms a dilute carbonic acid. The fresh water entering the underground moves rapidly down gradient (toward the Gulf of Mexico) and attacks the limy sediments. The result of this natural process is the destructive alteration of the carbonate rock, leaving a labyrinth of channels throughout the rock mass.

Well-documented subsurface data obtained from exploration and grouting of the foundation for Crystal River Unit 2 show that the solutioning process is most developed in the first 100 feet of section below the existing ground surface. Curtain and consolidation grouting carried out to closure on final order holes spaced on a maximum of 8-foot centers successfully injected 7 percent of grout over the total volume of rock. This figure represents the volume of voids existing in the subsurface, but does not equal the total volume of solution channels because certain solution channels have been infilled by secondary depositional processes.

4.2.2 Groundwater

Throughout west central Florida, groundwater occurs under both water table and artesian conditions. Water table (“unconfined”) conditions occur in shallow aquifers composed of Recent sediments and in pervious Tertiary Age limestones. These aquifers derive their water primarily from rainfall that falls directly onto the exposed formations and infiltrates them. Artesian (“confined”) conditions develop where pervious limestone beds are overlain by effectively impervious layers and are recharged at points of higher elevation where the overlying impervious layers are absent and the limestone beds outcrop at the ground surface.

The Inglis Limestone and the Avon Park Limestone occur at the surface (beneath a thin veneer of Pleistocene and Recent sediments) in the vicinity of the CR3 plant site. These two stratigraphic units comprise a part of the Floridan aquifer which supplies most of the groundwater in the State. Except in Citrus and Levy Counties, these rock units are buried beneath more impervious units, creating artesian conditions [8]. Surface expression of artesian conditions exists at numerous places throughout the region in the form of springs where “windows” exist in the overlying impervious confining layer, allowing groundwater to discharge.

In Citrus and Levy Counties the Inglis and Avon Park Limestones are exposed along the Gulf Coast and there they contain groundwater which occurs under water table conditions. These conditions allow relatively rapid groundwater recharge by infiltration of rainfall. Because an overlying confining layer is absent the risk of groundwater contamination in water table aquifers is greater relative to that in artesian aquifers.

Recharge to the groundwater table occurs as a result of approximately 55 inches of annual rainfall, most of which occurs during the summer months. Long-term meteorological measurements made at the station demonstrate that although wind direction varies, the predominant direction is from the northeast [8]. Groundwater gradients in the area of the plant slope generally to the west southwest (seaward) and groundwater eventually discharges into the Gulf of Mexico. However, the groundwater flow domain is three-dimensional and there is also a vertical component of flow. The vertical component of flow in the area of the station is upward, as would be expected in a coastal zone of groundwater discharge [9]. The deep foundations of the structures in the power block are below the water table, form a barrier to shallow groundwater flow and divert flow locally around and under the foundations.

4.2.3 Potential Contaminant Sources and Transport Mechanisms

Potential sources of soil and groundwater contamination, both radiological and non-radiological, include various tanks and pipelines containing radioactive liquids, tanks and pipelines containing diesel fuel, station transformers containing dielectric oil, radiologically contaminated components and equipment stored in temporary RCAs (SeaLand containers, decontamination tents), building sumps, spills from chemical storage areas, machine shops and paint shops and wastewater settling ponds. Contaminants from these sources potentially could be released directly to the soil where infiltrating rain water would transport them to the groundwater or residual contamination on plant equipment and impermeable surfaces potentially could be mobilized in storm water and infiltrate the groundwater. Minor spills and leaks of diesel fuel, hydraulic oil and engine coolant have occurred from various pieces of mobile equipment during the operating history of the station. Although they were immediately isolated and cleaned up, the cumulative effect of residual contaminants from the spills may impact local groundwater quality.

A network of thirteen groundwater monitoring wells has been constructed around the perimeter of the CR3 PA [10]. These wells are sampled quarterly as part of the station REMP and the samples are analyzed for tritium and gamma-emitting radionuclides. No groundwater samples from the site wells have been analyzed for indicators of non-radiological contaminants. Five of the wells on the west and southwest side of the PA (downgradient in both groundwater flow and predominant wind direction) have periodically contained very low concentrations of tritium, but no gamma-emitting radionuclides. In 2014 the levels of tritium measured ranged from 88 to 427 pCi/L [11]. The drinking water standard for tritium is 20,000 pCi/L [12]. In 2009 the highest tritium level measured in one of the five wells (CR3-5) was 1,967 pCi/L. This concentration has been attributed to infiltration of some of the hydro-demolition water used to cut an opening in the southwest side of the Reactor Building for the Steam Generator Replacement project in 2009.

No historical or current leaks to the environment in plant systems containing radioactive liquids are known and the source of these very low levels of tritium in groundwater has not been determined. Based on experience at other operating nuclear power stations these levels are consistent with those produced by wash out of tritium from routine gaseous plant effluent. Tritium was measured in 2014 in groundwater from two additional monitoring wells located on the north and south sides of the plant Settling Ponds at concentrations of 87 and 144 pCi/L. These detections have been attributed to discharges of the Station Drain Tank (SDT-1) to the Settling Ponds [11].

The available data suggest that significant impacts to groundwater at the station have not occurred. CR3 has not produced power for approximately seven years and has been permanently defueled for approximately three years. The volume of radioactive liquids currently produced and processed is a small fraction of that produced when the plant was producing power. Accordingly, the risk of an incident that would cause significant soil or groundwater contamination occurring now or in the future is substantially reduced. There are no water supply wells on the CR3 site and the direction of horizontal groundwater flow is generally west southwest to the Gulf of Mexico and not toward any off site wells. Therefore, a release of contaminants from sources at the station would likely not pose a risk to off-site receptors.

At the plant site, groundwater occurs under water table conditions with groundwater levels ranging from approximately 5.5 to 9 feet below ground surface, with an average of about 7 feet. The direction of flow is generally to the west southwest [10]. An average tidal range of about three feet has been measured in the plant intake and discharge canals. Fluctuations of the water levels in monitoring wells have been measured with changing tides to observe the effect of the tides on groundwater flow.

A time lag from less than one hour to as long as four hours has been observed between peaks of high tides and peaks of groundwater levels in monitoring wells [9]. In general, the time lag increases and the magnitude of tidally influenced groundwater level fluctuations decreases in wells located more distant from the canals. It can be noted that there are substantially different attenuation times in some monitoring wells that are approximately equidistant from the canals. The significance of this empirical observation is that variation exists in the transmissibility of the limestone. This variation is likely at least partly due to the presence of solution channels. These solution channels could provide preferential flow paths for potential groundwater contaminants.

Intrusion of salt water inland occurs within the Floridan aquifer along the Gulf Coast. At the coast, shallow groundwater is brackish to saline and chloride concentrations increase with depth due to the density difference between seawater and fresh groundwater. Moving inland, the thickness of the lens of fresh groundwater overlying saline groundwater increases. Based on electrical resistivity measurements completed in the area between the Crystal River and the Homosassa River at a depth of 100 feet the 250 mg/L isochlor was encountered 2 miles inland [13]. Groundwater seaward of this isochlor, including that beneath CR3, exceeds the FDEP Primary Drinking Water Standard for chlorides (250 mg/L) [12].

Chemical analyses of groundwater at the site indicate the water contains more than 350 ppm chlorides with a pH range of 7.0 to 7.1 and a conductivity of greater than 2,000 microhms/cm [8]. These analyses confirm that the groundwater beneath CR3 is not potable. No water supply wells exist on the CR3 site or in the down-gradient area between the station and the Gulf of Mexico. Drinking water is supplied to Crystal River Units 1, 2 and 3 from wells in the Floridan aquifer located approximately 6 miles inland, east and immediately west of US Highway 19 and up-gradient from the site. For these reasons, there are no human receptors on or down-gradient from the CR3 site and ingestion of groundwater is not a viable pathway for exposure to contamination.

The well field east of US Highway 19 also supplies water to Units 4 and 5 for operation of their clean air scrubbers. An investigation was completed in 2012 to determine if activities related to construction of these clean air scrubbers or the increased withdrawals from the well field to support their operation significantly affect groundwater flow patterns in the vicinity of CR3. The report concluded that they do not. [9]

<u>Conceptual Site Model Supporting Documents</u>

ANI Inspection Report_Groundwater.TIF
CR3 20090515 ANI Report.pdf
CR3 Groundwater Flow Study Report-EnHydro-Jan2007 (1).pdf
CR3 Groundwater Well Monitoring Program.pdf
CR3 ODCM.pdf
CR3 Rad GW Protection Operating Manual.pdf
Environmental Impacts Ranking Matrix.xls
Gaydos_GW Flow Study Summary Report 12.5.12.pdf
Haz Waste Inspection Report 11-12-2010.pdf
MW Installation Report_MW-11_MW-12_MW-13.pdf

5 Historical Site Assessment Methodology

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. [1]

5.1 Approach and Rationale

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

- 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 or other hazardous materials 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. [1]

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, 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 differentiate impacted from non-impacted areas of the site. [1]

As defined in MARSSIM, 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. [1]

It should be noted, that for the purpose of classifying impacted areas a subjective evaluation based on judgment and previous experience was utilized. The site release criteria will not be developed until later in the decommissioning process.

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 leaks or spills 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 any impacted areas that are not expected to contain residual radioactivity, or are expected to contain levels of residual radioactivity at 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. [1]

For purposes of classifying non-radiologically contaminated areas, the same concept has been applied, with the substitution of Florida Groundwater Standards and Soil Cleanup Target Levels, federal Maximum Contaminant Levels (MCLs) or Risk Based Concentrations (RBCs) in lieu of radiological site release criteria. The prefix NR (Non-Radiological) has been applied to these classifications to differentiate them from MARSSIM-based classifications. [1]

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, and then by NR Class 3 areas. Non-impacted areas do not receive any level of investigative effort because they have no potential for residual contamination. [1]

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 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 FSS would be performed. However, if the scoping survey of an area with a preliminary classification of Class 3 identifies residual contamination at concentrations greater than a small fraction of the site release criteria, the area must be reclassified as Class 1 (or Class 2) and a characterization survey performed, followed by a FSS with rigor appropriate for the class. Sufficient information should be collected during a scoping survey to identify situations that require immediate attention. [1]

5.1.3 Characterization Survey

This type of survey is a detailed radiological environmental characterization of an area. The characterization survey is the most comprehensive of all the survey types and generates the most 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, interior and exterior surfaces of buildings). The decision as to which media will be surveyed is a site-specific decision addressed throughout the radiation survey and site investigation process and informed by the results of the HSA. [1]

The data obtained during the site characterization survey will inform all follow-on phases of the site decommissioning. The radiological or hazardous material information will be used to determine the extent of contamination, select methods for any required remediation of structural surfaces or open land areas, 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 state regulatory agencies to terminate the site operating license with the goal of release of the site for unrestricted use. [1]

5.1.4 Remedial Action Support Survey

If an area is adequately characterized and is determined to be contaminated at concentrations greater than the site release criteria, decontamination 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. [1]

5.1.5 Final Status Survey

The FSS is used to demonstrate compliance with 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

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, 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, a final classification is then 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. [1]

Areas with reasonable potential for residual contamination from site activities are classified as impacted areas. Impacted areas are divided into three final 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 determines how large it can be in terms of surface area. [1]

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^{-1}) 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 g^{-1}). 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. [1]

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 DCGL or the non-radiological site release criteria, and the review and approval of the package. [1]

If any of the radionuclides or other contaminants of concern are present in background at levels that impact the DCGL or the non-radiological 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 release criterion. Approved site procedures will direct this process to ensure consistent implementation and adherence to applicable requirements. [1]

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 will always be made, while fixed measurements and sampling may not be necessary. Data are collected and stored using a data management system. [1]

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 simply serve to show that all of the measurements made in a given survey unit are below the applicable license termination criteria. In this case, demonstrating compliance with the release criteria is a simple matter and requires little in the way of analysis. [1]

In other cases, residual radioactivity or other contamination may exist with measurement results both above and below the license termination criteria. In these cases, statistical tests must be performed to make a decision as to whether or not the survey unit satisfies the 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 license termination criteria must be 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. [1]

5.1.6 Regulatory Agency Confirmation and Verification

The regulatory agency responsible for the site often confirms whether the site is acceptable for release. 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 will 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. [1]

5.2 Documents Reviewed

The following list summarizes many of the sources of information used to develop this HSA. This bulleted list is followed by a larger all-inclusive list of hyperlinked files consisting of all the supporting documents reviewed during the generation of this report. These supporting documents are repeated, for ease of access, in their relevant sections.

- ANI inspection reports
- Drawings of the CR3 site and various building drawings
- CR3 10 CFR 50.75(g) File (HPP0230)
- CR3 Off-site Dose Calculation Manual (ODCM)
- CR3 Spill Prevention, Control and Countermeasures Plan
- CR3 Stormwater Pollution Prevention Plan (SWPPP)
- CR3 Consultant’s reports of various subsurface investigations including a Groundwater Flow Study (January, 2007), a Groundwater Flow Study Summary Report (November, 2012) and a Monitoring Well Installation Report (May, 2013)
- CR3 Final Safety Analysis Report, Rev. 35
- CR3 historical photographs
- CR3 Annual Radioactive Effluents Release Reports
- CR3 Annual Radiological Environmental Monitoring Program (REMP) Reports
- CR3 Nonconforming Operations Reports (NCOR)
- CR3 Action Requests (ARs)
- CR3 Precursor Cards
- CR3 Plant Event Reports
- CR3 Groundwater Well Monitoring Program
- CR3 Groundwater monitoring data and well installation logs
- CR3 Buried Pipe Drawings
- CR3 Florida Pollutant Discharge Elimination System Permit
- CR3 Inventories of Asbestos Containing Material (ACM) and Lead-Acid Batteries
- CR3 special survey and operational radiological survey records
- CR3 Radioactive Source Program (source inventories and leak check records)
- CR3 operator or HP logs associated with spills of radioactive material
- CR3 effluent sample analyses

- CR3 soil and asphalt sample analyses
- CR3 waste stream analyses
- CR3 survey responses by long-tenured employees
- NUREG 1575 (MARSSIM)
- CR3 Significant Environmental Impacts Scoring Sheet
- Reports on the geology of the CR3 region published by the Florida Geological Survey and the Southeastern Geological Society
- FDEP Storage Tank Database
- FDEP Groundwater Standards
- U.S. Fish and Wildlife Service National Wetlands Inventory

Documents Reviewed Supporting Documents

62-520.400 Florida Minimum Criteria for Groundwater.doc
62-520.410 Florida Groundwater Classifications.doc
62-520.430 Florida Standards for Class G-III Groundwater.doc
CR3 AI0402B Procedure Writing Guide.pdf
CR3 Groundwater Flow Study Report-EnHydro-Jan2007 (1).pdf
CR3 PSDAR.pdf
CR3 RSP-101 Basic Radiological Safety Information and Instructions for Radiation Workers.pdf
FDEP Health Effects of Microbiological Contaminants - Drinking Water Program.pdf
FDEP Inorganic Contaminants - Drinking Water Program.pdf
FDEP Miscellaneous Contaminants - Drinking Water Program.pdf
FDEP Radionuclide Contamination - Drinking Water Program.pdf
FDEP Secondary Drinking Water Standards - Drinking Water Program.pdf
FDEP SoilCleanupTargetLevels.pdf
FDEP Synthetic Organic Contaminants - Drinking Water Program.pdf
FDEP Tank Database.xlsx
FDEP Tank Inventory.pdf
FDEP Tanks with Discharges.xlsx
FDEP Volatile Organic Chemical Contaminants - Drinking Water Program.pdf
Fretwell and Stewart_Resistivity Study of Coastal Karst_1981.PDF
Gaydos_GW Flow Study Summary Report 12.5.12.pdf
Geology of Citrus County_SEGS_2014.pdf
NEI 07-07.pdf
NPDES Permit.doc
NUREG-1575 (MARSSIM).pdf
REMP 2014_final.pdf
Site Picture Wetlands.pdf
2010 MAPEP.docx
62-520.400 Florida Minimum Criteria for Groundwater.doc
62-520.410 Florida Groundwater Classifications.doc
62-520.430 Florida Standards for Class G-III Groundwater.doc
CR3 2010 Annual Radiological Environmental Operating Report.pdf
CR3 90% draft SPCC Plan 010715.docx

CR3 draft SPCC figures 010715.pdf
CR3 ODCM.pdf
CR3 SPCC 2011.pdf
CR3 SPCC 2012.pdf
Crystal River South - Stormwater Pollution Prevention Plan.pdf
Geology of Citrus County_SEGS_2014.pdf
REMP 2009 Graph.xlsx
REMP 2009_final.docx
REMP 2009_final.pdf
REMP 2010 graph.xlsx
REMP 2010_final.docx
REMP 2010_final.pdf
REMP 2011_final.pdf
REMP 2012_final.pdf
REMP 2013_final.pdf
REMP 2014 graph.xlsx
REMP 2014_final.docx
REMP 2014_final.pdf
SETTLING POND SOIL.pdf
Storm Water Pollution Prevention Plan_Engineering Change.pdf
ANI Inspection Report_Groundwater.TIF
CR3 20090515 ANI Report.pdf
CR3 Groundwater Flow Study Report-EnHydro-Jan2007 (1).pdf
CR3 Groundwater Well Monitoring Program.pdf
CR3 ODCM.pdf
CR3 Rad GW Protection Operating Manual.pdf
Environmental Impacts Ranking Matrix.xls
Gaydos_GW Flow Study Summary Report 12.5.12.pdf
Haz Waste Inspection Report 11-12-2010.pdf
MW Installation Report_MW-11_MW-12_MW-13.pdf
ODCM AI-1500 Enclosure 1.docx
ODCM rev 36 Final.docx
ODCM rev 36 Final.pdf
ODCM rev 36 Markup.docx
REMP 2012_final.pdf
SP0736F Release Rev 18.TIF
SP0736F Release Rev 4.TIF
SP0736F to pond 584130.TIF
SP0736I-CDT-1.TIF
SP0736K hydro demolition Rev 2.TIF
SP0736K hydro demoliton Rev 1.TIF
SP0736L, Liquid Discharges to the Discharge Canal via RM-L2 (WDT-1).pdf
SP736F SDT-1 to pond 582798.TIF
SP736G SDT-1 Releases to the Discharge Canal.pdf
SP736I Condensate Release to the Discharge Canal (CDT-1).pdf

SP736M Liquid Releases to the Discharge Canal via RM-l7 (SDT-1).pdf
CR3 FSAR.pdf
10CFR61 Analysis Condensate Resin_2015.docx
10CFR61 Analysis Condensate Resin_2015.pdf
10CFR61 Analysis DAW_2010.docx
10CFR61 Analysis DAW_2010.pdf
10CFR61 Analysis DAW_2014.docx
10CFR61 Analysis DAW_2014.pdf
10CFR61 Analysis NUS Charcoal Resin_2015.docx
10CFR61 Analysis NUS Charcoal Resin_2015.pdf
10CFR61 Analysis Primary Resin_2014.docx
10CFR61 Analysis Primary Resin_2014.pdf
Alpha ratio tracking sheet.xlsx
Canal Radionuclide data.xlsx
HPP-112 ENCLOSURE 1.doc
HPP112_isotopic_mix.xlsx
NRC Screening Values.pdf
ODCM rev 36 draft for review.docx
ODCM Revision Form_Rev 35.pdf
ODCM_rev35 DRAFT.DOCX
PCP.07.docx
R16 Alpha ratios.xlsx
REMP 2014_final.docx
RS2009-10-2195 CTMT SG Opening for R16.pdf
RS2011-12-0137 Concrete Samples.pdf
RS2012-01-0120 Concrete Samples.pdf
RS2016-05-0004 Intake Structure Survey Results.docx
RS2016-05-0004 Intake Structure.pdf
10 CFR 75(g)_HPP0230_1977.PDF
10 CFR 75(g)_HPP0230_1978.PDF
10 CFR 75(g)_HPP0230_1979.PDF
10 CFR 75(g)_HPP0230_1980.PDF
10 CFR 75(g)_HPP0230_1981.PDF
10 CFR 75(g)_HPP0230_1982.PDF
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10 CFR 75(g)_HPP0230_2010.PDF
10 CFR 75(g)_HPP0230_2011.PDF
10 CFR 75(g)_HPP0230_2012.PDF
10 CFR 75(g)_HPP0230_2013.PDF
10 CFR 75(g)_HPP0230-1Q2014.PDF
10 CFR 75(g)_HPP0230-1Q2015.pdf
10 CFR 75(g)_HPP0230-2Q2014.PDF
10 CFR 75(g)_HPP0230-3Q2014.pdf
10 CFR 75(g)_HPP0230-4Q2014.pdf
10 CFR 75(g)_HPP0230-Annual Review_1-1-07_6-1-08.pdf
10 CFR 75(g)_HPP0230-CR3 Settling Pond.pdf
Site Picture CR3 Buildings and Structures.pdf
Site Picture For Licensing Discussion.pdf
Site Picture Wetlands.pdf
Discharge Canal - 1.JPG
Discharge Canal - 2.JPG
Discharge Canal.JPG
Intake Canal.JPG
Intake Structure - 1.JPG
Intake Structure - 2.JPG
Intake Structure - 3.JPG
Intake Structure.JPG
Monitoring Well 3.JPG
Monitoring Well 3S.JPG
Monitoring Wells 3 & 3S.JPG
Nitrogen and Hydrogen Storage Area.JPG
Old Chemical Storage Building - 1.JPG
Old Chemical Storage Building - 2.JPG
Old Chemical Storage Building - 3.JPG
Old Chemical Storage Building - 4.JPG
Old Chemical Storage Building.JPG
OTSG Area Drainage.JPG
OTSG South Side.JPG
OTSG Storage Facility - 1.JPG
OTSG Storage Facility.JPG
Outfall into Intake Canal.JPG
Outside OTSG toward RR Tracks.JPG
RMSW 'G' - 10.JPG
RMSW 'G' - 11.JPG

RMSW 'G' - 2.JPG
RMSW 'G' - 3.JPG
RMSW 'G' - 4.JPG
RMSW 'G' - 5.JPG
RMSW 'G' - 6.JPG
RMSW 'G' - 7.JPG
RMSW 'G' - 8.JPG
RMSW 'G' - 9.JPG
RMSW 'G' - East Side.JPG
RMSW 'G' - Floor crack.JPG
RMSW 'G' - Sand Blast Tent Area.JPG
RMSW 'G' - South Side.JPG
RMSW 'G'.JPG
Site Picture Aerial View of CR3 R3wflow3.jpg
Site Picture Aux119.pdf
Site Picture Aux143.pdf
Site Picture Aux75and95.pdf
Site Picture Berms.JPG
Site Picture Buried Piping MapPro output.pdf
Site Picture Control Complex.pdf
Site Picture CR3 Berms.jpg
Site Picture CR3 Buildings and Structures.pdf
Site Picture CR3-G86-D_SitePlotPlan_Buildings.pdf
Site Picture DSC01888.JPG
Site Picture DSC01894.JPG
Site Picture For Licensing Discussion.pdf
Site Picture RB160.pdf
Site Picture RB180.pdf
Site Picture Site Map with labels.JPG
Site Picture TB119.pdf
Site Picture TB145.pdf
Site Picture TB95.pdf
Site Picture TBNorth.pdf
Site Picture Wetlands.pdf
Southeast toward RT Bunker.JPG
Spill Retention Pond - 1.JPG
Spill Retention Pond - 2.JPG
Spill Retention Pond.JPG
Storm Water Retention Pond 'A' - 1.JPG
Storm Water Retention Pond 'A' - 2.JPG
Storm Water Retention Pond 'A'.JPG
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RS Reactor-Aux-Intermediate Bldg.docx
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RS_CR3-M-20160131-2 South Berm.pdf
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RS_FR-12-110 SDT-1 Solid Material Isotopic (West Berm).pdf
RS1978 Survey-1978.pdf
RS1978-05-12 S. Berm Asphalt Following Resin Spill.pdf
RS1983-04-301 scrap metal pile note.pdf
RS1983-04-307.pdf
RS1983-LOG-4-5-1983.pdf
RS1997-09-0335 Turbine Parts-Kelly Bldg.pdf
RS1998-02-0144 Tb Parts Survey Results.pdf
RS1998-10-0099 Post Turbine Parts.pdf
RS1999-02-0104 RMSW G - Survey for Release.pdf
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RS1999-03-0197 Turbine Parts.pdf
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RS2000-10-0024 Soil Samples from Swamp.pdf
RS2001-10-0576 FTI Boxes for Shipment (South Berm).pdf
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RS2002-01-0018 IB TB 119'.pdf
RS2002-01-0018 Intermediate Bldg 119'.pdf
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RS2008-10-0026 - Excavation of Light Pole.TIF
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RS2009-10-0082 Cold Machine Shop MSV-24.pdf
RS2009-10-0544 Alpha Ratio 600-1 (Aux Bldg).pdf
RS2009-10-2195 CTMT SG Opening for R16.pdf
RS2009-10-8015 RT Bunker.pdf
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RS2009-10-8137 Decon Tent Area.pdf
RS2009-10-8137 Decon Tent.pdf
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RS2010-07-0090 South Laydown Yard.pdf
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RS2010-07-0236 Nitrogen Line Excavation (East Berm).pdf
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RS2010-11-0221 Composite Sand Pile Ease of SAB.pdf
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RS2011-05-0179 ISFSI Jack&Bore and Railroad Tracks.pdf
RS2011-05-0179 Site Soil Survey Data Spill Retention Basin.pdf
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RS2012-01-0120 Concrete Samples.pdf
RS2012-07-0001 CC 95' Nuclear Sample Room.pdf
RS2012-07-0001 Nuclear Sample Room.pdf
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RS2012-07-0056 Block Orifice Room.pdf
RS2012-07-0090 AB 119' RCBT.pdf
RS2012-08-0129 Building Spray Tank Room.pdf
RS2012-08-0133 SDT-1 Leak (West Berm).tiff
RS2012-08-0133 SDT-1 leak.pdf
RS2012-08-0133 SDT-1 leak.tiff
RS2012-09-0097 Crane Dunnage (South Berm).pdf
RS2012-09-0101 Crane Dunnage (South Berm).pdf
RS2012-10-0108 RC Evap Rm.pdf
RS2012-11-0057 Letdown Cooler Room.pdf
RS2012-12-0030 Letdown Cooler Room.pdf
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RS2016-05-0004 Intake Structure.pdf
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Site Survey Data.xlsx
South Laydown Yard.pdf
Survey Log 2003 November.pdf
Survey Log 2003 October.pdf
Survey Log 2009 Survey Sediment Pond Soils.pdf
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AR00555078 Trace Rad Contamination Found in Excavated West Berm Trench.pdf
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AR00560532 Trace Levels of Contamination Found Outside the RCA Inside PA.pdf
AR00562443 Unmarked Drums in RR Loop 9-20-2012.pdf
AR00563859 Radioactive material Found in Warehouse Package Pickup Area.pdf
AR00568080 Surface Water Pooling From Underground Source 10-18-12.pdf
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AR00682781 JLG Man Lift Oil Leak 4-21-14.pdf
AR00692913 Hydraulic Oil Leak from Dump Trailer 6-12-14.pdf
AR00694175 Hydraulic Oil Leak from Truck at RB Equipment Hatch 6-19-14.pdf
AR00707774 Hydraulic Oil Spill from Fork Truck 9-11-14.pdf
AR00714933 Truck Power Steering Fluid Leak 10-23-14.pdf
AR00723232 Hydraulic Oil Leak from Truck at Sally Port 12-12-14.pdf
AR00724987 Hydraulic Fluid on W Berm 12-29-14.pdf
AR00728315 Hydraulic Oil Spill at Main Transformer 3A 1-20-15.pdf
AR00752539 Trace Levels of Contamination Identified at the G RMSW.pdf
Historical Text Search for Contamination_Radioactive_etc Report AR type NCR.pdf
HPP0230_1981 (cut out 2 NCORs).PDF
NCOR779-0258, Radioactive Spill outside the RCA (Core Flood_N2 Line Event).pdf
NCOR79-0258, Core Flood - N2 Event (discusses Piping inside Tb Bldg).pdf
NCOR80-0124 Radioactive Waste Outside RCA.pdf
NCOR81-0186 SDT-1 Spill on Berm.pdf
NCOR81-0186, SDT-1 Spill on Berm.pdf
NCOR81-0213 SDT-1 Spill on Berm.pdf
NCOR81-0213, SDT-1 Spill on Berm.pdf
NCOR82-0067, Secondary Resin Spill outside the RCA.pdf
NCOR82-0329 Uncontrolled Contaminated Material Outside RCA.pdf
NCOR83-0089 Contaminated Pipe Found Outside RCA.pdf
NCOR88-0139, Leakage of SDT-1 Contents to the Berm and Storm Drain.pdf
NCOR89-164.PDF
NCRs 2001.csv

NCRs 2002 First Half.csv
NCRs 2002 Fourth Qtr.csv.idfvault
NCRs 2002 Third Qtr.csv.idfvault
NCRs 2003 First Qtr.csv.idfvault
NCRs 2003 Fourth Qtr.csv
NCRs 2003 Second Qtr.csv
NCRs 2003 Third Qtr.csv.idfvault
NCRs 2004 First Qtr.csv.idfvault
NCRs 2004 Fourth Qtr.csv.idfvault
NCRs 2004 Second Qtr.csv
NCRs 2004 Third Qtr.csv.idfvault
NCRs 2005 First Qtr.csv
NCRs 2005 Fourth Qtr.csv
NCRs 2005 Second Qtr.csv
NCRs 2005 Third Qtr.csv.idfvault
NCRs 2006 First Qtr.csv.idfvault
NCRs 2006 Fourth Qtr.csv
NCRs 2006 Second Qtr.csv
NCRs 2006 Third Qtr.csv.idfvault
NCRs 2007 December.csv
NCRs 2007 First Qtr.csv.idfvault
NCRs 2007 November.csv
NCRs 2007 October.csv.idfvault
NCRs 2007 Second Qtr.csv.idfvault
NCRs 2007 Third Qtr.csv
NCRs 2008 April.csv
NCRs 2008 First Qtr.csv
NCRs 2008 Fourth Qtr.csv.idfvault
NCRs 2008 June.csv
NCRs 2008 May.csv.idfvault
NCRs 2008 Third Qtr.csv
NCRs 2009 August.csv.idfvault
NCRs 2009 December.csv
NCRs 2009 First Qtr.csv.idfvault
NCRs 2009 July.csv.idfvault
NCRs 2009 November.csv.idfvault
NCRs 2009 October.csv
NCRs 2009 Second Qtr.csv
NCRs 2009 September.csv
NCRs 2010 First Qtr.csv
NCRs 2010 Second Half.csv
NCRs 2010 Second Qtr.csv.idfvault
NCRs 2011 February.csv.idfvault
NCRs 2011 January.csv
NCRs 2011 March.csv

NCRs 2011 Second Half.csv
NCRs 2011 Second Qtr.csv.idfvault
NCRs 2012 First Half.csv.idfvault
NCRs 2012 Fourth Qtr.csv.idfvault
NCRs 2012 Third Qtr.csv
NCRs 2013 First Qtr.csv.idfvault
NCRs 2013 second half.csv
NCRs 2013 Second Qtr.csv
NCRs 2014 first half.csv.idfvault
NCRs 2014 Second half.csv
NCRs 2015.csv
PC001239 Low Levels of Contamination in Storm Drain.pdf
PC9802106 Leak in Discharge Piping from SDT-1 to Settling Ponds along West Berm.pdf
PC982106.pdf
PC98903279 Unplanned Release of Condensate Water at CR1 & 2 from the Settling Pond Release Flow Path Pipe.pdf
PC9904219 Sludge from Unit 1 &2 Sewage Treatment Plant is Contaminated with Cobalt-58.pdf
PC9904557 Detectable Radioactivity Found in the Sewage Treatment Plant.pdf
PR94-0347 Amerzine Spill in Chemical Warehouse 12-14-94.pdf
ST3241 AT Text Search all AR types.pdf
UOER 4-80, Radioactivity through N2 Supply Header to Tank Farm.PDF
HSA Interview Questionnaire.docx
Organization Chart - SAFSTOR 1.docx
Primary to Secondary LR 2005 - 2007.xls
Primary to Secondary LR.xls
Hot Spot 2013 June Hot Sot Index.doc
Hot Spot 2014 Jan HOT SPOT INDEX.doc
Diesel Spill From Coal Train 4-27-2010.pdf
IWW Release to secondary contain. 4-2-2013.pdf
IWW Release to Secondary Containment 4-2-2003.pdf
NALCO.pdf
Spill of Industrial Waste Water to Intake Canal 12-17-2009.pdf
Wastewater Treatment Facility Inspection Report 10-22-12.pdf

5.3 Property Inspections

Site tours were conducted December 8, 9, and 10, 2015; January 18 through 29 and February 22 through 26, 2016. These tours included observing SSCs on each elevation of the Reactor Building, Auxiliary Building, Intermediate Building and Turbine Building. Tours of the following buildings and areas also were conducted:

- Alternate AC Diesel Generator Building
- B.5.b Diesel Water Pump Building
- Construction Debris Dump
- Discharge Structure
- Emergency Diesel Generator Building
- Emergency Feedwater Pump 3 Building
- Fire Service Pump House
- Firing Range
- Hazardous Material Storage Buildings
- Intake Structure
- Issue Warehouse
- Maintenance Support Building (MSB)
- Nuclear Administration Building (NAB)
- Nuclear Security Operations Center (NSOC)
- Paint Shack
- Plant Administration Building-Technical Support Center (PAB/TSC)
- RMSW D
- RMSW G
- Sandblast Booth
- Settling Ponds
- Sewage Treatment Plant
- Site Administration Building (SAB)

In addition, the OTSG Storage Facility, the RT Bunker, the former SeaLand Container Storage Area, the Swamp Area, the former Nitrogen and Hydrogen Storage Area, the R16 Shipping Yard, the Switch Yard and the Storm Water Retention Ponds were observed during multiple walking and vehicle tours.

5.4 Personnel Interviews

During the period of time between 2013 and 2015, inclusive, Duke Energy issued questionnaires to departing employees in an effort to understand whether there was any knowledge of events (spills, leaks, etc.) involving radiological or hazardous material in addition to the events that had already been documented. A total of approximately 90 questionnaires were reviewed, none of which identified any additional events.

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 and the nature of the information discussed is contained in Table 1.

Table 1: CR3 Employee Discussion Subjects

Employee	Discussion Subjects
M. Culver	Former site facilities (tents, trailers, etc.), storm water retention ponds
M. Siapno	Contamination events, primary to secondary side leakage, settling ponds, radioactive waste issues, failed fuel
I. Wilson	Operational events, general plant knowledge
R. Pinner	Environmental information (groundwater & effluents)
C. McKeown	Operational events
G. McCallum	Site walkdown discussing status of SSCs
B. Akins	Radiation protection program
J. Lane	Underground pipes, plant configuration
C. Burtoff	Operating history
P. Rose	Plant licensing
J. Endsley	Electrical transformers and circuit breakers
T. Hobbs	HSA scope, plant licensing issues
M. VanSicklen	Operational status of selected SSCs
A. Riley	Document Control

Based on the responses to the employee questionnaire, there do not appear to be any undocumented incidents of contamination at the station that would be significant for its decommissioning.

Personnel Interviews Supporting Documents

HSA Interview Questionnaire.docx
Organization Chart - SAFSTOR 1.docx

6 Assessment Findings

One hundred and twenty-three (123) areas of interest on the CR3 site have been evaluated for the potential of impact by either radiological or non-radiological contaminants. The areas of interest are subdivided into the following categories: Building or Structure (35), Chemical and Drum Storage Area (6), Exterior Area (23), Oil-Filled Mechanical Equipment (10), Site-Wide Impacts (4), Storage Tanks (28) and Transformers (17).

Forty-nine (49) of these areas have been determined to be Non-Impacted with non-radiological contamination. Areas that have been classified preliminarily as Impacted with non-radiological contaminants include fifty-two (52) Class 3 areas, thirteen (13) Class 2 areas and nine (9) Class 1 areas.

Eighty-one (81) of the one hundred and twenty-three (123) areas of interest have been determined to be either Non-Impacted or Not Applicable with respect to radiological contamination. Areas that have been classified preliminarily as Impacted with radiological contamination include twenty-four (23) Class 3 areas, eleven (11) Class 2 areas and seven (7) Class 1 areas.

Appendix A summarizes the non-radiological findings, including preliminary area classifications. Appendix B summarizes the radiological findings, including preliminary area MARSSIM classifications. None of the impacted areas are considered to be an imminent threat to human health or the environment that would warrant immediate corrective action, or appear to present a significant challenge to the decommissioning process. The map locations listed in Appendix A and Appendix B refer to the areas shown in the figures.

6.1 Site-Wide Impacts

6.1.1 Asbestos Containing Material

Description and Historical Use

ACM was used widely during the construction of CR3 as a component of building materials (i.e. insulation, caulk, flooring, roofing, paint). During site decommissioning this material will require removal by licensed personnel using appropriate personal protective equipment and control of the removed asbestos.

Known and Potential Contaminants

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.

Potentially Contaminated Media

- Building Materials
- Pipe Insulation
- Roofing Materials

Preliminary Classification

Because of their known presence throughout many buildings and components of the station and the need to properly remove and dispose of ACM, areas where they exist are assigned a preliminary classification of NR Class 1.

Data Gaps

- A preliminary inventory of building materials and SSCs containing ACM.

Supporting Documents

AR00144217 Possible Asbestos in Unit 4160 Room.TIF
Asbestos Inventory 2007.pdf

6.1.2 Lead and Lead-Based Paint

Description and Historical Use

Use of lead-based paint was not controlled prior to 1978 and it was widely used during the construction of CR3. Lead blankets and blocks are currently used for shielding in parts of the RCA. In addition to lead, the potential presence of other RCRA metals (including cadmium, chromium and mercury) on building surfaces and components should be evaluated to determine their appropriate disposition during future station decommissioning activities.

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

- Building Surfaces
- Component Surfaces

Preliminary Classification

Because of its known presence throughout many buildings and components of the station and the need to properly remove and dispose of lead-based paint, areas where it exists are assigned a preliminary classification of NR Class 1.

Data Gaps

- A preliminary inventory of lead batteries and components, and building and component surfaces where lead and other RCRA metals are present.

Supporting Documents

AR00246475 Lead Based Paint testing needs improvement.TIF
Lead-Acid Battery Inventory.pdf

6.1.3 Mercury-Containing Components

Description and Historical Use

Components containing elemental mercury, including switches, gauges and fluorescent bulbs, are distributed throughout the station. These materials will require special handling and disposal as universal waste.

Known and Potential Contaminants

The non-radiological contaminant is Mercury. 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

- Gauges
- Electrical Switches
- Thermometers

Preliminary Classification

Because of their known presence throughout many buildings and components of the station and the need to properly remove and dispose of mercury-containing components, areas where they exist are assigned a preliminary classification of NR Class 1.

Data Gaps

- A preliminary inventory of mercury-containing components.

Supporting Documents

AR00133478 Mercury in Outlet Receptacle in Primary Sample Lab.TIF

6.1.4 Storm Drain System

Description and Historical Use

The storm drain system at CR3 consists of twenty-eight (28) catch basins and interconnected pipes that convey storm water from the PA to system outfalls (Figure 6). Five (5) interconnected catch basins in the southern part of the PA outfall into the Intake Canal near its eastern end. Twenty-one (21) interconnected catch basins in the northern part of the PA outfall into the Discharge Canal at two locations near its eastern end. Two (2) catch basins on the eastern berm of the PA discharge to the Swamp Area, where the ISFSI is currently under construction. A bermed containment area in the northwest corner of the Swamp Area collects oil and storm water from the transformer bays on the north berm.

Several minor spills of primarily diesel fuel and hydraulic oil have occurred at various locations in the PA over the operating history of the station. These spills were immediately remediated but their cumulative effect may have resulted in residual concentrations of contaminants entering the storm drain system.

Non-Radiological Known and Potential Contaminants

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

Non-Radiological Potentially Contaminated Media

- Storm Drain Sediment
- Discharge Canal Sediment
- Intake Canal Sediment
- Drain Pipes

Radiological 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.

Radiological Potentially Contaminated Media

- Concrete
- Piping
- Storm Drain Sediment

Preliminary Classification

Because the Storm Drain System receives drainage from all parts of the PA it has the potential to contain a wide variety of contaminants. Some contaminants may have accumulated at significant concentrations in sediment traps within the system Therefore, the Storm Drain System is assigned a preliminary classification of NR Class 2. Note that the Storm Drain system is assigned a preliminary classification of MARSSIM Class 3 in regard to radiological contaminants.

Data Gaps

- Chemical analysis for the list of potential contaminants in samples of sediment in storm drain pipes and near system outfalls, and in samples of soil and groundwater near areas determined to be impacted.

Supporting Documents

2014 Q1 NPDES Inspection w-comments.pdf
AR00435178 Transformer Oil Pumped to Storm Drain 11-24-10.TIF
AR00603660 Storm Drain Contaminaton.pdf
Concrete Curing Water to Storm Drain 10-7-2010.pdf
Crystal River South - Stormwater Pollution Prevention Plan.pdf
Hydro-Demolition Water to Storm Drain 10-2-2009.pdf
NPDES Permit.doc
Oil Spill to Storm Drain 1-26-93.pdf
Oily Sheen Around Storm Drain 9-2-2009.pdf
OW Mixture Pumped to Storm Drain 11-24-2010.pdf
PC001239 Low Levels of Contamination in Storm Drain.pdf
RS2013-04-0210 south berm storm drain.pdf
Storm Water Pollution Prevention Plan_Engineering Change.pdf

6.2 Non-Radiological Impacts

6.2.1 Non-Impacted Areas

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 features. Therefore, these features have been assigned a preliminary classification of NR Non-Impacted. Refer to the summary descriptions in Appendix A for details regarding the features.

- 12,500 KVA Temporary Cooling Tower Transformers
- 750 KVA Temporary Cooling Tower Transformers
- ACP Diesel Generator Fuel Tank
- Auxiliary Boiler Power Transformer
- Borated Water Storage Tank (BWST)
- Chemical and Flammable Material Storage Cabinets
- Chemical Warehouse
- Circulating Water Pump Pits
- Circulation Water Pump Motors
- Compressed Gas Storage Area
- Condensate Storage Tank (CDT-1)
- Conference and Cafeteria Building (CCB)
- Control Complex
- Decon Tent Area
- Discharge Structure
- Emergency Feedwater Tank Building
- Fire Service Tank 2A (FST-2A)
- Fire Service Tank 2A (FST-2B)
- Hazardous Waste Satellite Accumulation Areas
- Intake Structure
- Intermediate Building
- Maintenance Training Facility
- Meteorological Towers
- MNT Scaffold Yard
- NAB
- Nitrogen and Hydrogen Storage Area
- NSOC
- Old Chemical Storage Building
- Old Chemical Storage Building Transformer
- OTSG Storage Facility
- Paint Shack
- Parking Areas
- Plant Administration Building (PAB)
- Protected Area Ground Surfaces

- R16 Shipping Yard
- Reactor Building
- Reactor Building Polar Crane
- Reactor Building Spray Tank Room
- RMSW G
- Rusty Building
- RVCH Storage Facility
- SAB
- SAB Diesel Generator Fuel Tank
- Sandblast Booth
- SeaLand Container Storage Area
- Security CAS Building
- Tendon Grease Storage Tanker A
- Tendon Grease Storage Tanker B
- Units 1 and 2 (CR1/2)

6.2.2 Impacted Areas

Based on identified historical use, there is presumed to be some potential for non-radiological contamination in the environment in each area listed in Subsections 6.2.3 through 6.2.8 and summarized in Appendix A. Non-radiologically impacted areas are classified here as NR Class 1, NR Class 2 or NR Class 3, similar to the classification approach used for radiologically impacted areas described in MARSSIM, where Class 1 areas have the highest potential for impacts that may be significant to decommissioning. The same concept as that applied for radiologically impacted areas has been applied for non-radiologically impacted areas, with the substitution of FDEP Groundwater Standards [2] (GWSs), Soil Cleanup Target Levels (SCTLs), federal maximum contaminant levels (MCLs) or risk-based concentrations (RBCs) as the site release criteria rather than DCGLs. The prefix “NR” is added to the classification of each area potentially impacted by non-radiological contaminants to clearly distinguish it from areas with radiological impacts.

Appendix A is a summary of all areas on site where the potential for the existence of non-radiological contamination was evaluated and lists the preliminary classifications of each area. NR Class 1 areas have been judged to have a relatively high potential to be impacted by non-radiological contamination at concentrations greater than the site release criteria. Because they are all presumed to have some potential to have been impacted, NR Class 1, NR Class 2, and NR Class 3 areas will each require an appropriate level of characterization before they can be released for unrestricted use. NR Class 1 areas will require more comprehensive characterization during decommissioning and NR Class 3 areas will require the least rigorous level of characterization.

6.2.3 Building or Structure

6.2.3.1 Alternate AC Diesel Generator Building

Description and Historical Use
The Alternate AC Diesel Generator Building is located off the South Berm, south of the Auxiliary Building (Figure 3 and Figure 8). The building was constructed in approximately 2005 and houses the Alternate AC Diesel Generator. The generator has been removed from service permanently.

Known and Potential Contaminants
The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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 Surfaces
- Concrete

Preliminary Classification
No record of a release of hazardous material from this building to the environment has been identified. Should a spill of diesel fuel occur in the Alternate AC Diesel Generator Building it probably would be fully contained within the building. However, based on its past use, and the volume of fuel used in the building, this area is assigned a preliminary classification of NR Class 2.

Data Gaps
None

Supporting Documents
AR00070409 Diesel Fuel Leak While MTDG-1 in Operation.TIF

6.2.3.2 Auxiliary Building

Description and Historical Use

The Auxiliary Building is a concrete and steel multistory structure that interfaces with the Reactor Building (Figure 3 and Figure 8). The Auxiliary Building houses the essential auxiliaries, spent fuel storage facilities, and the RW handling and treatment facilities.

Known and Potential Contaminants

The non-radiological contaminants are Asbestos, Lead, Mercury, and Petroleum Products. Because of its location within a 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
- Component Surfaces
- Mercury-Containing Components
- Pipe Insulation
- Sumps
- Penetration Sealants

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. Minor spills of non-radiological contaminants, including hydraulic oil, lubricating oil, etc., have been contained within the Auxiliary Building and have not been released to the environment. These contaminants are not likely to have impacted soil or groundwater quality at the station. For this reason a preliminary classification of NR Class 3 is assigned to this building.

Data Gaps

None

Supporting Documents

AR00388158 A Decay Heat Vault Wall Leakage.TIF
AR00399804 B Decay Heat Vault Increased Inleakage.TIF
NAOH and Sulfuric Acid Spill in Aux Building 6-23-94.pdf

6.2.3.3 Cable Trays and Duct Banks

Description and Historical Use

Underground cable trays and duct banks contain cables and pipes running to various areas of the station. Stormwater and groundwater that may have mobilized site contaminants infiltrates these conduits. This water is pumped periodically to portable polyethylene tanks where it is sampled before releasing it to local storm drains.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media

- Groundwater
- Storm Water

Preliminary Classification

Because of the potential for low-level contamination to be detected in water that accumulates in underground cable trays and duct banks these structures are assigned a preliminary classification of NR Class 3.

Data Gaps

Analysis of groundwater sampled from nearby monitoring wells for the potential contaminants.

Supporting Documents

None

6.2.3.4 Dry Cleaning Facility

Description and Historical Use

A dry cleaning facility was formerly operated on both the South and East Berms (though not at the same time) for cleaning protective clothing (Figure 3 and Figure 8). The facility has been removed. The facility used Freon as a cleaning solvent. Spent solvent and filters were shipped from the site as hazardous waste.

Known and Potential Contaminants

The non-radiological contaminant is Solvents.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a release of hazardous material from this facility to the environment has been identified. Based on its past use, and the unknown nature of potential impacts to nearby soil and groundwater, this area is assigned a preliminary classification of NR Class 2.

Data Gaps

- Chemical analyses of soil and groundwater samples for the potential contaminants.

Supporting Documents

None

6.2.3.5 Emergency Diesel Generator Building

Description and Historical Use

The Emergency Diesel Generator Building is located at the southeast corner of the Auxiliary Building (Figure 3 and Figure 8). The generators provide electrical power to operate all safety-related SSCs in the event of the loss of off-site electrical power. The building contains two large diesel generators and their associated day tanks. Fuel has been drained from day tank A and day tank B is in service.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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 Surfaces
- Concrete

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. Should a spill of diesel fuel occur in the Emergency Diesel Generator Building it probably would be fully contained within the building. However, based on the age of the day tanks and the volume of diesel fuel used by the generators, the building surfaces and concrete could be significantly contaminated with diesel fuel and the building is assigned a preliminary classification of NR Class 2.

Data Gaps

None

Supporting Documents

None

6.2.3.6 Emergency Feedwater Pump 3 Building

Description and Historical Use
The Emergency Feedwater Pump 3 Building is located on the South Berm near the Emergency Feedwater Tank Building (Figure 3 and Figure 8). The enclosure was constructed in approximately 1998 and contains DFT-4, a 13,750-gallon single-walled above ground storage tank containing fuel for the pump.

Known and Potential Contaminants
The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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 Surfaces
- Concrete

Preliminary Classification
No record of a release of hazardous material from this building to the environment has been identified. Should a spill of diesel fuel occur in the pump enclosure it probably would be fully contained within the building. However, based on the age of the tank, the volume of diesel fuel that it contains and the potential for overfilling, the pump enclosure could be contaminated with diesel fuel and it is assigned a preliminary classification of NR Class 3.

Data Gaps
None

Supporting Documents
None

6.2.3.7 Fire Service Pump House

Description and Historical Use

The Fire Service Pump House is located in the West Berm area, immediately south of the Fire Service Water Tanks and the Intermediate Building (Figure 3 and Figure 8). The Pump House contains two pumps for charging the Fire Service hydrants and standpipes and two above ground tanks storing diesel fuel for the pumps.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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 Surfaces
- Concrete

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. Should a spill of diesel fuel occur in the Fire Service Pump House it probably would be fully contained within the building. The building is assigned a preliminary classification of NR Class 3.

Data Gaps

None

Supporting Documents

None

6.2.3.8 Maintenance Support Building

Description and Historical Use

The MSB is inside the RCA, southwest of the Reactor Building (Figure 3 and Figure 8). Reactor Coolant Pump (RCP) seals were rebuilt in this building. The RCP motors were shipped off site for repair. Other maintenance completed in this building includes cleaning of the Reactor Head studs and non-destructive examination of the Reactor Head lifting tripod.

Known and Potential Contaminants

The non-radiological contaminants are RCRA Metals, Hydraulic Oil, Oil-Soaked Rags, Petroleum Constituents, Lubricating Oil, and Spent Solvents. Because of its location within a 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)
- Concrete

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. Should a spill of lubricating oil, hydraulic oil or other hazardous fluid occur in the MSB it would be fully contained within the building. However, based on the type of activities undertaken in the building, building surfaces and concrete could be significantly contaminated with lubricating oil, hydraulic oil and other hazardous fluids and the building is assigned a preliminary classification of NR Class 2.

Data Gaps

None

Supporting Documents

AR00093167 Storage Tanks did not meet PT-356 Requirements.TIF

6.2.3.9 Receiving Warehouse

Description and Historical Use

The Receiving Warehouse is located outside of the PA, south of the CCB (Figure 3 and Figure 8). Materials and equipment shipped from off-site vendors were delivered to this warehouse and were then distributed where needed in the plant. Chemicals formerly used in the plant were received here, but the building is no longer used and all materials have been removed.

Known and Potential Contaminants

The non-radiological contaminants are Acids-Bases, Petroleum Products, Sodium Hypochlorite, Laboratory Chemicals, and Solvents. Because of its location within a 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 Surfaces
- Concrete

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. Based on its previous use, it is unlikely that hazardous materials that may have been released in the warehouse would be detectable in the environment at concentrations greater than a small fraction of the site release criteria. For this reason, the building is assigned a preliminary classification of NR Class 3.

Data Gaps

None

Supporting Documents

None

6.2.3.10 RMSW D

Description and Historical Use

RMSW D is a large oil tank located west of CR1/2 (Figure 2 and Figure 7) that was used to store boiler fuel for the previously oil-fired units. After CR1/2 were converted to coal-fired boilers the tank was converted into a warehouse where CR3 stored both radiological material and potentially more than 1,000 55-gallon drums of lubricating oil and other petroleum products. All radiological material and drums of lubricating oil have been removed and the structure has been returned to the control of CR1/2.

Known and Potential Contaminants

The non-radiological contaminants are Lubricating Oil and Petroleum Products.

Potentially Contaminated Media

- Building Surfaces
- Concrete

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. Based on its previous use, it is unlikely that hazardous materials that may have been released in the warehouse would be detectable in the environment at concentrations greater than a small fraction of the site release criteria. For this reason, the building is assigned a preliminary classification of NR Class 3.

Data Gaps

None

Supporting Documents

AR00294825 Heavy Fuel Oil Residue Found in Soil at Fossil's Round WH.TIF

6.2.3.11 RT Bunker

Description and Historical Use

The RT Bunker is a small corrugated metal-sided building surrounded by a high earthen berm located inside the railroad loop east of the Paint Shack (Figure 3 and Figure 8). The building is where radiography technicians inspected weld coupons and welds on small components using industrial radiographic sources including Cobalt 60. The interior walls of the RT Bunker are painted with lead-based paint and likely also contain lead shielding to help shield the gamma rays produced during radiographic inspections.

Known and Potential Contaminants

The non-radiological contaminants are Lead and Asbestos.

Potentially Contaminated Media

- Building Surfaces

Preliminary Classification

No record of a release of hazardous material from the RT Bunker to the environment has been identified. However, because of the presence of lead-based paint and likely presence of lead shielding, the area of the RT Bunker is assigned a preliminary classification of NR Class 1.

Data Gaps

- Survey of the interior walls of the RT Bunker for the presence of lead-based paint and lead shielding.

Supporting Documents

None

6.2.3.12 Sewage Treatment Plant

Description and Historical Use

The Sewage Treatment Plant is located outside of the southwest corner of the PA, north of the Intake Canal (Figure 2, Figure 3 and Figure 8). The plant processes domestic wastewater from CR Units 1, 2 and 3 in accordance with a permit issued by the FDEP. A sand filter formerly used to filter treated effluent before it is discharged to the Settling Ponds has been removed. Sludge from the system is disposed periodically in an off-site landfill.

Known and Potential Contaminants

The non-radiological contaminant is RCRA Metals.

Potentially Contaminated Media

- Concrete
- Piping

Preliminary Classification

No record of a release of hazardous material from the Sewage Treatment Plant to the environment has been identified. Discharge Monitoring Reports indicate that the water quality of the treated effluent complies with the permit criteria. Based on its current and previous use, it is unlikely that hazardous materials that may have been released from the Sewage Treatment Plant would be detectable in the nearby environment at concentrations greater than a small fraction of the site release criteria. For this reason, the plant is assigned a preliminary classification of NR Class 3.

Data Gaps

None

Supporting Documents

AR00075086 Sewage Flowing Outside of the MTF.TIF
AR00320787 Sewer Line Ruptured During Core Boring.TIF
AR00348439 Sewage Spill at Units 1,2,3 Sewage Treatment Plant.TIF
AR00370075 Minor Domestic Wastewater Release from CR1 2 and 3 WWTP.TIF
Buried Sanitary Sewer Leak to Roadway 6-3-2009.pdf
Domestic Waste Water Spill From Manhole 12-9-2009.pdf
IWW Release to secondary contain. 4-2-2013.pdf
IWW Release to Secondary Containment 4-2-2003.pdf
Sanitary Sewer Lift Station Overflow 10-25-13.docx
Sanitary Sewer Lift Station Spill 4-30-2009.pdf
Spill of Industrial Waste Water to Intake Canal 12-17-2009.pdf
Wastewater Treatment Facility Inspection Report 10-22-12.pdf

6.2.3.13 Turbine Building

Description and Historical Use

The Turbine Building is located north of the Reactor Building and Intermediate Building (Figure 3 and Figure 8). The Turbine Building houses the Turbine Generator and associated auxiliaries, including the Condensers, Feedwater System, and Condensate Water Treatment System.

Known and Potential Contaminants

The non-radiological contaminants are Asbestos, Lead, Mercury, and Petroleum Products. Because of its location within a 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
- Component Surfaces
- Mercury-Containing Components
- Pipe Insulation
- Sumps

Preliminary Classification

Equipment and floor drains in the Turbine Building are directed to the Turbine Building Sump. From there wastewater passes through an oil-water separator that discharges to the SDT-1 on the West Berm, outside of the building. Small volumes of oil that have been released from the separator were completely contained within the building and immediately cleaned up. It is unlikely that hazardous materials that may have been released in the Turbine Building would be detectable in the environment at concentrations greater than a small fraction of the site release criteria. For this reason, the Turbine Building is assigned a preliminary classification of NR Class 3.

Data Gaps

None

Supporting Documents

NaOH Spill Battery Rm 11-18-1993.pdf

6.2.4 Chemical and Drum Storage Areas

Chemical and Drum Storage Areas Supporting Documents

2011 Chemicals Used Inventory.xls
AR00086804 Tank at the Old Chemical Storage Area Overflowed (1).TIF
AR00089282 Oil Found on Floor of Chemical Storage Building.TIF
AR00309140 PCB Ballast Collection Exceeded 30 Days.TIF
EPCRA Chemical Inventory Report to FLDEP.pdf
Haz Waste Inspection Report 11-12-2010.pdf
NaOH Spill 6-22-1994.pdf
PR94-0347 Amerzine Spill in Chemical Warehouse 12-14-94.pdf
TCA in Soil in Haz Waste Storage Area 1-19-88.pdf

6.2.4.1 CRP Grease Tanker and Drum Storage Area

Description and Historical Use

The CRP Grease Tanker and Drum Storage Area was located inside the railroad loop, east of the Paint Shack (Figure 3 and Figure 8). There were two grease tankers that provided grease for control of corrosion of the steel tendons in the Reactor Building. The grease tankers and drums have been removed.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents, RCRA Metals, and Volatile Organic Compounds.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from this area to the environment has been identified. Grease in the tankers is a semisolid material with a melting point of 135 degrees F. However, the storage area is unpaved, it is estimated that more than fifty drums were stored there and the contents of the drums are unknown. Based on the volume of hazardous material potentially stored in the CRP Grease Tanker and Drum Storage Area, this area is assigned a preliminary classification of NR Class 3.

Data Gaps

- Chemical analyses of soil and groundwater samples for petroleum constituents, heavy metals and volatile organic compounds.

6.2.4.2 Hazardous Material Storage Buildings

Description and Historical Use
There are three hazardous material storage buildings in the southeast corner of the South Berm (Figure 3 and Figure 8). These buildings have steel siding and roofs and are each about the size of a SeaLand container. The buildings store small containers and a few drums of spent solvents, oily rags, waste oil, universal wastes and other hazardous wastes. The surface in the area of the buildings is paved with asphalt. The buildings are locked and contain spill pans in the floors to provide secondary containment.

Known and Potential Contaminants
The non-radiological contaminants are Acids-Bases, Waste Oil Constituents, Laboratory Chemicals, Oil-Soaked Rags, Universal Wastes, and Spent Solvents. Because of its location within a 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
- Asphalt
- Soil
- Groundwater

Preliminary Classification
No record of a significant spill from these buildings to the environment has been identified. The buildings are RCRA waste storage areas and will require final closure in accordance with RCRA regulations. Based on the types of materials stored there is the potential that contaminants could be detected at concentrations likely less than but potentially approaching those of the site release criteria. For this reason, a preliminary classification of NR Class 2 is assigned to the area of these buildings.

Data Gaps
- Chemical analysis of soil and groundwater samples for the potential contaminants.

6.2.4.3 Issue Warehouse

Description and Historical Use

The Issue Warehouse is located east of the PAB/TSC and north of the Maintenance Training Facility (Figure 3 and Figure 8). Chemicals and petroleum products that were formerly stored in the now removed Chemical Warehouse are stored in this building.

Approximately twenty drums of virgin oils currently are stored in racks equipped with spill pans. Several steel cabinets contain small containers of acids, oxidizers or flammable materials. Containers of paint, cleaners, solvents and laboratory chemicals no more than five gallons in capacity are stored on pallets with spill pans.

Known and Potential Contaminants

The non-radiological contaminants are Acids-Bases, Petroleum Products, Sodium Hypochlorite, Laboratory Chemicals, 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 Surfaces
- Concrete

Preliminary Classification

No record of a release of hazardous material from this building to the environment has been identified. It is unlikely that hazardous materials that may have been released in the Issue Warehouse would be detectable in the environment at concentrations greater than a small fraction of the site release criteria. For this reason, the Issue Warehouse is assigned a preliminary classification of NR Class 3.

Data Gaps

None

6.2.5 Exterior Areas

6.2.5.1 Area Surrounding RMSW G

Description and Historical Use

RMSW G is located outside of the PA, south of the Maintenance Training Facility (Figure 3 and Figure 8). The area around the building was formerly fenced and is where contaminated turbine components were processed. These activities included use of a Sandblast Booth. No activities are ongoing in the formerly fenced area.

Known and Potential Contaminants

The non-radiological contaminant is RCRA Metals.

Potentially Contaminated Media

- Sandblast Grit
- Soil
- Groundwater
- Asphalt

Preliminary Classification

No record of a significant spill from this area to the environment has been identified. Based on the past use of a Sandblast Booth in the area there is the potential that residual contaminants could be detected in environmental samples, but probably at levels not exceeding a small fraction of the site release criteria. For this reason, a preliminary classification of NR Class 3 is assigned to the area surrounding RMSW G.

Data Gaps

- Chemical analysis of soil and groundwater samples for RCRA metals.

Supporting Documents

None

6.2.5.2 Construction Debris Dump

Description and Historical Use

The Construction Debris Dump is located inside the Railroad Loop, south of the coal conveyor (Figure 3 and Figure 8). Soil excavated during various construction projects at the station has been staged there. Debris was removed from the area during the 1990s and radiological surveys were completed but no soil or groundwater samples were analyzed for potential non-radiological contaminants.

Material currently in this area includes two large stockpiles; one of 1.5-inch crushed stone (gneiss) and one of limy soil and limestone. Other material in the area includes approximately 100 dump truck load-sized piles of crushed limestone, various piles of large concrete pieces, timber cribbing, large diameter steel and concrete pipe, asphalt and scrap metal. There is no indication of the presence of hazardous materials.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents, RCRA Metals, and Asbestos.

Potentially Contaminated Media

- Soil
- Asphalt
- Building Materials
- Concrete
- Groundwater

Preliminary Classification

No record of a significant spill from this area to the environment has been identified. Based on the types of material placed in the Construction Debris Dump and the uncontrolled method of storage, a preliminary classification of NR Class 3 has been assigned to this area.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminates.

Supporting Documents

None

6.2.5.3 East Berm

Description and Historical Use

The entire power block area is constructed on a berm whose elevation is approximately twenty-one (21) feet higher than the surrounding facilities. The berm provides protection against the originally estimated maximum storm surge and wave height that would result from the maximum probable storm.

The East Berm (Figure 4) encompasses the area east of the Security CAS Building, the Control Complex, the Maintenance Shops and the Auxiliary Building. Small spills or leaks of diesel fuel and hydraulic oil have occurred in this area during the operating history of the station. These spills and leaks were immediately isolated and cleaned up. A dry cleaning facility for cleaning protective clothing was operated in this area (Subsection 6.2.3.4).

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents, RCRA Metals, and Solvents.

Potentially Contaminated Media

- Soil
- Groundwater
- Sediment

Preliminary Classification

Because the East Berm is subject to weathering there is some potential that residual contaminants from past spills could be mobilized by wind and rain and be detectable in soil, sediment or groundwater. These contaminants probably would be detectable at levels not exceeding a small fraction of the site release criteria. For this reason, a preliminary classification of NR Class 3 is assigned to the area of the East Berm.

Data Gaps

- Chemical analysis of soil, sediment, and groundwater samples for the potential contaminants.

Supporting Documents

AR00061143 Morpholine Spill on East Berm.TIF
AR00234946 Chemical Spill on Berm While Spraying Weeds.TIF
AR00312383 Fluid Found Under Forklift 7154.TIF
AR00682781 JLG Man Lift Oil Leak 4-21-14.pdf

6.2.5.4 Firing Range

Description and Historical Use

The Firing Range is located west of the coal ash storage area for CR1/2, near the north bank of the Intake Canal (Figure 2 and Figure 7). The Firing Range is an active facility used for weapons training by the station security force. Lead bullets fired during training accumulate within a soil berm at the western end of the facility. This berm was remediated in 2012. The Environmental Stewardship Plan for this facility specifies that to minimize the potential for groundwater contamination lead abatement activities should be completed on a five-year cycle or as determined by a contractor [14]. The CR3 Environmental Coordinator has reported that, going forward, lead abatement activities will be completed on a 10-year cycle.

Known and Potential Contaminants

The non-radiological contaminant is Lead.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from this area to the environment has been identified. Because of the known presence of lead in the soil of the Firing Range berm and the potential for associated groundwater contamination, a preliminary classification of NR Class 1 is assigned to this facility.

Data Gaps

- Chemical analysis of soil and groundwater samples for lead.

Supporting Documents

2011 Firing Range Lead Analysis Results.pdf
2012 Firing Range TCLP Results.pdf
Shooting Range Environmental Stewardship Plan.docx
Shooting Range Location.pdf

6.2.5.5 North Berm

Description and Historical Use
The entire power block area is constructed on a berm whose elevation is approximately twenty-one (21) feet higher than the surrounding facilities. The berm provides protection against the originally estimated maximum storm surge and wave height that would result from the maximum probable storm.

The North Berm (Figure 4) encompasses the area north of the Turbine Building and the Rusty Building, and includes the Transformer Bays. Small spills or leaks of diesel fuel and hydraulic oil have occurred in this area during the operating history of the station. These spills and leaks were immediately isolated and cleaned up.

Known and Potential Contaminants
The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media
- Soil
- Groundwater

Preliminary Classification
Because the North Berm is subject to weathering there is some potential that residual contaminants from past spills could be mobilized by wind and rain and be detectable in soil, sediment or groundwater. These contaminants probably would be detectable at levels not exceeding a small fraction of the site release criteria. For this reason, a preliminary classification of NR Class 3 is assigned to the area of the North Berm.

Data Gaps
- Chemical analysis of soil, sediment, and groundwater samples for the potential contaminants.

Supporting Documents
AR00234946 Chemical Spill on Berm While Spraying Weeds.TIF
AR00389468 Oil Sheen on Berm near Spare Transformer.TIF
Portable Diesel Air Compressor Fuel Spill 4-2-80.pdf
Portable Diesel Air Compressor Fuel Spill 6-13-80.pdf

6.2.5.6 Settling Ponds

Description and Historical Use

The East and West Settling Ponds are located west of the PA, near the south bank of the Discharge Canal and west of the large circular tanks that formerly stored oil for CR1/2 (Figure 2 and Figure 7). Effluent from the Sewage Treatment Plant that serves Units 1, 2 and 3 is discharged to these ponds. Effluent from SDT-1Tank has also been discharged to the ponds on a few occasions when the effluent quality did not comply with the station's NPDES permit criteria. The Settling Ponds were flooded in 1993 during the "No Name" storm.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents, RCRA Metals, Hydrazine and Nalco, a water-treatment chemical.

Potentially Contaminated Media

- Sediment
- Groundwater

Preliminary Classification

No record of a significant spill from this area to the environment has been identified. Based on the types of wastewater discharged to the Settling Ponds, a preliminary classification of NR Class 2 has been assigned to this area.

Data Gaps

- Chemical analysis of sediment and groundwater for the potential contaminants.

Supporting Documents

AR00043635 Settling Pond Discharge Line Damaged.TIF
AR00336603 RB Hydro Demo Release to Settling Ponds.TIF
Leaks in Drain Line to Settling Pond.doc
NALCO.pdf
SD Line Plan.doc
SD Line Repair Logic.xls
SD Line to settling ponds.doc
SD System Buried Piping information.docx

6.2.5.7 South Berm

Description and Historical Use

The entire power block area is constructed on a berm whose elevation is approximately twenty-one (21) feet higher than the surrounding facilities. The berm provides protection against the originally estimated maximum storm surge and wave height that would result from the maximum probable storm.

The South Berm (Figure 4) encompasses the area south of the Reactor Building and the Auxiliary Building. Small spills or leaks of diesel fuel and hydraulic oil have occurred in this area during the operating history of the station. These spills and leaks were immediately isolated and cleaned up. A dry cleaning facility for cleaning protective clothing was operated in this area (Subsection 6.2.3.4).

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents, RCRA Metals, and Solvents.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the South Berm is open to the weather there is some potential that residual contaminants from past spills could be mobilized by wind and rain and be detectable in soil, sediment or groundwater. These contaminants probably would be detectable at levels not exceeding a small fraction of the site release criteria. For this reason, a preliminary classification of NR Class 3 is assigned to the area of the South Berm.

Data Gaps

- Chemical analysis of soil, sediment, and groundwater samples for the potential contaminants.

Supporting Documents

AR00067665 Hydrazine Spill on Berm.TIF
AR00088523 Ethylene Glycol Spill on SE Berm.TIF
AR00234946 Chemical Spill on Berm While Spraying Weeds.TIF
AR00366105 Minor Hydraulic Oil Spill on South Berm.TIF
AR00554989 Crane Leaking Coolant on S Berm 8-14-12.pdf
AR00694175 Hydraulic Oil Leak from Truck at RB Equipment Hatch 6-19-14.pdf
AR00714933 Truck Power Steering Fluid Leak 10-23-14.pdf
Hydraulic Oil Spill 10-5-2010.pdf

6.2.5.8 Station Drain Tank Effluent Pipe Leak Area

Description and Historical Use

The Station Drain Tank Effluent Pipe Leak Area is located on the side of the roadway between CR1/2, south of the Discharge Canal (Figure 2 and Figure 7). The contents of the tank normally was routed to the Discharge Canal, except when sampling of the tank indicated that its contents did not meet the discharge criteria in the CR3 NPDES permit. Under those circumstances the tank contents would be discharged to the Settling Ponds west of CR1/2 by way of an eight-inch diameter fiberglass pipeline that runs along the roadway. The pipe runs underground from CR3 to the point where it joins the effluent pipe from the Sewage Treatment Plant for Units 1, 2 and 3.

In June 2001 the underground portion of the pipeline on the side of the roadway between CR1/2 was damaged while excavating in the area. Discharge through the pipe was not occurring at the time of the pipe break but stagnant water drained from the broken pipe into the excavation. A vacuum truck removed the standing water in the excavation and transported it to the Settling Ponds. After review of the discharge permit for the last discharge through the pipeline it was determined that the spill did not create a radiological or non-radiological environmental impact.

A previous leak in the piping from SDT-1 was discovered in April 1998 on the West Berm. The leak was underground and occurred at a pipe elbow that had been improperly glued and fitted at the time of installation. Although the pipe joint apparently had been leaking since the time of plant startup both CR3 and the FDEP determined that no significant environmental impact resulted.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

The area of the pipe leak is subject to weathering and there is some potential that residual contaminants from the spill could be mobilized by wind and rain and be detectable in nearby soil, sediment or groundwater. The area of the spill has been remediated but there is the potential that residual contamination at levels no greater than a small fraction of the site release criteria may remain in the local soil or groundwater. For this reason, a preliminary classification of NR Class 3 has been assigned to the area of the pipe leak.

Data Gaps

- Chemical analysis of soil and groundwater for petroleum constituents and RCRA metals.

Supporting Documents

AR00043635 Settling Pond Discharge Line Damaged.TIF
AR00072099 SDT-1 Drainline to Settling Pond Break.TIF
Leaks in Drain Line to Settling Pond.doc
PC9802106 Leak in Discharge Piping from SDT-1 to Settling Ponds along West Berm.pdf
SD Line Plan.doc
SD Line Repair Logic.xls
SD Line to settling ponds.doc
SD System Action Plan 1.doc
SD System Buried Piping information.docx

6.2.5.9 Storm Water Retention Ponds

Description and Historical Use

There are two storm water retention ponds: Storm Water Retention Pond A, north of the railroad tracks and west of RMSW G, and Storm Water Retention Pond B, south of the railroad tracks and southeast of Storm Water Retention Pond A (Figure 3 and Figure 8). Retention Pond A collects storm water from the Swamp Area.

A third structure, the Spill Retention Basin, is located south of the railroad tracks and directly south of Storm Water Retention Pond A (Figure 3 and Figure 8). The Spill Retention Basin receives drainage from Storm Water Retention Pond A. A control structure in the Spill Retention Basin allows overflow to Storm Water Retention Pond B.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media

- Sediment
- Groundwater

Preliminary Classification

No record of a significant spill from the Storm Water Retention Ponds or the Spill Retention Basin to the environment has been identified. Because there is the potential that low levels of residual contaminants from vehicle leaks in the eastern part of the PA or small spills in other areas of the station may have been mobilized by storm water, the areas of the ponds and basin are assigned a preliminary classification of NR Class 3.

Data Gaps

- Chemical analysis of soil, sediment, and groundwater samples for the potential contaminants.

Supporting Documents

None

6.2.5.10 Swamp Area

Description and Historical Use

The Swamp Area is in the eastern portion of the PA, south of the PAB/TSC and east of the East Berm (Figure 3 and Figure 8). The ISFSI currently is under construction in the Swamp Area. This area of the station is approximately twenty-one (21) feet lower in elevation than the buildings of the power block, which are on the Berm. Storm water from the East Berm is collected in two catch basins and discharged to the Swamp Area.

An unlined, bermed catchment area in the northwest corner of the Swamp Area receives drainage from the Transformer Bays on the North Berm. Storm water and leaks of dielectric oil from the transformers were collected in this catchment area.

In September 1989 approximately 200 gallons of diesel fuel were spilled to the Swamp Area from a 500-gallon Aboveground Storage Tank (AST) for a diesel-driven air compressor. The spill was remediated by excavating and shipping approximately seventy five cubic yards of contaminated soil to an approved off-site facility. Low levels of diesel fuel constituents were detected in a groundwater sample from a monitoring well installed next to the remediated area. The FDEP closed the spill in 1990.

Known and Potential Contaminants

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

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

There is the potential that residual contaminants mobilized by storm water from the East Berm may have been discharged to the Swamp Area. Impacts to soil or groundwater quality also may have occurred in the area of the bermed catchment in the northeast corner of the Swamp Area due to leaks of dielectric oil from the station transformers. The spill of approximately 200 gallons of diesel fuel was cleaned up in 1989 and the incident has been closed by the FDEP.

Soil samples were collected from the Swamp Area circa 2010 prior to placing fill for construction of the ISFSI. Analysis of these samples did not identify non-radiological contaminants at levels above presumed action levels. However, no groundwater samples were analyzed. For these reasons, a preliminary classification of NR Class 2 is assigned to this area.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants.

Supporting Documents

100276-0100 PE Crystal River SoilResults.pdf
AR00287789 Hydraulic Fluid Leak on Fork Lift.TIF
AR00322908 Hydraulic Line Ruptured on Manlift in Swamp.TIF
AR00692913 Hydraulic Oil Leak from Dump Trailer 6-12-14.pdf
Diesel Fuel Spill into AST Secondary Containment 2-7-90.pdf
Diesel Spills 12-20-89 and 9-27-89.pdf

6.2.5.11 Switch Yard

Description and Historical Use

The Switch Yard is located north of the Discharge Canal and west of the Main CR3 Parking Lot (Figure 2, Figure 3, Figure 7 and Figure 8). The Switch Yard is where the electrical power produced by Units 1, 2, 3, 4 and 5 is distributed to the power transmission grid. A layer of crushed limestone forms the floor of the Switch Yard. Five oil-cooled circuit breakers, each with capacities of 1,720 gallons of mineral oil and staged within concrete containments, are in use in the Switch Yard but none are related to activities at CR3.

An Off Site Power Transformer to provide power to CR3 is located in the Switch Yard. This transformer contains 9,430 gallons of mineral oil and is located within a concrete containment. Two gas-cooled circuit breakers are connected to the Off Site Power Transformer.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from the Switch Yard to the environment has been identified. However, there is the potential that dielectric oil could have been released from the Off Site Power Transformer or oil-cooled circuit breakers in the Switch Yard. For this reason a preliminary classification of NR Class 3 has been assigned to this area.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants.

Supporting Documents

AR00217211 Oil Leak in 500 KV Yard.TIF

6.2.5.12 Unit 4 and 5 Coal Ash Storage Area

Description and Historical Use

Unit 4 and 5 Coal Ash Storage Area is a large coal ash storage area east of Units 4 and 5 (Figure 2 and Figure 7). Sediment dredged from the Settling Ponds was deposited in a portion of this area.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media

- Sediment
- Groundwater

Preliminary Classification

No record of a significant spill from this area to the environment has been identified. Because the dredge spoils deposited in this location may contain non-radiological contaminants there is a potential that these contaminants could be detectable in the nearby soil or groundwater. However, the volume of dredge spoils placed there is a small fraction of the coal ash stored in this location and it is reasonable to assume that any residual contaminants in the dredge spoil would be detectable at only a small fraction of the site release criteria. For this reason, a preliminary classification of NR Class 3 is assigned to Unit 4 and 5 Coal Ash Storage Area.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants.

Supporting Documents

None

6.2.5.13 West Berm

Description and Historical Use

The entire power block area is constructed on a berm whose elevation is approximately twenty-one (21) feet higher than the surrounding facilities. The berm provides protection against the originally estimated maximum storm surge and wave height that would result from the maximum probable storm.

The West Berm (Figure 4) encompasses the area west of the Turbine Building, Reactor Building and the Fire Service Pump House. Small spills or leaks of diesel fuel and hydraulic oil have occurred in this area during the operating history of the station. These spills and leaks were immediately isolated and cleaned up.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

Because the West Berm is open to the weather there is some potential that residual contaminants from past spills could be mobilized by wind and rain and be detectable in soil, sediment or groundwater. These contaminants probably would be detectable at levels not exceeding a small fraction of the site release criteria. For this reason, a preliminary classification of NR Class 3 is assigned to the area of the West Berm.

Data Gaps

- Chemical analysis of soil, sediment, and groundwater samples for the potential contaminants.

Supporting Documents

AR00234946 Chemical Spill on Berm While Spraying Weeds.TIF
AR00724987 Hydraulic Fluid on W Berm 12-29-14.pdf

6.2.6 Oil-Filled Mechanical Equipment

Oil-Filled Mechanical Equipment Supporting Documents

AR00515017 Hydraulic Oil Leak at S Vehicle Gate 2-6-12.pdf
AR00515996 Diesel Spill Under Mobile Crane 2-9-12.pdf
Diesel Spill From Coal Train 4-27-2010.pdf
Diesel Spill From Mobile Light Plant 9-19-2010.pdf
Hydraulic Oil Spill 10-5-2010.pdf
NaOH Spill 6-22-1994.pdf
NaOH Spill Battery Rm 11-18-1993.pdf

6.2.6.1 Auxiliary Building Elevator

Description and Historical Use

A hydraulically operated elevator has been in service in the Auxiliary Building (Figure 3 and Figure 8) during the operating history of the station. This equipment includes a reservoir containing hydraulic oil.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. Because of its location within a building, 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

No record of a significant spill from the Auxiliary Building Elevator to the environment has been identified. Any spill that might occur would likely be fully contained within the building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the Auxiliary Building Elevator.

Data Gaps

- Visual inspection of the elevator mechanical equipment to identify indications of leaking hydraulic oil.

6.2.6.2 Conference and Cafeteria Building Elevator

Description and Historical Use

A hydraulically operated elevator has been in service in the CCB (Figure 3 and Figure 8) during the operating history of the building. This equipment includes a reservoir containing hydraulic oil.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. Because of its location within a building, 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

No record of a significant spill from the CCB Elevator to the environment has been identified. Any spill that might occur would likely be fully contained within the building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the Conference and Cafeteria Building Elevator.

Data Gaps

- Visual inspection of the elevator mechanical equipment to identify indications of leaking hydraulic oil.

6.2.6.3 Control Complex Elevator

Description and Historical Use

A hydraulically operated elevator has been in service in the Control Complex Building (Figure 3 and Figure 8) during the operating history of the station. This equipment includes a reservoir containing hydraulic oil.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. Because of its location within a building, 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

No record of a significant spill from the Control Complex Building Elevator to the environment has been identified. Any spill that might occur would likely be fully contained within the building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the Control Complex Building Elevator.

Data Gaps

- Visual inspection of the elevator mechanical equipment to identify indications of leaking hydraulic oil.

6.2.6.4 Feedwater Pump Motors

Description and Historical Use

Feedwater Pumps and their motors containing lubricating oil are located in the Turbine Building and the Intermediate Building (Figure 3 and Figure 8). The pumps have been retired permanently and the motor oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. Because of its location within a building, 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

Preliminary Classification

No record of a significant spill from the Feedwater Pump Motors to the environment has been identified. Any spill that might occur would likely be fully contained within the Turbine Building or Intermediate Building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the area of the Feedwater Pump Motors.

Data Gaps

- Visual inspection of the area of the pump motors to identify indications of leaking lubricating oil.

6.2.6.5 Nuclear Administration Building Elevator

Description and Historical Use

A hydraulically operated elevator has been in service in the NAB (Figure 3 and Figure 8) during the operating history of the station. This equipment includes a reservoir containing hydraulic oil.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. Because of its location within a building, 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

No record of a significant spill from the Nuclear Administration Building Elevator to the environment has been identified. Any spill that might occur would likely be fully contained within the building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the Nuclear Administration Building Elevator.

Data Gaps

- Visual inspection of the elevator mechanical equipment to identify indications of leaking hydraulic oil.

6.2.6.6 Plant Administration Building-Technical Support Center Elevator

Description and Historical Use

A hydraulically operated elevator has been in service in the PAB/TSC (Figure 3 and Figure 8) during the operating history of the station. This equipment includes a reservoir containing hydraulic oil.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. Because of its location within a building, 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

No record of a significant spill from the PAB/TSC Elevator to the environment has been identified. Any spill that might occur would likely be fully contained within the building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the PAB/TSC Elevator.

Data Gaps

- Visual inspection of the elevator mechanical equipment to identify indications of leaking hydraulic oil.

6.2.6.7 Reactor Building Elevator

Description and Historical Use

A hydraulically operated elevator has been in service in the Reactor Building (Figure 3 and Figure 8) during the operating history of the station. This equipment includes a reservoir containing hydraulic oil.

Known and Potential Contaminants

The non-radiological contaminant is Hydraulic Oil. Because of its location within a building, 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

No record of a significant spill from the Reactor Building Elevator to the environment has been identified. Any spill that might occur would likely be fully contained within the building and not cause substantial impact to local soil or groundwater. For these reasons a preliminary classification of NR Class 3 has been assigned to the Reactor Building Elevator.

Data Gaps

- Visual inspection of the elevator mechanical equipment to identify indications of leaking hydraulic oil.

6.2.6.8 Reactor Coolant Pump Motors

Description and Historical Use

Reactor Coolant Pumps and Motors are located in the Reactor Building (Figure 3 and Figure 8). The Reactor Coolant Pump Motors each contained 190 gallons of lubricating oil. The pumps have been retired permanently and the motor oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil. Because of its location within a building, 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

Preliminary Classification

No record of a significant spill from the Reactor Coolant Pump Motors to the environment has been identified. Any spill that might occur would likely be fully contained within the Reactor Building and not cause substantial impact to local soil or groundwater. For these reasons, a preliminary classification of NR Class 3 has been assigned to the area of the Reactor Coolant Pump Motors.

Data Gaps

- Visual inspection of the area of the pump motors to identify indications of leaking lubricating oil.

6.2.7 Storage Tanks

Storage Tanks Supporting Documents

AR00093167 Storage Tanks did not meet PT-356 Requirements.TIF
AR00111233 Oil Water Separator Tank SDS-1 Leaking.TIF
AR00217570 IAP-4 Fuel Tank Overflow due to tanks not equalized.TIF
AR00217692 High Particulate in FO Storage Tanks DFT-1B and FST-2B.TIF
AR00253129 Water and Oil in DFT-1A Sandpipe Area.TIF
AR00306686 TSC Diesel Fuel Oil Spill.TIF
DFT-4 & DFT-5 Fuel Oil Removal.docx
Diesel Fuel Spill into AST Secondary Containment 2-7-90.pdf
Diesel Fuel Spill onto Pervious Surface 7-18-91.pdf
Diesel Spills 12-20-89 and 9-27-89.pdf
FDEP Tank Database.xlsx
FDEP Tank Inventory.pdf
FDEP Tanks with Discharges.xlsx
Lube Oil Under Storage Tank in TB 11-23-82.pdf
Lube Oil Under Storage Tank in TB 2-28-81.pdf
NOTC Diesel AST.pdf
OP-407N SDT-1 release 223729.TIF
OP-407-N, Liquid Releases from the Secondary Plant.pdf
Portable Diesel Air Compressor Fuel Spill 4-2-80.pdf
Portable Diesel Air Compressor Fuel Spill 6-13-80.pdf
SD System Action Plan 1.doc

6.2.7.1 ACP Diesel Generator Fuel Tank

Description and Historical Use

The Access Control Point (ACP) Diesel Generator Fuel Tank is an approximately 275-gallon steel above ground tank providing diesel fuel for the stand-by generator at the security control point on the plant access road. The generator and fuel tank were visually inspected and determined to be leak free when they and the remainder of the ACP were turned over to the control of Duke Corporate Security in 2014.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from the ACP Diesel Generator Fuel Tank to the environment has been identified. Because the tank is an above ground tank and a visual inspection of the tank and its vicinity showed it to be leak free, and because the tank is no longer associated with CR3 and its use and control has been turned over to Duke Corporate Security, a preliminary classification of NR Non-Impacted has been assigned to the area of the tank.

Data Gaps

None

6.2.7.2 B.5.b Diesel Water Pump Fuel Tank

Description and Historical Use

The B.5.b Diesel Water Pump Fuel Tank is a 240-gallon trailer-mounted, double-walled AST inside a concrete containment near the Intake Structure (Figure 5 and Figure 9). The pump and tank are in service. The portable pump and tank were required by the NRC following the September 2001 terror attacks in New York and Washington, D.C. Their purpose is to provide additional capability to supply water for cooling the reactor core and spent fuel pool in the event of a "beyond design basis accident" such as loss of large areas of the plant due to explosions or fire.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the B.5.b Diesel Water Pump Fuel Tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.3 DFT-1A

Description and Historical Use

DFT-1A is a 30,000-gallon underground tank storing diesel fuel for Emergency Diesel Generator A. The tank is located on the East Berm, outside of the Diesel Generator Building at the southeast corner of the Auxiliary Building (Figure 5 and Figure 9). Emergency Diesel Generator A is no longer in service and its tank has been drained.

The tank is cathodically protected and is surrounded by crushed limestone within a concrete containment. During its operating history the contents of the tank were sampled periodically and analyzed for water and sediment to provide an indication of a leak.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from DFT-1A to the environment has been identified. Because DFT-1A is an underground tank that previously stored a large volume of fuel with the potential for spills and overfills, a preliminary classification of NR Class 1 has been assigned to the area of the tank.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants in the area of the tank.

6.2.7.4 DFT-1B

Description and Historical Use

DFT-1B is a 30,000-gallon underground tank storing diesel fuel for Emergency Diesel Generator B. The tank is located on the East Berm, next to DFT-1A, outside of the Diesel Generator Building at the southeast corner of the Auxiliary Building (Figure 5 and Figure 9). The tank is in service.

The tank is cathodically protected and is surrounded by crushed limestone within a concrete containment. During its operating history the contents of the tank were sampled periodically and analyzed for water and sediment to provide an indication of a leak.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from DFT-1B to the environment has been identified. Because DFT-1B is an underground tank storing a large volume of fuel with the potential for spills and overfills, a preliminary classification of NR Class 1 has been assigned to the area of the tank.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants in the area of the tank.

6.2.7.5 DFT-4

Description and Historical Use

DFT-4 is a single-walled 13,750-gallon above ground diesel fuel tank for the Emergency Feedwater Pump 3. The tank and pump are located in the Emergency Feedwater Pump 3 Building in the southwest corner of the South Berm, southwest of the Reactor Building (Figure 5 and Figure 9). The pump is no longer in service and the tank has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from DFT-4 to the environment has been identified. Minor spills and overfills of the tank that may have occurred would have been entirely contained within the Emergency Feedwater Pump 3 Building. However, because of the volume of fuel formerly stored in the tank and the potential for residual contamination, a preliminary classification of NR Class 2 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.6 DFT-5

Description and Historical Use

DFT-5 is a double-walled 10,000-gallon above ground diesel fuel tank for the Alternate AC Diesel Generator. The tank is located within a concrete secondary containment structure immediately east of the Alternate AC Diesel Generator Building, which is off the South Berm (Figure 5 and Figure 9). The tank was installed in 2005 and is now permanently retired and drained.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the Alternate AC Diesel Generator Fuel Tank to the environment has been identified. Based on the volume of diesel fuel stored and the potential for overfills, a preliminary classification of NR Class 2 is assigned to this tank.

Data Gaps

None

6.2.7.7 Diesel Generator A Fuel Day Tank

Description and Historical Use

Diesel Generator A Fuel Day Tank is an AST located in the Diesel Generator Building at the southeast corner of the Auxiliary Building (Figure 5 and Figure 9). The purpose of the day tank is to provide sufficient fuel for operation of the diesel generator for a few hours while limiting the volume of fuel that could spill or cause a fire near the generator. Diesel Generator A is no longer in service and its day tank has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the Diesel Generator A Fuel Day Tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.8 Diesel Generator B Fuel Day Tank

Description and Historical Use

Diesel Generator B Fuel Day Tank is an AST located in the Diesel Generator Building at the southeast corner of the Auxiliary Building (Figure 5 and Figure 9). The purpose of the day tank is to provide sufficient fuel for operation of the diesel generator for a few hours while limiting the volume of fuel that could spill or cause a fire near the generator. Diesel Generator B and its day tank are in service.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the Diesel Generator B Fuel Day Tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.9 EHC Fluid Tank

Description and Historical Use

The EHC Fluid Tank is an AST located in the northwest corner of the Turbine Deck. The tank contains high pressure, fire-resistant electrohydraulic control fluid (Fyrquel®) used to control high-pressure steam valves on the Turbine.

Known and Potential Contaminants

The non-radiological contaminant is Electrohydraulic Control Fluid. Because of its location within a building, 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
- Tank Interior
- Piping

Preliminary Classification

The EHC Fluid Tank is located within the Turbine Building and no record of a significant spill from the tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.10 Fire Service Pump A Fuel Tank

Description and Historical Use

The Fire Service Pump A Fuel Tank is an approximately 275-gallon above ground storage tank located on the West Berm in the Fire Service Pump House (Figure 3, Figure 5, Figure 8 and Figure 9). The pump and tank are in service and contained within concrete containments.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel and Petroleum Constituents. Because of its location within a 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

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.11 Fire Service Pump B Fuel Tank

Description and Historical Use

The Fire Service Pump B Fuel Tank is an approximately 550-gallon above ground storage tank located on the West Berm in the Fire Service Pump House (Figure 3, Figure 5, Figure 8 and Figure 9). The pump and tank are in service and contained within concrete containments.

Known and Potential Contaminants

The non-radiological contaminants are Diesel Fuel and Petroleum Constituents. Because of its location within a 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

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.12 Hydrazine Feed Tank

Description and Historical Use
The Hydrazine Feed Tank is an above ground storage tank in the Auxiliary Building (Figure 3 and Figure 8). Hydrazine was injected into the reactor coolant to scavenge oxygen and inhibit corrosion.

Known and Potential Contaminants
The non-radiological contaminant is Hydrazine. Because of its location within a building, 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
- Tank Interior
- Piping

Preliminary Classification
The Hydrazine Feed Tank is located within the Auxiliary Building and no record of a significant spill from the tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps
None

6.2.7.13 IAP-4

Description and Historical Use

IAP-4 was a 500-gallon AST containing fuel for a diesel-driven air compressor. The tank was double-walled and located within a concrete containment on the North Berm, near the easternmost of the transformer bays (Figure 5 and Figure 9). The air compressor and tank have been removed from the station.

In September 1989 approximately 200 gallons of fuel spilled from the tank when its Tygon sight tube became disconnected. The spilled fuel drained to the bermed catchment area in the northwest corner of the Swamp Area. Remediation of the spill was completed when approximately 75 cubic yards of contaminated soil was excavated and transported to an approved off-site facility for disposal. The FDEP has closed the spill.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

Because it is likely that any remaining residual contamination from IAP-4 would be detectable at concentrations no greater than a small fraction of the site release criteria, a preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.14 LOT-1

Description and Historical Use

LOT-1 is a 25,100-gallon Underground Storage Tank (UST) that stored lubricating oil for the Turbine. The tank was installed in 1971, replaced in 2009, and is now drained and permanently out of service. LOT-1 was normally empty except when oil was being transferred from the Turbine Lubricating Oil Reservoir (LOT-2) during outages. LOT-1 is located within a below-grade vault on the West Berm outside of the Turbine Building (Figure 5 and Figure 9). The tank has overflowed in the past but it has been reported that oil never escaped the vault.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

Based on the volume of oil stored in LOT-1, the potential for overfills and its operating history, a preliminary classification of NR Class 1 has been assigned to the area of the tank.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants.

6.2.7.15 LOT-2

Description and Historical Use

LOT-2 is a 25,000-gallon reservoir for turbine lubricating oil. The reservoir is located within a concrete containment on the floor of the Turbine Building basement (Figure 5 and Figure 9). LOT-2 is permanently out of service and has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Lubricating Oil Constituents. Because of its location within a building, 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
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from LOT-2 to the environment has been identified. Spills from LOT-2 most likely would have been fully contained within the Turbine Building and collected within the Turbine Building Sump. Because of its size a preliminary classification of NR Class 2, has been assigned to LOT-2

Data Gaps

None

6.2.7.16 MET-1

Description and Historical Use

MET-1 is a 1,500-gallon UST storing diesel fuel for the PAB/TSC Generator. The tank is in service and is located inside the PA, east of the PAB/TSC (Figure 5 and Figure 9).

MET-1 is cathodically protected and is surrounded by crushed limestone within a concrete containment. During its operating history the contents of the tank were sampled periodically and analyzed for water and sediment to provide an indication of a leak.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MET-1 to the environment has been identified. Because MET-1 is an underground tank storing a large volume of fuel with the potential for spills and overfills, a preliminary classification of NR Class 1 has been assigned to the area of the tank.

Data Gaps

- Chemical analysis of soil and groundwater samples for the potential contaminants in the area of the tank.

6.2.7.17 MET-2

Description and Historical Use

MET-2 is the diesel fuel day tank for the PAB/TSC Diesel Generator. The tank is in service. The tank is within a concrete containment in the lower level of the PAB/TSC (Figure 5 and Figure 9).

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents. Because of its location within a building, 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

No record of a significant spill from MET-2 to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.18 NSOC Diesel Generator Fuel Tank

Description and Historical Use

The Nuclear Security Operations Center Diesel Generator Fuel Tank is a 350-gallon AST located outside the southern wall of the NSOC (Figure 5 and Figure 9), the checkpoint for personnel gaining access to the PA. The tank is within a concrete containment structure and is in service.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Concrete
- Soil
- Groundwater
- Tank Interior
- Piping

Preliminary Classification

No record of a significant spill from the NSOC Diesel Generator Fuel Tank to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the area of the tank.

Data Gaps

None

6.2.7.19 Poly Tanks

Description and Historical Use

Portable polyethylene tanks with capacities ranging from approximately 200 to 500 gallons are staged at various locations on the Berms. Storm water and groundwater that accumulates in underground cable trays and duct banks is pumped to these tanks periodically. The contents of the tanks are sampled, analyzed, and released to local storm drains if the water quality complies with the criteria in the station NPDES Permit.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals.

Potentially Contaminated Media

- Groundwater

Preliminary Classification

No record of a significant spill from the Poly Tanks to the environment has been identified. A preliminary classification of NR Class 3 has been assigned to the areas of the tanks.

Data Gaps

None

6.2.7.20 SAB Diesel Generator Fuel Tank

Description and Historical Use

The Site Administration Building (SAB) Diesel Generator Fuel Tank is an approximately 275-gallon steel above ground tank providing diesel fuel for the stand-by generator at the SAB on the plant access road. The generator and fuel tank were visually inspected and determined to be leak free when they and the remainder of the SAB were turned over to the control of the Duke fossil plants in 2014.

Known and Potential Contaminants

The non-radiological contaminant is Diesel Fuel Constituents.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from the SAB Diesel Generator Fuel Tank to the environment has been identified. Because the tank is an above ground tank and a visual inspection of the tank and its vicinity showed it to be leak free; and because the tank is no longer associated with CR3 and its use and control have been transferred to the Duke fossil plants, a preliminary classification of NR Non-Impacted has been assigned to the area of the tank.

Data Gaps

None

6.2.7.21 SDT-1

Description and Historical Use

SDT-1 is the Station Drain Tank. The tank is in service. This tank is a 100,000-gallon AST located on the West Berm outside of the Turbine Building (Figure 5 and Figure 9). The Turbine Building Sump discharges through an oil-water separator to SDT-1. The contents of this tank normally is batch released to the Discharge Canal, except when the station NPDES permit limits are not achieved and discharge is to the Settling Ponds (Subsection 6.2.5.6). A hole in the tank bottom discovered during an internal tank inspection was repaired.

Known and Potential Contaminants

The non-radiological contaminants are RCRA Metals, Petroleum Constituents, and Hydrazine.

Potentially Contaminated Media

- Sludge
- Tank Interior
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from SDT-1 to the environment has been identified. Based on its past and current use, the area of SDT-1 is assigned a preliminary classification of NR Class 2.

Data Gaps

- Chemical analysis of sludge, soil and groundwater samples for the potential contaminants.

6.2.7.22 Turbine Building Sump Oil and Water Separator

Description and Historical Use

The Turbine Building Sump Oil and Water Separator is in the basement of the Turbine Building (Figure 3 and Figure 8). The separator receives wastewater collected in the Turbine Building Sump and removes immiscible non-aqueous liquids such as lubricating oil, fuel oil and other petroleum products.

These immiscible liquids are pumped to a 55-gallon drum and transported off site for disposal. The separated wastewater is pumped to SDT-1. Samples from SDT-1 are analyzed and its contents are discharged to the Discharge Canal if the water quality complies with the station's NPDES Permit criteria; otherwise the wastewater is pumped to the Settling Ponds.

Known and Potential Contaminants

The non-radiological contaminants are Petroleum Constituents and RCRA Metals. Because of its location within a 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

- Concrete
- Sludge
- Tank Interior
- Piping

Preliminary Classification

Overflow of the 55-gallon drum to which immiscible liquids from the Oil and Water Separator are pumped has occurred in the past. These spills have been isolated and immediately cleaned up, with little potential for impact to soil or groundwater. A preliminary classification of NR Class 3 has been assigned to the area of the Turbine Building Sump Oil and Water Separator.

Data Gaps

None

6.2.8 Transformers

Transformers Supporting Documents

AR00265015 Small Oil Leak on MTTR-3A.TIF
AR00274815 Oil Leak from B Step up Transformer.TIF
AR00277615 MTTR-3B Oil Leakage Increased.TIF
AR00278462 Transformer Oil Leak 5-7-08.TIF
AR00315135 MTTR-2 Startup Transformer Low Oil Level and Leakage.TIF
AR00316434 Oil Leak on Auxiliary Transformer.TIF
AR00410140 MTTR-3B Oil Leak from Cooler No 1.TIF
AR00435178 Transformer Oil Pumped to Storm Drain 11-24-10.TIF
AR00728315 Hydraulic Oil Spill at Main Transformer 3A 1-20-15.pdf

6.2.8.1 Concrete Batch Plant Transformers

Description and Historical Use
Four (4) 750 KVA transformers, each containing 313 gallons of mineral oil, were located within a gravel trench containment in the CR3 parking lot (Figure 2 and Figure 7). The transformers powered a concrete batch plant formerly located in the CR3 parking lot. The transformers have been removed from the site.

Known and Potential Contaminants
The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification
No record of a significant spill from the Concrete Batch Plant Transformers to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. Because these transformers contained a relatively small volume of dielectric oil and they have been removed from the site a preliminary classification of NR Class 3 has been assigned to the area of the transformers.

Data Gaps
None

6.2.8.2 Maintenance Training Facility Transformer

Description and Historical Use

The Maintenance Training Facility Transformer is a 500 KVA transformer containing 268 gallons of mineral oil. The transformer is located within a concrete containment at the southeast corner of the Maintenance Training Facility (Figure 5 and Figure 9). The transformer is in service.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from the Maintenance Training Facility Transformer to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. Because this transformer contained a relatively small volume of dielectric oil a preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

None

6.2.8.3 MTSH-3HA

Description and Historical Use

MTSH-3HA is a 500 KVA transformer located near the Intake Structure (Figure 5 and Figure 9) and provided power to the traveling screens and other intake equipment. The transformer is staged within a concrete containment structure. MTSH-3HA was replaced in 2005 and is now out of service.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTSH-3HA to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. Because this transformer contained a relatively small volume of dielectric oil a preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

None

6.2.8.4 MTSH-3HB

Description and Historical Use

MTSH-3HA is a 500 KVA transformer located near the Intake Structure (Figure 5 and Figure 9) and provided power to the traveling screens and other intake equipment. The transformer is staged within a concrete containment structure. MTSH-3HA was replaced in 2005 and is now out of service.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTSH-3HB to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. Because this transformer contained a relatively small volume of dielectric oil a preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

None

6.2.8.5 MTTR-1

Description and Historical Use

MTTR-1 is the station Auxiliary Transformer that transforms off-site power for operating on-site equipment and can also be configured to run on-site equipment with power produced by the station. The transformer is located on the North Berm in a concrete containment bay with a two-foot base of crushed limestone (Figure 5 and Figure 9). Drainage from the containment flows to a bermed catchment in the northwest corner of the Swamp Area. MTTR-1 has a capacity of 6,620 gallons of dielectric oil. The transformer was installed in approximately 1978. MTTR-1 is permanently out of service and has been drained of dielectric oil.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-1 to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the crushed limestone base in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.6 MTTR-2

Description and Historical Use

MTTR-2 is the station Start-Up Transformer. The transformer is located on the North Berm in a concrete containment bay with a two-foot base of crushed limestone (Figure 5 and Figure 9). Drainage from the containment flows to a bermed catchment in the northwest corner of the Swamp Area. MTTR-2 has a capacity of 3,380 gallons of dielectric oil. The transformer was installed in approximately 1978. MTTR-2 is out of service and its oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-2 to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the crushed limestone base in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.7 MTTR-3A

Description and Historical Use

MTTR-3A is the station Generator Step-Up Transformer A. The transformer is located on the North Berm in a concrete containment bay with a two-foot base of crushed limestone (Figure 5 and Figure 9). Drainage from the containment flows to a bermed catchment in the northwest corner of the Swamp Area. MTTR-3A has a capacity of 19,318 gallons of dielectric oil. The transformer was replaced in 2007, is now out of service and its oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-3A to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the crushed limestone base in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.8 MTTR-3B

Description and Historical Use

MTTR-3B is the station Generator Step-Up Transformer B. The transformer is located on the North Berm in a concrete containment bay with a two-foot base of crushed limestone (Figure 5 and Figure 9). Drainage from the containment flows to a bermed catchment in the northwest corner of the Swamp Area. MTTR-3B has a capacity of 19,318 gallons of dielectric oil. The transformer was replaced in 2007, is now out of service and its oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-3B to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the crushed limestone base in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.9 MTTR-3C

Description and Historical Use

MTTR-3C is the station Generator Step-Up Transformer C. The transformer is located on the North Berm in a concrete containment bay with a two-foot base of crushed limestone (Figure 5 and Figure 9). Drainage from the containment flows to a bermed catchment in the northwest corner of the Swamp Area. MTTR-3C has a capacity of 19,318 gallons of dielectric oil. The transformer was replaced in 2007, is now out of service and its oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-3C to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the crushed limestone base in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.10 MTTR-3D

Description and Historical Use

MTTR-3D is the station Generator Step-Up Transformer D. This transformer was a back-up Generator Step-Up Transformer. MTTR-3D is located on the North Berm in a concrete diked area (Figure 5 and Figure 9). Any accumulated dielectric oil inside the dike would have been pumped to the secondary containment of adjacent transformer MTTR-3C, where it would have drained to the bermed catchment in the northwest corner of the Swamp Area. MTTR-3D has a capacity of 19,318 gallons of dielectric oil. The transformer was replaced in 2007, is now out of service and its oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-3D to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the concrete in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.11 MTTR-6

Description and Historical Use

MTTR-6 is the station Backup Engineering Safeguards Transformer (BEST). The transformer is located on the North Berm in a concrete containment bay with a two-foot base of crushed limestone (Figure 5 and Figure 9). Drainage from the containment flows to a bermed catchment in the northwest corner of the Swamp Area. MTTR-6 has a capacity of 8,280 gallons of dielectric oil. The transformer was replaced in 1985, is now out of service and its oil has been drained.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-6 to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 3 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the crushed limestone base in the transformer bay and in the bermed catchment in the Swamp Area to which it drains for the potential contaminants.

6.2.8.12 MTTR-7

Description and Historical Use

MTTR-7 is the Alternate AC Diesel Generator Transformer. The transformer is located off the South Berm, near DFT-5, in a concrete containment bay (Figure 5 and Figure 9). The transformer was installed in 2005 and is in service.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Drain Pipes
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from MTTR-7 to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 2 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the concrete in the transformer bay for the potential contaminants.

6.2.8.13 Off Site Power Transformer

Description and Historical Use

The Off Site Power Transformer is located in the Switch Yard (Figure 2 and Figure 7) and was installed in 1985 in a concrete containment. The transformer provides off site power to the station and has a capacity of 9,430 gallons of mineral oil.

Known and Potential Contaminants

The non-radiological contaminant is Dielectric Oil.

Potentially Contaminated Media

- Gravel
- Soil
- Groundwater

Preliminary Classification

No record of a significant spill from the Off Site Power Transformer to the environment has been identified. However, it is common for transformer bushings and gaskets to develop small leaks with age due to thermal fatigue as the temperature of the dielectric oil varies between periods of operation and periods of outage. A preliminary classification of NR Class 2 has been assigned to the area of the transformer.

Data Gaps

- Chemical analysis of samples of the concrete in the transformer bay for the potential contaminants.

6.3 Radiological Impacts

The approach for sorting historical radiological information collected at CR3 was to divide the data into two review areas, those being:

1. Buildings or Structures
2. Exterior Areas (outside of buildings and structures)

Historical information was collected and reviewed to first classify all areas as either Impacted or Non-Impacted. Impacted areas, buildings, and structures have been given a preliminary MARSSIM classification based on available radiological characterization data, knowledge of historical site operations, and results of personnel interviews. The classification of an area or subsection of an area may be revised when new radiological sample data become available. Appropriate documentation would be provided to justify the revised classification. This subsection and Appendix B contain a summary of all potentially impacted areas, buildings and structures on site at the time this HSA was developed and their preliminary classifications. Figure 2 and Figure 3 show the location and preliminary classification of each exterior area, building, and structure.

Each condition of interest summarized in Appendix B has been assigned a preliminary classification, as described in MARSSIM. Site-specific DCGLs for CR3, which are the basis for classification of radiologically contaminated areas, have not yet been determined. The preliminary classifications listed here and in Appendix B are only estimates of the relative magnitude of radiological contamination that may now exist in an area of interest. In some areas, for example the NSOC, the classification is based solely on knowledge of plant operations and processes, rather than radiological sampling and analysis. In other areas, for example the area outside of the Containment Equipment Hatch, the classification is based on past radiological surveys.

The major structures inside the PA are the Reactor Building, the Turbine Building, the Auxiliary Building, the Intermediate Building, the Maintenance Support Building, the Emergency Diesel Generator Building, The Emergency Feedwater Pump Building, and the Control Complex. Additionally, several office-type buildings exist within the PA, such as the NSOC, PAB, NAB, Security CAS, and the Rusty Building. All buildings and SSCs directly associated with the CR3 nuclear power reactor or associated with handling of related radioactive material are Class 1 areas as they are defined in MARSSIM [1].

Areas designated as Class 1 are very likely to contain radioactive contamination at concentrations greater than the license termination criteria. Remediation of this contamination will require removal and disposal of Radioactive Waste (RW) at a licensed disposal facility if the CR3 site is to be released for unrestricted use and its operating license issued by the U.S. NRC is to be terminated.

6.3.1 Non-Impacted Areas

There are many buildings, structures, and areas which are located within the licensed footprint of the site, namely a 4,400 foot minimum exclusion radius centered on the Reactor Building (Figure 15), but outside of the CR3 Protected Area that are likely to not have been impacted by site operations. However gaseous and particulate emissions from CR3 may have resulted in the presence of low levels of contamination.

A meeting was conducted on February 25, 2016 between the assessment team and station management to discuss an approach to dispositioning those buildings, structures, and areas outside of the Protected Area, that are not specifically identified in this HSA. The meeting minutes are linked below. Furthermore, Section 8 - Recommendations contains a discussion on how to disposition these areas.

Non-Impacted Areas Supporting Documents

HSA Licensed Footprint Meeting Minutes (25Feb2016).pdf

6.3.2 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):

- 2010 Dry Active Waste
- 2014 Dry Active Waste
- 2014 Primary (WDT) Resin
- 2015 Condensate Resin
- 2015 NUS Charcoal Resin

Any radioisotope identified as "positive" by CR3's evaluation of the 10 CFR 61 analyses was included in the master list of ROCs contained in Table 2. In the table, if the fraction remaining is less than 1.0E-06, which roughly corresponds to twenty half-lives, the fraction is reported as zero (0.0E+00).

Table 2: Part 61 Composite List of Positively Identified Radionuclides

		Fraction Remaining After			
Element	**Half-Life (yrs)**	**2 yrs**	**5 yrs**	**10 yrs**	**50 yrs**
Hydrogen-3	1.2E+01	8.9E-01	7.5E-01	5.7E-01	6.0E-02
Carbon-14	5.7E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Manganese-54	8.5E-01	2.0E-01	1.7E-02	3.0E-04	0.0E+00
Iron-55	2.7E+00	6.0E-01	2.8E-01	8.0E-02	3.3E-06
Cobalt-57	7.4E-01	1.6E-01	9.5E-03	9.0E-05	0.0E+00
Cobalt-58	1.9E-01	7.9E-04	0.0E+00	0.0E+00	0.0E+00
Nickel-59	7.6E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cobalt-60	5.3E+00	7.7E-01	5.2E-01	2.7E-01	1.4E-03
Nickel-63	1.0E+02	9.9E-01	9.7E-01	9.3E-01	7.1E-01
Zinc-65	6.7E-01	1.3E-01	5.6E-03	3.1E-05	0.0E+00
Strontium-90	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Niobium-94	2.0E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Niobium-95	9.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zirconium-95	1.8E-01	3.7E-04	0.0E+00	0.0E+00	0.0E+00
Silver-110m	6.8E-01	1.3E-01	6.3E-03	4.0E-05	0.0E+00
Antimony-125	2.8E+00	6.0E-01	2.8E-01	8.1E-02	3.5E-06
Iodine-129	1.6E+07	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cesium-134	2.1E+00	5.1E-01	1.9E-01	3.5E-02	0.0E+00
Cesium-137	3.0E+01	9.5E-01	8.9E-01	7.9E-01	3.2E-01
Cerium-141	8.9E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cerium-144	7.8E-01	1.7E-01	1.2E-02	1.4E-04	0.0E+00
Plutonium-238	8.8E+01	9.8E-01	9.6E-01	9.2E-01	6.7E-01
Plutonium-239	2.4E+04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Plutonium-240	6.6E+03	1.0E+00	1.0E+00	1.0E+00	9.9E-01
Americium-241	4.3E+02	1.0E+00	9.9E-01	9.8E-01	9.2E-01

		Fraction Remaining After			
Element	**Half-Life (yrs)**	**2 yrs**	**5 yrs**	**10 yrs**	**50 yrs**
Plutonium-241	1.4E+01	9.1E-01	7.8E-01	6.2E-01	8.8E-02
Curium-243	2.9E+01	9.5E-01	8.9E-01	7.9E-01	3.0E-01
Curium-244	1.8E+01	9.3E-01	8.3E-01	6.8E-01	1.5E-01

This composite list was subsequently shortened (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) beta emitters (HTD&Betas), tritium, and Transuranics (TRUs). The results are listed in Table 3 for radionuclides with a half-life greater than 0.5 years.

Table 3: Categorized Radioisotopes of Concern

Element	Category	Half-Life (yrs)
Manganese-54	Gammas	8.5E-01
Cobalt-57	Gammas	7.4E-01
Nickel-59	Gammas	7.6E+04
Cobalt-60	Gammas	5.3E+00
Zinc-65	Gammas	6.7E-01
Silver-110m	Gammas	6.8E-01
Antimony-125	Gammas	2.8E+00
Cesium-137	Gammas	3.0E+01
Cerium-144	Gammas	7.8E-01
Europium-152[b]	Gammas	1.3E+01
Europium-154[b]	Gammas	1.6E+01
Europium-155[b]	Gammas	1.8E+00
Carbon-14	HTD&Betas	5.7E+03
Iron-55	HTD&Betas	2.7E+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	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 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		

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

10CFR61 Analysis Condensate Resin_2015.docx
10CFR61 Analysis Condensate Resin_2015.pdf
10CFR61 Analysis DAW_2010.docx
10CFR61 Analysis DAW_2010.pdf
10CFR61 Analysis DAW_2014.docx
10CFR61 Analysis DAW_2014.pdf
10CFR61 Analysis NUS Charcoal Resin_2015.docx
10CFR61 Analysis NUS Charcoal Resin_2015.pdf
10CFR61 Analysis Primary Resin_2014.docx
10CFR61 Analysis Primary Resin_2014.pdf
Alpha ratio tracking sheet.xlsx
Canal Radionuclide data.xlsx
HPP-112 ENCLOSURE 1.doc
HPP112_isotopic_mix.xlsx
NRC Screening Values.pdf
ODCM rev 36 draft for review.docx
ODCM Revision Form_Rev 35.pdf
ODCM_rev35 DRAFT.DOCX
PCP.07.docx
R16 Alpha ratios.xlsx
REMP 2014_final.docx
RS2009-10-2195 CTMT SG Opening for R16.pdf
RS2011-12-0137 Concrete Samples.pdf
RS2012-01-0120 Concrete Samples.pdf
RS2016-05-0004 Intake Structure Survey Results.docx
RS2016-05-0004 Intake Structure.pdf

6.3.3 Building or Structure

6.3.3.1 Alternate AC Diesel Generator Building

Description and Historical Use

The Alternate AC Diesel Generator Building is located off the South Berm, south of the Auxiliary Building (Figure 3 and Figure 12). The building was constructed in approximately 2005 and houses the Alternate AC Diesel Generator. The generator has been removed from service permanently.

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
- Concrete
- SSCs
- Steel

Preliminary Classification

The Alternate AC Diesel Generator Building and all SSCs within it 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.

Data Gaps

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

Supporting Documents

None

6.3.3.2 Auxiliary Building

Description and Historical Use

The Auxiliary Building is a concrete and steel multistory structure that interfaces with the Reactor Building (Figure 3 and Figure 12). The Auxiliary Building houses the essential auxiliaries, spent fuel storage facilities, and the RW handling and treatment facilities.

A review of radiological surveys conducted over the past couple of years shows a reasonable estimate of current conditions inside the Auxiliary Building. The Auxiliary Building is currently posted as an RCA and Radiation Area, with smaller areas within posted as Locked High Radiation Area (LHRA), High Radiation Area (HRA), and Contaminated Area (CA). Survey information for the Auxiliary Building is contained in Table 4.

Table 4: Auxiliary Building Survey Information

Area or Component	Dose Rate (mR/hr)
75' 'A' Decay Heat Vault	<1-7
75 'B' Decay Heat Vault	<1-1.5
75' Tendon Gallery	<1
95' G/A	<1-*12/1
95' Sea Water Rm	<1
95' Triangle Room (LPI)	1-*30/10
95' Rainforest (HPI)	<1-*6/1
95' RC Evap. Rm	<1-4
95' Condensate Waste Tank Rm	5-*26/10
95' Nuclear Sample Rm	<1-3
95' RCBT (bleed tank)	5-20
95' Decant Slurry Pump Rm	<1-6
119' N G/A	<1-*5/1
119' S G/A	<1-1
119' EGDG 1A-1B	<1
119' Green Rm	<1
119' Block Orifice Rm	*20/12, <1-3
119' RCBT	5-7
119' RMA-6 Area	<1
119' Deborating Demin Rm	2-*30/15
119' Post Filter Valve Alley	<1-*1.5/1
119' Pre Filter Rm	1.2-*1200/300
119' Make Up Tank	1.5
119' Seal Return Cooler Room	<1
119' BST Rm	<1-*4
119' Yellow Rm	<1-50
119' Yellow Rm ½ Wall	1-5
119' Yellow Rm ½ Wall Access Cage	15-*4500/700
119' Spent Fuel Demin Rm	50-*5000/600

Area or Component	Dose Rate (mR/hr)
119’ Berm	<0.5-*3/<1
119’ MSB	<1
119’ Hot Machine Shop	<1
143’ G/A	<1-1.5
162” G/A	*1-<1
** = denotes contact reading, otherwise general 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

- Building Materials
- Concrete
- Filters
- Resins
- SSCs
- Steel

Preliminary Classification

The 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, and 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.

Data Gaps

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

Supporting Documents

AR00358312 NRC RP Team Identified Deficiency in Radwaste Storage.pdf
RS_CR3-M-20140520-1 Triangle Room-LPI.pdf
RS_CR3-M-20140624-2 Post-filter Valve Alley.pdf
RS_CR3-M-20140816-3 HPI Valve Alley (Alpha Ratio).pdf
RS_CR3-M-20141023-3 AB 119' Seal Return Cooler Room.pdf
RS_CR3-M-20160119-3 Yellow Room over Half Wall.pdf
RS_CR3-M-20160120-3 Yellow Room.pdf
RS_CR3-M-20160123-5 95' Aux Bldg.pdf
RS_CR3-M-20160128-5 160' Aux Bldg Spent Fuel Floor.pdf

RS_CR3-M-20160129-5 Hot Shop.pdf
RS_CR3-M-20160201-9 143' Aux Bldg.pdf
RS_CR3-M-20160203-2 Decay Heat Vaults.pdf
RS_CR3-M-20160203-5 119' Aux Bldg.pdf
RS2009-10-0544 Alpha Ratio 600-1 (Aux Bldg).pdf
RS2010-03-0092 AB 119' Make Up Demins.pdf
RS2011-06-0007 AB 95' Concentrate Waste Tank Room.pdf
RS2011-08-0021 AB 119' Deborating Demin Tank Room.pdf
RS2012-07-0056 Block Orifice Room.pdf
RS2012-07-0090 AB 119' RCBT.pdf
RS2012-10-0108 RC Evap Rm.pdf
RS2012-11-0057 Letdown Cooler Room.pdf
RS2012-12-0030 Letdown Cooler Room.pdf
RS2012-12-0090 Pre-filter Room.pdf
RS2012-12-0184 AB 119' Spent Fuel Demin.pdf
RS2013-07-0100 AB 95' RCBT Room.pdf
RS2014-01-0007 IB AB MUT-RMA-6 area-119 ft map.pdf
RS2014-01-0031 AB IB HPI-rainforest.pdf
RS2014-01-0057 AB 95' Decant Slurry Pump Room.pdf

6.3.3.3 Control Complex

Description and Historical Use

The Control Complex is a multistory structure comprised of six elevations, namely 95’, 108’, 124’, 134’, 145’ and 164’ (Figure 3 and Figure 12). The 95’ elevation is primarily comprised of the HP office complex and the primary chemistry lab. A portion of this elevation is within the RCA, as it serves as the primary RCA entrance and exit. The 95’ elevation has been reconfigured over the years. Early on, the HP calibration facility was located in the HP office complex. The 145’ elevation contains the Control Room.

With the exception of the 95’ elevation, radioactive material was not used or stored in this building, but because of its proximity to the RCA 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
- SSCs
- Steel

Preliminary Classification

The majority of the Control Complex and all SSCs within it 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. The 95’ elevation is preliminarily classified as a MARSSIM Class 1 structure based on the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Data Gaps

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

Supporting Documents

RS_CR3-M-20160203-6 95' Control Complex.pdf
RS2012-07-0001 Nuclear Sample Room.pdf

6.3.3.4 Discharge Structure

Description and Historical Use

The Discharge Structure is an on-shore reinforced concrete structure that discharges plant effluents into the discharge canal for transport to the Gulf of Mexico (Figure 3 and Figure 12). The Discharge Structure is the point of termination for the circulating water discharge pipe. That pipe enters the Discharge Structure below the water level of the discharge canal. The structure provides a transition from the pipe to the discharge canal, and is the outlet to the Gulf. The Discharge Structure also receives drainage and Service Water returns from the Auxiliary Building and Turbine Building standpipes.

Plant radioactive liquid effluent discharges are sent through the Circulating Water System discharge to provide dilution. There is a potential that residual radioactive material may have accumulated in the structure from years of radioactive liquid effluent discharges. However, radioactive material was not used or stored in the Discharge Structure.

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

- Concrete
- Piping
- Steel

Preliminary Classification

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

Data Gaps

- Direct measurements and contamination surveys of the Discharge Structure concrete
- Direct measurements of the discharge piping
- Radiological analysis of additional sediment samples from the discharge pipe

Supporting Documents

OP-407-N, Liquid Releases from the Secondary Plant.pdf
SP0736I-CDT-1.TIF
SP0736L, Liquid Discharges to the Discharge Canal via RM-L2 (WDT-1).pdf
SP736G SDT-1 Releases to the Discharge Canal.pdf
SP736I Condensate Release to the Discharge Canal (CDT-1).pdf
SP736M Liquid Releases to the Discharge Canal via RM-I7 (SDT-1).pdf

6.3.3.5 Emergency Diesel Generator Building

Description and Historical Use

The Emergency Diesel Generator Building is at the southeast corner of the Auxiliary Building (Figure 3 and Figure 12). The generators provide electrical power to operate all safety-related SSCs in the event of the loss of off-site electrical power. The building contains two large diesel generators and their associated day tanks.

In July of 2008, AR00285638 was written when contaminated scaffolding was found in the “B” Diesel Generator Fan Room. Surveys identified that the contamination was limited to the scaffold pic boards, and once the scaffolding material was relocated to the MSB, the Fan Room was surveyed (RS08-07-0012) and found to be clean. Aside from this room and this instance, 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
- Concrete
- SSCs
- Steel

Preliminary Classification

The Emergency Diesel Generator Building and all SSCs within it 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.

Data Gaps

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

Supporting Documents

AR00285638 Contamination in B Diesel Generator Room.pdf
RS2008-07-0012 B Diesel Gen Survey.pdf

6.3.3.6 Emergency Feedwater Pump 3 Building

Description and Historical Use

The Emergency Feedwater Pump 3 Building is located within the PA on the southwest berm near the Emergency Feedwater Tank Building (Figure 3 and Figure 12). The building contains DFT-4, a 13,750-gallon single-walled above ground storage tank containing fuel for the pump.

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
- Concrete
- SSCs
- Steel

Preliminary Classification

The Emergency Feedwater Diesel Pump 3 Building and all SSCs within it 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.

Data Gaps

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

Supporting Documents

None

6.3.3.7 Emergency Feedwater Tank Building

Description and Historical Use

The Emergency Feedwater Tank Building is located on the South Berm south of the MSB (Figure 3 and Figure 12). The building houses a large above ground tank storing makeup feedwater to be used during a loss of coolant emergency.

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
- Concrete
- SSCs
- Steel

Preliminary Classification

The Emergency Feedwater Tank Building and all SSCs within it 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.

Data Gaps

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

Supporting Documents

None

6.3.3.8 Fire Service Pump House

Description and Historical Use

The Fire Service Pump House is located in the PA in the West Berm area, immediately south of the Fire Service Water Tanks and the Intermediate Building (Figure 3 and Figure 12). The Pump House contains two pumps for charging the Fire Service hydrants and standpipes, and two above ground tanks storing diesel fuel for the 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

- Building Materials
- Concrete
- SSCs
- Steel

Preliminary Classification

The Fire Service Pump House and all SSCs within it 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.

Data Gaps

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

Supporting Documents

None

6.3.3.9 Intake Structure

Description and Historical Use

The Intake Structure is located at the eastern end of the Intake Canal (Figure 3 and Figure 12) and is where circulating water and raw seawater was withdrawn from the Intake Canal.

Based on the fact that plant derived material has been identified in the storm water drains, several of which discharge to the Intake Canal through an outfall, there is a possibility, albeit small because of dilution, that contamination has accumulated in the Intake 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

- Building Materials
- Concrete
- SSCs
- Steel

Preliminary Classification

The Intake Structure 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.

Data Gaps

- Direct measurements and contamination surveys of the Intake Structure concrete
- Direct measurements of the intake piping
- Radiological analysis of additional sediment samples from the intake pipe

Supporting Documents

RS2016-05-0004 Intake Structure Survey Results.docx
RS2016-05-0004 Intake Structure.pdf

6.3.3.10 Intermediate Building

Description and Historical Use

The Intermediate Buildings (Figure 3 and Figure 12) are Seismic Class I structures designed for abnormal incidents such as tornado loads and missiles. The buildings' inner walls fully (75') or partially (95' & 119') surround the Reactor Building and allow access to many of the Reactor Building tendons. There are three distinct areas that define the Intermediate Building.

a. The 75' area is known as the Tendon Gallery. Access to this area is through the 95' intermediate building. An alternate access is located on the southwest berm but the hatch is locked by Security. The Tendon Gallery allows access to the lower containment building tendons. A sump along with two sumps pumps are located in the area.
b. The 95' Intermediate Building is accessed through the Seawater Room or the area just outside the Pass Room / Nuclear Sample Room of the Auxiliary Building (AB). This building allows access to Reactor Building tendons located on the 95' elevation. The CAV-2/6 valve alley is located in the northeast section of the building.
c. The 119' Intermediate Building is accessed from the 119' Turbine Building. This building allows access to containment building tendons located on the 119' elevation. The building allows access to the Personnel Hatch, which is the primary ingress and egress area to the Reactor Building. The Personnel Hatch was accessed through the 119' Auxiliary Building but has since been barricaded. Main Steam Safety Valves and the four main steam lines exiting the reactor building are located in this structure. Delamination of the Reactor Building in 2011 resulted in concrete spalling off and falling inside the Intermediate Building.

Relatively recent survey data provide a reasonable estimate of current conditions inside the Intermediate Building. Survey information for the Intermediate Building is contained in Table 5.

Table 5: Intermediate Building Survey Information

Area or Component	Dose Rate (mR/hr)
95' Intermediate Bldg.	<1
119' Intermediate Bldg.	<1
** = denotes contact reading, otherwise general area*	

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

- Building Materials
- Concrete

- SSCs
- Steel

Preliminary Classification

The Intermediate Building and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure because the 95' elevation of the building has been an RCA throughout the station operating years and the 119' elevation contains turbine system components (MSIVs, MSRVs, etc.) that have become contaminated due to primary to secondary side leakage. Therefore, there is a high potential for containing residual radioactive material, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Data Gaps

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

Supporting Documents

RS Reactor-Aux-Intermediate Bldg.docx
RS2002-01-0018 IB TB 119'.pdf
RS2009-02-0099 Tendon Gallery Sump Sample.pdf
RS2009-02-0224 Tendon Gallery Survey.pdf
RS2010-05-0357 - Tendon Gallery.pdf
RS2012-07-0029 Tendon Gallery.pdf
RS2013-12-0132 CAV 2-6 valve alley.pdf
RS2014-01-0007 IB AB MUT-RMA-6 area-119 ft map.pdf
RS2014-01-0031 AB IB HPI-rainforest.pdf

6.3.3.11 Maintenance Support Building

Description and Historical Use

The MSB is inside the RCA, southwest of the Reactor Building (Figure 3 and Figure 12). Activities that occurred in this facility included work on Reactor Coolant Pump motors, Rx Head Stud cleaning, RCP seal rebuild, and non destructive examination (NDE) on RVCH Tripod. Additionally, contamination was identified (RS08-07-0012) on the floor attributable to contaminated scaffolding that was being stored in the building. In February of 2009, AR00319845 was written to document the fact that fixed contamination was found on a support girder. The MSB includes an HP office and a former HP calibration lab.

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

Preliminary Classification

The MSB and all the SSCs contained within are preliminarily classified as a MARSSIM Class 1 structure based on the discussion above and the fact that the building has been an RCA throughout the station operating years. Therefore, the building 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.

Data Gaps

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

Supporting Documents

AR00319845 Fixed Contamination Found in MSB Support Girder.pdf
AR00351509 MSB - Contamination Found in a Clean Area.pdf
RS_CR3-M-20160130-2 MSB.pdf

6.3.3.12 Nuclear Administration Building

Description and Historical Use

The NAB is a two-story office structure located within the PA, but outside of the RCA. The NAB is located north of the PAB/TSC and is depicted on Figure 3 and Figure 12.

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
- Concrete
- Steel

Preliminary Classification

The NAB and all SSCs within it 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.

Data Gaps

- 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

Supporting Documents

RS2016-02-0005 Routine_z03.pdf

6.3.3.13 Nuclear Security Operations Center

Description and Historical Use

The NSOC is the point of access for personnel into the PA. The building is located on the south side of West Powerline Street, northeast of the NAB (Figure 3 and Figure 12).

The only radioactive material that was utilized in the building were sealed sources used to perform calibrations/checks of the exit portal monitors and Ni-63 sources in the Security explosive detector monitors. Additionally, there have been alarms of the portal monitors due to individuals that had been administered radiopharmaceuticals. Follow up and routine surveys have not identified contamination in the facility. However, 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
- Concrete
- Steel

Preliminary Classification

The NSOC and all SSCs within it 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.

Data Gaps

- 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

Supporting Documents

RS2016-02-0005 Routine_z03.pdf

6.3.3.14 OTSG Storage Facility

Description and Historical Use

The OTSGs and portions of the hot leg piping were replaced in Refuel Outage 16. The original OTSGs and portions of the hot leg piping are considered as solid waste only and are stored in a separate containment building designed and built (reference Engineering Change 63043) to specifically house the original OTSGs and portions of the hot leg piping until plant decommissioning. This facility is located outside the CR3 PA (Figure 3 and Figure 12). The building was designed as a Seismic Class III structure, with reinforced walls, roof and floor, to meet the radiation dose criteria to operating personnel and the general public, as outlined in 10CFR20.1301.

The OTSGs are wrapped for contamination control, and surveys associated with the OTSGs have not shown contamination on the outside of the package or within the facility. Planning is currently underway to prepare the OTSGs for shipment, and the forthcoming work will involve cutting the radioactive piping, which will result in a potential for the spread of contamination. Additionally, once the OTSGs have been shipped offsite, the Reactor Vessel Closure Head, currently stored in the RVCH Storage Facility, will be brought into the OTSG Storage Facility for processing (segmentation) prior to shipment. This activity will also have a high potential for contaminating the OTSG Storage Facility.

Known and Potential Contaminants

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

Potentially Contaminated Media

- Building Materials
- Concrete
- Steel

Preliminary Classification

The OTSG Storage Facility is preliminarily classified as a MARSSIM Class 1 structure due to the discussion above, and the presumption that if residual radioactivity is present, its concentration could exceed the acceptance criteria.

Data Gaps

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

Supporting Documents

None

6.3.3.15 Plant Administration Building-Technical Support Center

Description and Historical Use

The PAB was built in the 1989 – 1991 timeframe to provide additional office space within the PA. The PAB encompassed the existing TSC (Figure 3 and Figure 12).

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
- Concrete
- Steel

Preliminary Classification

The PAB and all SSCs within it 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.

Data Gaps

- 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

Supporting Documents

RS2016-02-0005 Routine_z03.pdf

6.3.3.16 Reactor Building

Description and Historical Use

The Reactor Building is a cylindrical reinforced concrete structure bearing on a sound foundation (Figure 3 and Figure 12). The foundation slab is reinforced with conventional steel reinforcing. The cylindrical walls are pre-stressed with a post-tensioning tendon system in the vertical and horizontal directions. The dome roof is pre-stressed utilizing a three-way, post-tensioning tendon system. The inside surface of the Reactor Building is lined with a carbon steel liner to ensure a high degree of leak-tightness for containment.

Several samples of Reactor Building concrete taken during hydro-demolition and attempted delamination repair efforts were radiologically analyzed. Several of the samples showed low levels of Tritium (13.4 - 47.6 pCi/gm).

The Reactor Building houses the Reactor Pressure Vessel, Steam Generators, Reactor Coolant Pumps, the Reactor Coolant Pressurizer, the Refueling Cavity, the Transfer Canal, the Reactor Building Sump and other ancillary components.

A quarterly routing survey, conducted in June 2014 shows a reasonable estimate of current conditions inside the Reactor Building. The Reactor Building is currently posted as an RCA and Radiation Area, with smaller areas within posted as LHRA, HRA, and CA. Survey information for the Reactor Building is contained in Table 6.

Table 6: Reactor Building Survey Information

Area or Component	Dose Rate (mR/hr)
95’ general area (G/A)	<1-8
Letdown Line Outside D-Rings	*800/250
RB Sump	12-80
SFV-83 (sump area)	*140/30
119’ G/A	<1
160’ G/A	<1-2
180’ G/A	<1-1.5
‘A’ D-Ring G/A 95’	1-*8/5
‘A’ D-Ring 95’ to 180’ Ladders & Platforms	0.5-20
RCV-25	*250/60
RCV-35	*200/100
RCV-21	*4/1
‘B’ D-Ring G/A 95’	3-6
Letdown Line Inside D-rings	*170/80
‘B’ D-Ring 95’ to 180’ Ladders & Platforms	<1 -5
RCV-41	*40/10
Top of Pressurizer	*100/50
Bottom of pressurizer	*150/60
Pressurizer Spray Line	*100/50

Area or Component	Dose Rate (mR/hr)
Pressurizer Surge Line	*200/70
‘Old’ Letdown Cooler Room (LDCR)	10-300
‘New” LDCR	2-6
Reactor Coolant Drain Tank	<1-2
‘A’ Core Flood Rm	<1
‘B’ Core Flood Rm	<1
Reactor Cavity – Shallow End	2-20
Reactor Cavity Deep End	80-*3000/800
* denotes contact reading, otherwise general 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

- Building Materials
- Concrete
- SSCs
- Steel

Preliminary Classification

The Reactor 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.

Data Gaps

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

Supporting Documents

Containment Wall Concrete Samples.xlsx
RS Reactor-Aux-Intermediate Bldg.docx
RS_CR3-M-20140617-1 Reactor Bldg Routine.pdf
RS_CR3-M-20150511-3 RB Upper Cavity.pdf
RS2009-10-2195 CTMT SG Opening for R16.pdf
RS2011-12-0137 Concrete Samples.pdf
RS2012-01-0120 Concrete Samples.pdf
RS2012-11-0057 Letdown Cooler Room.pdf
RS2012-12-0030 Letdown Cooler Room.pdf

RS2013-03-0151 Letdown Line outside D-rings.pdf
RS2013-12-0225 Letdown Line outside d-rings.pdf

6.3.3.17 Reactor Building Spray Tank Room

Description and Historical Use

The Reactor Building Spray Tank Room is a structure located adjacent to and north of the BWST (Figure 3 and Figure 12). The building was part of the original plant construction and houses 2 Building Spray Tanks and associated components.

Historically, this room has been located within the RCA on the South Berm. From time to time the area immediately outside the door to this room would be radiologically released from the RCA to support work on tendons.

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

- Building Materials
- Concrete
- SSCs
- Steel

Preliminary Classification

The Reactor Building Spray Tank Room and all SSCs within it are preliminarily classified as a MARSSIM Class 1 structure based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration could exceed the acceptance criteria.

Data Gaps

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

Supporting Documents

RS2012-08-0129 Building Spray Tank Room.pdf

6.3.3.18 RMSW D

Description and Historical Use

The RMSW D is a converted oil tank located outside of the PA and west of Units 1 & 2 (Figure 2 and Figure 11). Approximately one half of the warehouse was utilized to store radioactive material contained within SeaLand containers, LSA boxes and 55-gallon drums. An area constructed of concrete block walls was utilized to store higher dose rate items. Surveys of the facility never detected contamination (loose or fixed) on the warehouse floors and walls. This warehouse underwent a free release survey in Aug-Sept of 2009, prior to turning the warehouse over to the fossil organization. Survey CR3-M-20140903-5 identified one spot with fixed contamination (14K DPM/Area Under Probe (AUP)), which was subsequently mechanically removed. Resurveys of the area verified that no contamination remained.

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
- Steel

Preliminary Classification

RMSW D is preliminarily classified as a MARSSIM Class 2 structure because it formerly stored radioactive material, and the presumption that if residual radioactivity is present, it will not be at concentrations expected to exceed the site release criteria.

Data Gaps

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

Supporting Documents

RS_CR3-M-20140808-3 RMSW D - Survey for Release.pdf
RS_CR3-M-20140812-3 RMSW D - Survey for Release.pdf
RS_CR3-M-20140812-5 RMSW D - Survey for Release.pdf
RS_CR3-M-20140813-6 RMSW D - Survey for Release.pdf
RS_CR3-M-20140814-5 RMSW D - Survey for Release.pdf
RS_CR3-M-20140815-4 RMSW D - Survey for Release.pdf
RS_CR3-M-20140819-4 RMSW D - Survey for Release.pdf
RS_CR3-M-20140820-5 RMSW D - Survey for Release.pdf
RS_CR3-M-20140829-4 RMSW D - Survey for Release.pdf
RS_CR3-M-20140903-5 RMSW D - Survey for Release.pdf
RS_CR3-M-20140905-4 RMSW D - Survey for Release.pdf
RS_CR3-M-20140910-2 RMSW D - Survey for Release.pdf

6.3.3.19 RMSW G

Description and Historical Use

RMSW G is located outside of the PA, south of the Maintenance Training Facility (Figure 3 and Figure 12). The area around the building was formerly fenced and is where contaminated turbine components were processed. These activities included use of a Sandblast Booth. No activities are ongoing in the formerly fenced area.

A series of free release surveys were performed in the February 2009 timeframe. One survey (RS99-02-0121) identified fixed contamination of 3K DPM/AUP. Two additional surveys (RS99-02-185 and RS99-02-0195) referred to areas as “previously contaminated”.

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

Preliminary Classification

RMSW “G” 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.

Data Gaps

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

Supporting Documents

AR00752539 Trace Levels of Contamination Identified at the G RMSW.pdf
RS_CR3-M-20140412-1 RMSW G - Survey for Release.pdf
RS1999-02-0104 RMSW G - Survey for Release.pdf
RS1999-02-0121 RMSW G - Survey for Release.pdf
RS1999-02-0147 RMSW G - Survey for Release.pdf
RS1999-02-0161 RMSW G - Survey for Release.pdf
RS1999-02-0171 RMSW G - Survey for Release.pdf
RS1999-02-0185 RMSW G - Survey for Release.pdf
RS1999-02-0195 RMSW G - Survey for Release.pdf
RS1999-02-195 RMSW G - A Level Release.pdf

6.3.3.20 Rusty Building

Description and Historical Use

The Rusty Building is part of the original plant construction and served as the original Administration Building (Figure 3 and Figure 12). With construction of the NAB and PAB, the Rusty Building became an "overflow" office complex for project personnel during plant operations.

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
- Concrete
- Steel

Preliminary Classification

The Rusty Building and all SSCs within it 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.

Data Gaps

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

Supporting Documents

RS2016-02-0005 Routine_z03.pdf

6.3.3.21 RVCH Storage Facility

Description and Historical Use

The Reactor Vessel Closure Head (RVCH) and attached Control Rod Drive Mechanism (CRDM) Service Structure (CRDMSS) were replaced in Refuel Outage 13. The original RVCH is considered solid waste only, and is stored in a separate containment building designed and built (reference Engineering Change 50223) to specifically house the RVCH/CRDMSS until plant decommissioning. This facility is located outside the CR3 PA (Figure 3 and Figure 12). The building is designed as a Seismic Class III structure, with reinforced concrete walls, to meet the radiation dose criteria to operating personnel and the general public, as outlined in 10CFR20 Section 11.3.1.

The RVCH is wrapped for contamination control, and surveys associated with the RVCH have not shown contamination on the outside of the package or within the facility.

Planning is currently underway to transfer the RVCH to the OTSG Storage Facility for processing in support of shipping the components offsite for burial. Contamination control measures will be employed to prevent the spread of contamination during the transfer, however, should the measures prove ineffective and contamination is released from the RVCH package, the contamination will likely change the preliminary classification of the facility.

Known and Potential Contaminants

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

Potentially Contaminated Media

- Building Materials
- Concrete
- Steel

Preliminary Classification

The RVCH Storage 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.

Data Gaps

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

Supporting Documents

AR00108043 Old RVCH Containment Bag Leaked Water at Storage Building.pdf
RS2003-10-0916 RVCH Transport Leak.pdf

6.3.3.22 Security CAS Building

Description and Historical Use

The Security Central Alarm Station is a red, steel-sided, two-story office structure completed circa 2010. The building is located within the PA, but outside of the RCA north of the former Ready Warehouse and southwest of the PAB/TSC. The building is shown on Figure 3 and Figure 12.

The Security CAS Building is the location where closed circuit camera feeds and other security sensors are monitored and alarms initiated for a security breach. 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
- Concrete
- Steel

Preliminary Classification

The Security CAS Building and all SSCs within it 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.

Data Gaps

- 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

Supporting Documents

None

6.3.3.23 Sewage Treatment Plant

Description and Historical Use

The Sewage Treatment Plant is located outside of the southwest corner of the PA, north of the Intake Canal (Figure 3 and Figure 12). The plant processes domestic wastewater from CR Units 1, 2 and 3 in accordance with a permit issued by the FDEP. A sand filter formerly used to filter treated effluent before it was discharged to the Settling Ponds has been removed. Sludge from the system is disposed periodically in an off-site landfill.

There have been several condition reports (AR00107680, AR00259995, PC9904219, and PC9904557) documenting instances where plant derived radioactive material was identified in the sewage, albeit at very low levels. The presence of radioactive material was attributed to low levels (i.e. below detection limits) of contamination on outage workers who subsequently showered prior to leaving site. The drains from the showers are routed to the sewage treatment plant. The low levels of radioactive material would accumulate in the sludge which was surveyed prior to release from the site.

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
- Steel

Preliminary Classification

The 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.

Data Gaps

- Direct measurements and contamination surveys of the structure interior surfaces
- Radiological analysis of concrete samples to assess volumetric contamination
- Radiological analysis of sediment samples

Supporting Documents

AR00107680 Contaminated Sewage Sludge.pdf
AR00259995 Treated Sewage from Unit 1 and 2 Low Level Contamination.pdf
PC9904219 Sludge from Unit 1 &2 Sewage Treatment Plant is Contaminated with Cobalt-58.pdf
PC9904557 Detectable Radioactivity Found in the Sewage Treatment Plant.pdf

6.3.3.24 Turbine Building

Description and Historical Use

The Turbine Building is located north of the Reactor Building and Intermediate Building (Figure 3 and Figure 12). The Turbine Building houses the Turbine Generator and associated auxiliaries, including the Condensers, Feedwater System, and Condensate Water Treatment System.

CR3 operated with primary to secondary leaks through the steam generator tubes and as a result, contamination was transported to various systems within the Turbine Building. These systems were identified in procedure RSP-101 (Enclosure 3) and controlled as Administratively Established RCAs. The systems identified in RSP-101 are:

- All Steam Systems
    - Main and Reheat Steam [MS & RH]
    - Extraction Steam [EX]
    - Auxiliary Steam [AS]
    - Feedwater System [FW]
    - Feedwater Heater Drains [HD]
    - Feedwater Heater Reliefs, Vents, and Drains [HV]
    - Miscellaneous Turbine Room Steam Drains [MS & SD]
    - Turbine Gland Steam and Drains [GS]
    - Steam Generator Blowdown/Sample Lines
- Secondary side laundry drains
- Condensate [CD] System up to and including the Condensate Demineralizers [CX] and Regeneration [SD]
- Turbine Building Sump
- Nitrogen [NG] System
- Hydrogen [HY] System
- Service Water [SW] System
- Secondary Services Cooling [SC] System
- Industrial Cooling [CI] System
- Air Removal System [AR]
- Raw Water System upstream of RM-L2

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

- Building Materials
- Concrete
- Filters
- Resins
- SSCs
- Steel

Preliminary Classification

Except as noted below, the Turbine Building and all SSCs within it 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 could exceed the acceptance criteria.

The Turbine Building Sump, the Steam Generator Blowdown System, the Service Water System, the leading edge of the Main Turbine Blades, the Main Steam System valve packing and tank drains, and sludge from the Main Condenser are preliminarily classified as MARSSIM Class 1 SSCs due to a high potential for localized areas of residual radioactivity that could exceed the acceptance criteria.

Data Gaps

- Direct measurements and contamination surveys of the building interior
- Direct measurements and contamination surveys of the building roof
- Direct measurements and contamination surveys of the Turbine Building Sump, Main (high and low pressure) Turbine Blades, and Steam Generator Blowdown System
- Radiological analysis of roofing material samples to determine volumetric contamination
- Radiological analysis of sediment samples from the Turbine Building Sump
- Radiological analysis of sediment samples from the Main Condenser

Supporting Documents

AR00069477 Contamination Found Inside Raw Water Piping.pdf
AR00601863 'A' OTSG Secondary Leakage has Increased.pdf
RS2009-10-0057 145' Turbine Bldg HDV-507-508.pdf
RS2009-10-0058 145' Turbine Bldg MSR-3A Crossover.pdf
RS2009-10-0064 145' Turbine Bldg Crossover Pipe.pdf
RS2009-10-0073 N2 Line 119' Turbine Bldg.pdf
RS2009-10-0082 Cold Machine Shop MSV-24.pdf
RS2014-05-0040 Turbine Sump Sludge.pdf

6.3.3.25 Units 1 and 2

Description and Historical Use

CR1/2, designed and built as coal-fired stations, began commercial operation in 1966 and 1969, respectively, prior to and during construction of CR3. The locations of CR1/2 are shown on Figure 3 and Figure 12.

CR1/2 and CR3 share some of the onsite commodities. All three units withdraw cooling water from the intake canal, and discharge to both the discharge canal and the Settling Ponds. CR3 gets its start-up steam from CR1/2 and as such does not have an Auxiliary Boiler. Finally, CR1/2 and CR3 all share the Sewage Treatment Plant.

Known and Potential Contaminants

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

Potentially Contaminated Media

- Building Surfaces
- Roofing Materials
- Asphalt
- Concrete
- Filters

Preliminary Classification

The exterior surfaces (walls and roof) of CR1/2 are preliminarily classified as a MARSSIM Class 3 structure based on the fact that the units are in the predominant downwind direction of CR3. As such, deposition of plant derived radioactivity may be present on these surfaces. If residual radioactivity is present, it is presumed that its concentration will not exceed a small fraction of the acceptance criteria.

Data Gaps

- Direct measurements and contamination surveys of the building exterior
- Direct measurements and contamination surveys of the building roof
- Direct measurements and contamination surveys of concrete and asphalt surfaces around the facility
- Direct measurements and contamination surveys of the ventilation intake components
- Radiological analysis of roofing material samples to determine volumetric contamination

Supporting Documents

None

6.3.4 Exterior Area

6.3.4.1 Area Surrounding RMSW G

Description and Historical Use
RMSW G is located outside of the PA, south of the Maintenance Training Facility (Figure 3 and Figure 12). The area around the building was formerly fenced and is where contaminated turbine components were processed. These activities included use of a Sandblast Booth. No activities are ongoing in the formerly fenced 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
The area surrounding the RMSW G is preliminarily classified as a MARSSIM Class 2 area, based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps
- Direct measurements and contamination surveys of the ground surfaces
- Radiological analysis of asphalt and soil samples to determine volumetric contamination

Supporting Documents
AR00368569 Leakage from Drum of Turbine Building Sump Material.pdf
RS_CR3-M-20150416-2 RMSW G Yard - Survey for Release.pdf
RS_CR3-M-20150601-5 RMSW G Yard - Survey for Release.pdf
RS_CR3-M-20150602-4 RMSW G Yard - Survey for Release.pdf
RS1997-09-0335 Turbine Parts-Kelly Bldg.pdf
RS1998-02-0144 Tb Parts Survey Results.pdf
RS1999-02-0252 Turbine Parts Area-Sand Blast.pdf
RS1999-03-0128 Turbine Parts.pdf
RS1999-03-0197 Turbine Parts.pdf
RS1999-03-317 Turbine Parts.pdf
RS1999-04-0004 Turbine Parts.pdf
RS1999-04-0076 Turbine Parts.pdf
RS1999-04-0117 Turbine Parts.pdf
RS1999-04-0228 Turbine Parts.pdf
RS1999-04-144 Turbine Parts.pdf
RS2013-07-0233 RMSW G Outside.pdf

6.3.4.2 Decon Tent Area

Description and Historical Use

The Decon Tent Area is north of the OTSG Storage Building where a decontamination tent had been erected for use during the 2009 Steam Generator Replacement Outage (Figure 3 and Figure 12). The tent was allowed to remain after the outage, but has since been removed. The Decon Tent was a posted RCA, and contained posted Contamination Areas. The floor of the Decon Tent was constructed of stainless steel plate.

In 2013 and 2014, surveys were performed on land areas outside and below (following tent removal) the Decon Tent. Smears, direct frisk, and soil samples demonstrated that there was no contamination outside or below the tent.

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

The Decon Tent Area is preliminarily classified as a MARSSIM Class 2 area, based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps

- Direct measurements and contamination surveys of the ground surfaces
- Radiological analysis of asphalt and soil samples to determine volumetric contamination

Supporting Documents

RS2009-10-8137 Decon Tent Area.pdf
RS2009-10-8137 Decon Tent.pdf
RS2009-12-8068 Decon Tent.pdf
RS2009-12-8192 Decon Tent.pdf
RS2013-03-0037 Decon Tent.pdf
RS2013-07-0224 Decon Tent Down Post.pdf
RS2014-04-0151 Decon Tent Area Soil Samples.pdf

6.3.4.3 East Berm

Description and Historical Use
The East Berm encompasses the area east of the Maintenance Shops and the Auxiliary Building (Figure 4 and Figure 13).

The East Berm was utilized during outages for placement of a laundry cleaning facility and served as a travel path for material being brought out of and into the hot machine shop.

In the 1979 and 1980 timeframe there were two events where core flood water was cross-tied to the Nitrogen system resulting in contamination going to the Nitrogen and Hydrogen Storage Area. The Nitrogen system piping that became contaminated during these events was abandoned in place, however, it was never removed from this area. An event in July, 2010 (AR00411245) was written to document the release of radioactive water outside of the RCA, when a piece of the nitrogen piping was cut outside of the Turbine Building Roll Up Door. Soil samples taken in the area showed low levels of Co-60 and Cs-137. The contaminated soils were remediated and resurveyed until radioactivity was no longer above detectable levels.

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
- Piping

Preliminary Classification
The East Berm is preliminarily classified as a MARSSIM Class 2 area, based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps
- Direct measurements and contamination surveys of the ground surfaces
- Radiological analysis of asphalt and soil samples to determine volumetric contamination

Supporting Documents
AR00411245 Contamination Outside RCA.pdf
RS2010-07-0236 Nitrogen Line Excavation (East Berm).pdf
RS2010-07-0244 N2 Line Cut Outside Tb Bldg (East Berm).pdf

6.3.4.4 Nitrogen and Hydrogen Storage Area

Description and Historical Use

The Nitrogen and Hydrogen Storage Area is inside the railroad loop, west of the Paint Shack (Figure 3 and Figure 12). The area was contaminated on two occasions by leaks that developed when the nitrogen pipeline was mistakenly cross-tied with a line associated with the core flood system. The nitrogen and hydrogen storage tanks have been removed, however the concrete pads and system piping remain.

The two occurrences are detailed in NCOR79-0258 and Unusual Operating Event Report (UOER) 4-80. The second event resulted much higher levels of activity being discovered in the area. The report indicates that a soil sample was measured with 1.2E-02 uCi/g. The area was remediated and resurveyed until radioactivity was no longer above detectable levels.

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 Nitrogen and Hydrogen Storage Area is preliminarily classified as a MARSSIM Class 2 area, based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps

- Direct measurements and contamination surveys of the ground surfaces
- Radiological analysis of concrete and soil samples to determine volumetric contamination

Supporting Documents

NCOR779-0258, Radioactive Spill outside the RCA (Core Flood_N2 Line Event).pdf
NCOR79-0258, Core Flood - N2 Event (discusses Piping inside Tb Bldg).pdf
UOER 4-80, Radioactivity through N2 Supply Header to Tank Farm.PDF

6.3.4.5 North Berm

Description and Historical Use
The North Berm is within the PA and encompasses the area north of the Transformer Bays and the Rusty Building (Figure 4 and Figure 13). This area was never used to store RAM, and there is no history of events involving leaks or spills of radioactive liquids.

This area, however, was subject to the routine movement of personnel and equipment.

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
- Piping

Preliminary Classification
The North Berm 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.

Data Gaps

- Direct measurements and contamination surveys of the ground surfaces
- Radiological analysis of concrete, asphalt, and soil samples to determine volumetric contamination

Supporting Documents
None

6.3.4.6 Protected Area Ground Surfaces

Description and Historical Use

This section is a catch-all for ground surfaces within the PA that are not contained within any of the four identified berm areas. The areas include the asphalt-paved area / roadway extending from the NSOC up to the East Berm, the Security Sally Ports, concrete walkways around and between the NAB and the PAB, as well as the landscaped areas.

The areas encompassed within this category were not used to store radioactive material. However, these areas are within the PA and subject to the routine movement of personnel and equipment between buildings. The Sally Ports were used to inspect vehicles transporting RAM into and out of 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
- Soil

Preliminary Classification

The Protected Area Ground Surfaces, with the exception of the two Security Sally Ports, are 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. The two Security Sally Ports are classified as MARSSIM Class 2 areas based on the discussion above, and the presumption that if residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps

- Direct measurements and contamination surveys of the ground surfaces
- Radiological analysis of concrete, asphalt, and soil samples to determine volumetric contamination.

Supporting Documents

None

6.3.4.7 R16 Shipping Yard

Description and Historical Use

The R16 Shipping Yard, also referred to as the North Shipping Yard, is located north of CR3, north of the Switch Yard and outside the PA (Figure 2 and Figure 11). This area was used as a RAM shipment staging area during Refuel Outage #16. A release survey (RS13-07-0285) was performed in July, 2013, which consisted of a gamma walkover survey and five (5) soil samples. The soil samples were isotopically analyzed to environmental LLDs and did not identify any plant derived activity. The values were consistent with the values obtained during a baseline survey (RS09-06-0266) conducted in June of 2009, prior to use of 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 R16 Shipping 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.

Data Gaps

- Gamma walkover survey to identify any areas with elevated activity
- Radiological Analysis of soil samples taken in areas with elevated activity, if any

Supporting Documents

RS2009-06-0266 R16 Storage Yard - Baseline Survey.pdf
RS2013-07-0285 R16 Shipping Yard - Down Post.pdf
RS2013-07-0285 R16 Shipping Yard.pdf

6.3.4.8 SeaLand Container Storage Area

Description and Historical Use

The SeaLand Container Storage Area is located outside of the PA and inside of the railroad loop (Figure 3 and Figure 12). Radioactive material was stored in the containers but they have all been removed from the area.

This area was used as a sealand container storage area during Refuel Outage #16. A release survey (RS10-07-0090) was performed in July, 2010, which consisted of a gamma walkover survey and five (5) soil samples. The soil samples were isotopically analyzed to environmental LLDs and did not identify any plant derived activity. The dose rates in the area were higher, but consistent with background levels, than the values obtained during a baseline survey (RS09-05-0244), conducted in May of 2009, prior to use of the area. Soil samples taken as part of the release survey following use of the area, failed to identify plant derived material when counted to environmental LLDs.

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 SeaLand Container Storage Area 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.

Data Gaps

- Gamma walkover survey to identify any areas with elevated activity
- Radiological Analysis of soil samples taken in areas with elevated activity, if any

Supporting Documents

RS2009-05-0244 Sealand Container Storage Yard.pdf
RS2010-07-0090 South Laydown Yard.pdf
South Laydown Yard.pdf

6.3.4.9 Settling Ponds

Description and Historical Use

The East and West Settling Ponds are located west of the PA, near the south bank of the Discharge Canal and west of the large circular tanks that formerly stored oil for CR1/2 (Figure 2 and Figure 11). Effluent from the Sewage Treatment Plant that serves Units 1, 2 and 3 is discharged to these ponds. Effluent from SDT-1 has also been discharged to the ponds on a few occasions when the effluent quality did not comply with the station's NPDES permit criteria.

In an ANI Inspection Report dated 15 May 2009, a recommendation was made to collect soil and vegetation samples from the banks of the ponds and analyze the samples for gamma emitting radionuclides. In response to this recommendation, samples have been obtained with the results reported as supplemental data in the annual REMP Reports. The data indicate a steadily decreasing concentration and are summarized in Table 7.

Table 7: Analytical Results for Soil and Vegetation Samples From the Settling Ponds

Year	Sample results (pCi/gm)
2009	0.190 – 0.299 (Cs137); 0.027 (Co-60)
2010	0.020 – 0.137 (Cs-137)
2011	0.076 – 0.097 (Cs-137)
2012	0.010 – 0.016 (Cs-137)
2013	0.006 – 0.008 (Cs-137)
2014	0.007 (Cs-137)

While DCGLs have yet to be determined, the NRC screening levels (NUREG-1757, Vol. 2), list values of 11 pCi/gm and 3.8 pCi/gm for Cs-137 and Co-60, respectively. These screening levels are significantly higher than the levels historically seen in Settling Pond soils/sediments.

Tritium was measured in 2014 in groundwater from two monitoring wells located on the north and south sides of the plant Settling Ponds at concentrations of 87 and 144 pCi/L. These detections have been attributed to discharges of the Station Drain Tank (SDT-1) to the Settling Ponds [11].

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 Settling Ponds are 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.

Data Gaps

- Radiological analysis of sediment and soil samples from within and around the ponds

Supporting Documents

AR00452489 Leakage Existed from SDT-1 to the Settling Pond.pdf
AR00579415 CP0161, Rev 7, REMP.pdf
OP-407N SDT-1 release 223729.TIF
PC98903279 Unplanned Release of Condensate Water at CR1 & 2 from the Settling Pond Release Flow Path Pipe.pdf
Setting Pond Survey Results.pdf
settling pond data.msg
SETTLING POND SOIL.pdf
SP0736F Release Rev 18.TIF
SP0736F Release Rev 4.TIF
SP0736F to pond 584130.TIF
SP0736K hydro demolition Rev 2.TIF
SP0736K hydro demoliton Rev 1.TIF
SP736F SDT-1 to pond 582798.TIF

6.3.4.10 South Berm

Description and Historical Use

The South Berm encompasses the area inside the PA and south of the Fire Service Pump House, Reactor Building, Auxiliary Building and the Emergency Diesel Generator Building (Figure 4 and Figure 13). During the life of the plant a large portion of the South Berm has been included in the Radiation Controlled Area due to the storage of RW, removal of the Equipment Hatch, and contamination events. A portion of the South Berm has never been included in the RCA.

There have been several events and related surveys that identified contamination in the RCA portion of the South Berm. The most notable event occurred in May 1978 which resulted when a line that was transferring primary resin from a storage tank inside the plant to a HIC on a transport vehicle outside of the plant ruptured and released spent resin to the ground. This event is captured in NCOR78-119 and LER No. 78-015/04T-1.

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
- Piping

Preliminary Classification

The South Berm area that has been included in the RCA is preliminarily classified as a MARSSIM Class 1 area based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration may exceed the acceptance criteria. That portion of the berm that has not been included in the RCA is preliminarily classified as a MARSSIM Class 2 area, because it borders the Class 1 area, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps

- Direct measurements of soil, asphalt, and concrete
- Radiological analysis of concrete and asphalt samples to determine volumetric contamination
- Radiological analysis of soil samples to determine volumetric contamination

Supporting Documents

AR00316860 Discrete Radioactive Particle Found at OSB Demobilization Area.pdf
AR00362812 Radioactive Material Outside of the Primary RCA.pdf
AR00401623 Fixed Contamination on Concrete in RCA Back Berm.pdf
AR00560532 Trace Levels of Contamination Found Outside the RCA Inside PA.pdf
RS_CR3-M-20160131-2 Berm.pdf

RS_CR3-M-20160131-2 South Berm.pdf
RS1978-05-12 S. Berm Asphalt Following Resin Spill.pdf
RS2000-01-10B8 - Excavation of Light Pole.TIF
RS2001-10-0576 FTI Boxes for Shipment (South Berm).pdf
RS2001-10-0612 DRP MSB Berm.TIF
RS2008-10-0026 - Excavation of Light Pole.TIF
RS2009-03-0185 S Berm Slab B Soil Samples.pdf
RS2010-05-0050 South Berm Fixed Contam.pdf
RS2010-05-0050_001 south berm fixed contam.pdf
RS2010-05-0371 - South Berm - RCA Downsize.pdf
RS2012-09-0097 Crane Dunnage (South Berm).pdf
RS2012-09-0101 Crane Dunnage (South Berm).pdf
RS2013-04-0210 South Berm Storm Drain.pdf
s-berm storm drain isotopic.pdf

6.3.4.11 Station Drain Tank Effluent Pipe Leak Area

Description and Historical Use

The Station Drain Tank Effluent Pipe Leak was located on the side of the roadway between CR1/2, south of the Discharge Canal (Figure 2 and Figure 11). The contents of the tank normally was routed to the Discharge Canal, except when sampling of the tank indicated that its contents did not meet the discharge criteria in the CR3 NPDES permit. Under those circumstances the tank contents would be discharged to the Settling Ponds west of CR1/2 by way of an eight-inch diameter fiberglass pipeline that runs along the roadway. The pipe runs underground from CR3 to the point where it joins the effluent pipe from the Sewage Treatment Plant for Units 1, 2 and 3.

In June 2001, the underground portion of the pipeline on the side of the roadway between CR1/2 was damaged while excavating in the area. Discharge through the pipe was not occurring at the time of the pipe break but stagnant water drained from the broken pipe into the excavation. A vacuum truck removed the standing water in the excavation and transported it to the Settling Ponds. After review of the discharge permit for the last discharge through the pipeline it was determined that the spill did not create a radiological or non-radiological environmental impact.

A previous leak in the piping from SDT-1 was discovered in April 1998 on the West Berm. The leak was underground and occurred at a pipe elbow that had been improperly glued and fitted at the time of installation. Although the pipe joint apparently had been leaking since the time of plant startup both CR3 and the FDEP determined that no significant environmental impact resulted.

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
- Drain Pipes

Preliminary Classification

The Station Drain Tank Effluent Pipe Leak Area 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.

Data Gaps

- Gamma walkover survey to identify any areas with elevated activity
- Radiological Analysis of soil samples taken in areas with elevated activity

Supporting Documents

10 CFR 75(g)_HPP0230_1999.PDF

6.3.4.12 Storm Water Retention Ponds

Description and Historical Use

There are two storm water retention ponds: Storm Water Retention Pond A, north of the railroad tracks and west of RMSW G, and Storm Water Retention Pond B, south of the railroad tracks and southeast of Storm Water Retention Pond A (Figure 3 and Figure 12). Retention Pond A collects storm water from the Swamp Area.

A third pond, the Spill Retention Basin, is located south of the railroad tracks and directly south of Storm Water Retention Pond A (Figure 3). The Spill Retention Basin receives drainage from Storm Water Retention Pond A. A control structure in the Spill Retention Basin allows overflow to Storm Water Retention Pond B.

In 2010 Spill Retention Pond A was being modified for increased runoff from the planned construction of the ISFSI. Low levels of Cs-137 above background (maximum of 5.65 E-7 µCi/g) were found. About 200 cubic yards was shipped offsite as radwaste.

Storm Water Retention Pond B and the Spill Retention Basin were also modified and excavated in 2010 and 2011. Over 100 samples of the excavated soil were taken and counted to environmental MDAs. No licensed material was identified.

Known and Potential Contaminants

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

Potentially Contaminated Media

- Sediment
- Soil

Preliminary Classification

Storm Water Retention Pond A is preliminarily classified as a MARSSIM Class 2 area based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria. Storm Water Retention Pond B and the Spill Retention Basin are preliminarily classified as MARSSIM Class 3 based on the fact that they communicate with Pond A, and sampling has not identified the presence of plant derived material.

Data Gaps

- Gamma walkover survey to identify any areas with elevated activity
- Radiological Analysis of soil samples taken in areas with elevated activity

Supporting Documents

RS1998-02-0144 Tb Parts Survey Results.pdf
RS2010-11-0221 Composite Sand Pile Ease of SAB.pdf
RS2010-11-0226 Pond B Retention Area.pdf
RS2010-11-0236 Pond B Outside Townsend Work Area.pdf

RS2010-11-0322 MTF Extension and Pond B.pdf
RS2010-12-0101 Pond B Outlet Structure.pdf
RS2010-12-0118 Pond A.pdf
RS2010-12-0134 Pond A.pdf
RS2010-12-0224 Retention Pond.pdf
RS2010-12-0245 Pond B.pdf
RS2010-12-0312 Pond A.pdf
RS2010-12-0327 Pond B Outlet Spillway.pdf
RS2011-03-0357 Spillway.pdf
RS2011-05-0179 ISFSI Jack&Bore and Railroad Tracks.pdf

6.3.4.13 Swamp Area

Description and Historical Use

The Swamp Area is in the eastern portion of the PA, south of the PAB/TSC and east of the East Berm (Figure 3 and Figure 12). The ISFSI currently is under construction in the Swamp Area. This area of the station is approximately 21 feet lower in elevation than the buildings of the power block, which are on the Berm. Stormwater from the East Berm is collected in two catch basins and discharged to the Swamp Area.

Radioactivity attributable to runoff from the east berm has been identified in soil samples in the western portion of the Swamp Area. Although soil has been removed from this area and shipped offsite as RW, the scope of the cleanup activities was not meant to remove all impacted soils from 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

- Sediment
- Soil

Preliminary Classification

The Swamp Area is preliminarily classified as a MARSSIM Class 2 area based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps

Supporting Documents

AR00320618 Trace Levels of Licensed Material Inside PA (Swamp).TIF
RS_CR3-M-20150204-1 - Swamp.pdf
RS_CR3-M-20150217-2 - Swamp.pdf
RS_CR3-M-20150223-3 - Swamp.pdf
RS_CR3-M-20150226-4 - Swamp.pdf
RS2000-10-0024 Soil Samples from Swamp.pdf

6.3.4.14 Unit 4 and 5 Coal Ash Storage Area

Description and Historical Use

Unit 4 and 5 Coal Ash Storage Area is a large coal ash storage area east of Units 4 and 5 (Figure 2 and Figure 11). Sediment dredged from the Settling Ponds was deposited in a portion of this area. While licensed material has been identified in Settling Pond sediment, the concentrations have been very low relative to anticipated dose based DCGLs based on a reasonable pathway model.

Known and Potential Contaminants

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

Potentially Contaminated Media

- Soil

Preliminary Classification

The Unit 4 and 5 Coal Ash Storage Area 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.

Data Gaps

Radiological analysis of soil samples, from below the ash pile in the specific area where Settling Pond sediments were placed, to determine volumetric contamination.

Supporting Documents

None

6.3.4.15 West Berm

Description and Historical Use

The West Berm encompasses the area inside the PA and west of the Turbine Building and Intermediate Building (Figure 4 and Figure 13). The west berm contains SDT-1, CDT-1, and the two Fire Service Water Tanks.

During the period of the station operation, there have been several events involving SDT-1 which resulted in contamination on the west berm. Additionally, this area is the location where water slap and sludge lancing trailers were placed during outages.

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
- Piping

Preliminary Classification

The West Berm area is preliminarily classified as a MARSSIM Class 2 area based on the discussion above, and the presumption that if localized residual radioactivity is present, its concentration is not likely to exceed the acceptance criteria.

Data Gaps

- Direct measurements of soil, asphalt, and concrete; especially around SDT-1.
- Radiological analysis of concrete and asphalt samples to determine volumetric contamination
- Radiological analysis of soil samples to determine volumetric contamination

Supporting Documents

AR00106444 SDT-1 Discharge Line Leak.pdf
AR00555078 Trace Rad Contamination Found in Excavated West Berm Trench.pdf
NCOR81-0186, SDT-1 Spill on Berm.pdf
NCOR81-0213, SDT-1 Spill on Berm.pdf
NCOR82-0067, Secondary Resin Spill outside the RCA.pdf
NCOR88-0139, Leakage of SDT-1 Contents to the Berm and Storm Drain.pdf
PC9802106 Leak in Discharge Piping from SDT-1 to Settling Ponds along West Berm.pdf
RS2012-08-0133 SDT-1 leak.pdf
RS2012-08-0133 SDT-1 leak.tiff
SDT-1 free release of solid material isotopic.pdf
SDT-1 Pipe.TIF

7 Conclusions

This HSA has been completed in accordance with guidance provided in NUREG-1575 (MARSSIM). As expected, operational activities at CR3 from initial power generation in March 1977 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 CR3 had an excellent operating history that has resulted in very low radiological and non-radiological 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, or appear to present a significant challenge for decommissioning.

In most cases, contamination was remediated immediately at the time of its discovery. Some incidents of contamination were not completely remediated at the time of discovery for one or more of the following reasons:

- the source of contamination was removed and residual contaminant concentrations were very low,
- screening data indicated that the measured contaminant levels did not present a risk to human health or the environment,
- the contamination was contained and managed within a structure,
- the contamination was inaccessible,
- the contaminants were not mobile in soil.

It should be noted that the HSA reflects the current radiological and non-radiological status of the site. Because the chosen decommissioning strategy is SAFSTOR, the information contained in the HSA will need to be evaluated with respect to the period of time that has elapsed when the next stages of decommissioning are initiated. As an example, the initial MARSSIM classification of SSCs and the environs will need to be reevaluated if characterization and FSS planning activities are initiated 40 years from now. The following conclusions are presented for consideration and to clearly state important observations.

- Known incidents of contamination were remediated immediately to reduce the risk to human health and the environment.
- As part of decommissioning planning, 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.
- In order to reduce the size of the licensed footprint of the site, FSS quality surveys should be performed of the buildings/areas in accordance with MARSSIM guidance and regulatory awareness.
- No new impacted areas that were not previously known have been identified by this HSA.
- Where lead-based paint, ACM, or components containing mercury 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.

- Most of the large transformers located in transformer bays on the North Berm outside the Turbine Building have been drained of their dielectric oil and do not pose a continuing risk of non-radiological contamination.
- CR3 has implemented the guidance prescribed by NEI 07-07 (the Industry Groundwater Protection Initiative) and has established an on-going groundwater monitoring program.
- A hydrogeological investigation was undertaken in 2006 to install groundwater monitoring wells, determine groundwater gradients and probable flow paths, and characterize near-surface groundwater quality. These initiatives further strengthen the groundwater monitoring program.
- The horizontal component of groundwater flow in both unconsolidated sediments and bedrock beneath the site is generally to the southwest toward the Gulf of Mexico. Knowledge of groundwater flow patterns supports future decommissioning planning in terms of both managing groundwater intrusion to deep excavations and in evaluating the potential migration of plant-related radionuclides.
- Tritium, at very low levels, is the only plant-related radionuclide that has been identified in groundwater at CR3. Although this conclusion will be verified during future soil characterization activities, the absence of other plant-related radionuclides in groundwater indicates there will not be significant migration of plant-related radionuclides in on-site soils.

8 Recommendations

With completion of this HSA, the next task in the process prescribed in MARSSIM is to collect samples in the areas identified as potentially impacted and analyze the samples for the contaminants that past activities may have released. The characterization data will support design of the final status surveys for each building, structure, and land area that has been classified as impacted. Planning for this characterization phase should include consideration of the data gaps identified in Section 6.

Given that the decommissioning strategy is the SAFSTOR option, the next phases of the MARSSIM process described in Section 5.1 may not be initiated for approximately 40 years. It is recommended that an evaluation be performed to determine which characterization activities should be performed over the next several years to support decommissioning planning. The intent of these near-term characterization activities will be to identify the extent of contamination in SSCs and the environs and to then incorporate this information in planning and estimating costs for decommissioning activities planned in the future. An example of the benefits of strategic characterization activities in the near term is a more accurate estimate of contaminated soil and concrete volumes that will require disposal as either radiological or non-radiological waste.

As decommissioning of the station advances and areas become accessible, all areas of the site identified as potentially impacted should be evaluated to document current conditions and select appropriate remedial responses, if they are required. Characterization should include not only environmental media (soils, sediment and groundwater), but also building materials to determine whether or not radioactive or other hazardous materials are present and may potentially pose a risk to human health and safety or the environment during site-related activities. However, the extent of building characterization should depend on the anticipated end-state of the site at the time of license termination and site release. For example, if the buildings will be removed as waste prior to license termination, then the extent of their characterization need only be sufficient for waste disposal purposes rather than for the design of their final status survey(s).

To facilitate planning for decommissioning, CR3 should consider advancing core borings approximately 24 inches into selected concrete surfaces in the Auxiliary Building, Reactor Building and Intermediate Building. The total length of each concrete core should be divided into equal sections each approximately four inches long. A sample from each of the sections should be analyzed to determine its content of tritium and Carbon-14 and the depth to which these radionuclides have penetrated the concrete. This information will be useful in preparing an estimate of the volume of concrete that is contaminated at a concentration greater than the DCGLs for tritium and Carbon-14 and in estimating costs for waste disposal.

Subsurface soil and groundwater sampling should be conducted at Class 1 and NR Class 1 areas not contained within buildings. Several soil and groundwater samples from each area should be analyzed for the contaminants of concern and the results compared to appropriate DCGLs (in the case of radiological contaminants) or regulatory criteria (in the case of non-radiological contaminants) to determine the need for remediation. Screening of Class 2, NR Class 2, Class 3 and NR Class 3 areas to determine whether or not environmental contaminants are present should follow the same process as that used in Class 1 and NR Class 1 areas but may be less rigorous and require fewer sample analyses. In some areas characterization may be limited to sampling of containment surfaces, surface soil or groundwater from nearby existing monitoring wells.

While the existing array of CR3 groundwater monitoring wells is routinely sampled and analyzed for radiological constituents in support of the station REMP, no analyses have been completed to characterize the groundwater quality pertaining to non-radiological contaminants. At least one round of groundwater samples from the CR3 monitoring wells should be analyzed for non-radiological contaminants including petroleum constituents, solvents, PCBs and RCRA metals.

Material accumulated within the sediment traps at the bottom of storm drains should be sampled and analyzed for plant-related radionuclides and non-radiological contaminants such as petroleum constituents and RCRA metals. CR3 should consider additional sampling and analysis of sediment in the Discharge Canal near the station circulating water and Stormwater outfalls, in the Intake Canal near the Stormwater outfall (for non-radiological constituents) and at the Settling Ponds to determine whether or not radiological or non-radiological contamination of the sediments in these locations has occurred. This sampling and analysis would support planning for decommissioning of the station and license termination.

Monitoring of groundwater from CR3 monitoring wells has detected only tritium at very low levels above the lower limits of detection in these wells. CR3 has not produced power for approximately seven years and has been permanently defueled for approximately three years. The volume of radioactive liquids currently produced and processed is a small fraction of that produced when the plant was producing power. Accordingly, the risk of an incident that would cause significant soil or groundwater contamination occurring now or in the future is substantially reduced.

Monitoring of groundwater from plant monitoring wells currently required by the CR3 Radiological Environmental Monitoring Program should continue at its current frequency at least until all fuel is removed from the Spent Fuel Pool and the pool and associated systems are drained. At that time CR3 can consider a reduction in the frequency of groundwater monitoring during SAFSTOR and active decommissioning of the station.

An approach to reducing the size of the licensed footprint for those buildings and areas <u>not</u> classified as impacted would be to identify the area within the footprint with the maximum effluent particulate deposition (D/Q) in the predominant downwind direction. Once identified, a survey protocol can be developed in an attempt to demonstrate a negligible impact from site releases. The results could then be presented to the regulators as a partial site release package, in accordance with 10CFR50.83, as the basis for releasing other non-impacted areas.

9 Cited References

[1] U.S. Nuclear Regulatory Commission, U.S. Environmental Protection Agency, U.S. Department of Energy, and U.S. Department of Defense, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev 1," 2000.

NUREG-1575 (MARSSIM).pdf

[2] Florida Department of Environmental Protection, "62-520.400 Minimum Criteria for Ground Water".

62-520.400 Florida Minimum Criteria for Groundwater.doc
62-520.410 Florida Groundwater Classifications.doc
62-520.430 Florida Standards for Class G-III Groundwater.doc

[3] U.S. Nuclear Regulatory Commission, "10 CFR 50.75(g) Reporting and Recordkeeping for Decommissioning Planning," 2015.

10 CFR 75(g)_HPP0230-1Q2015.pdf
10 CFR 75(g)_HPP0230-2Q2014.PDF
10 CFR 75(g)_HPP0230-3Q2014.pdf
10 CFR 75(g)_HPP0230-4Q2014.pdf
10 CFR 75(g)_HPP0230-Annual Review_1-1-07_6-1-08.pdf
10 CFR 75(g)_HPP0230-CR3 Settling Pond.pdf
10 CFR 75(g)_HPP0230_1977.PDF
10 CFR 75(g)_HPP0230_1978.PDF
10 CFR 75(g)_HPP0230_1979.PDF
10 CFR 75(g)_HPP0230_1980.PDF
10 CFR 75(g)_HPP0230_1981.PDF
10 CFR 75(g)_HPP0230_1982.PDF
10 CFR 75(g)_HPP0230_1983.PDF
10 CFR 75(g)_HPP0230_1986.PDF
10 CFR 75(g)_HPP0230_1988.PDF
10 CFR 75(g)_HPP0230_1989.PDF
10 CFR 75(g)_HPP0230_1991.PDF
10 CFR 75(g)_HPP0230_1992.PDF
10 CFR 75(g)_HPP0230_1993.PDF
10 CFR 75(g)_HPP0230_1994.PDF
10 CFR 75(g)_HPP0230_1997.PDF
10 CFR 75(g)_HPP0230_1998.PDF
10 CFR 75(g)_HPP0230_1999.PDF
10 CFR 75(g)_HPP0230_2000.PDF
10 CFR 75(g)_HPP0230_2001.PDF
10 CFR 75(g)_HPP0230_2006.PDF

10 CFR 75(g)_HPP0230_2007.PDF
10 CFR 75(g)_HPP0230_2008.PDF
10 CFR 75(g)_HPP0230_2009.PDF
10 CFR 75(g)_HPP0230_2010.PDF
10 CFR 75(g)_HPP0230_2011.PDF
10 CFR 75(g)_HPP0230_2012.PDF
10 CFR 75(g)_HPP0230_2013.PDF

[4] Nuclear Energy Institute, "NEI 07-07 Industry Groundwater Protection Initiative," NEI, 2007.

NEI 07-07.pdf

[5] U.S. Nuclear Regulatory Commission, "10 CFR 50 DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES," 2015.

NRC Acknowledgement Letter of Permanent Cessation of CR3 Power Ops.pdf

[6] U.S. Fish and Wildlife Service, "National Wetlands Inventory".

USFWS National Wetlands Inventory.pdf

[7] Southeastern Geological Society, "Geology of Citrus County, Florida," 2014.

Geology of Citrus County_SEGS_2014.pdf

[8] Duke Energy Florida, "Final Safety Analysis Report, Crystal River Unit 3, Rev 35".

CR3 FSAR.pdf

[9] Gaydos Hydro Services LLC, "CR3 Groundwater Flow Study Summary Report," November 2012.

Gaydos_GW Flow Study Summary Report 12.5.12.pdf

[10] EnHydro LLC, "Groundwater Flow Study Report, Crystal River Unit 3," 2007.

CR3 Groundwater Flow Study Report-EnHydro-Jan2007 (1).pdf

[11] Duke Energy Florida, "Annual Radiological Environmental Operating Report, Crystal River Unit 3," 2014.

CR3 2010 Annual Radiological Environmental Operating Report.pdf

[12] Florida Department of Environmental Protection, "Drinking Water Standards".

FDEP Health Effects of Microbiological Contaminants - Drinking Water Program.pdf
FDEP Inorganic Contaminants - Drinking Water Program.pdf
FDEP Miscellaneous Contaminants - Drinking Water Program.pdf
FDEP Radionuclide Contamination - Drinking Water Program.pdf
FDEP Secondary Drinking Water Standards - Drinking Water Program.pdf
FDEP SoilCleanupTargetLevels.pdf
FDEP Synthetic Organic Contaminants - Drinking Water Program.pdf
FDEP Tank Database.xlsx
FDEP Tank Inventory.pdf
FDEP Tanks with Discharges.xlsx
FDEP Volatile Organic Chemical Contaminants - Drinking Water Program.pdf

[13] J. D. a. S. M. T. Fretwell, "Resistivity Study of a Coastal Karst Terrain, Florida," *Ground Water,* vol. Vol 19, no. No 2, March-April 1981.

Fretwell and Stewart_Resistivity Study of Coastal Karst_1981.PDF

[14] Crystal River Nuclear Power Station, "Crystal River Security Training Facility Shooting Range Environmental Stewardship Plan, Rev 00," March 2012.

Shooting Range Environmental Stewardship Plan.docx

[15] Duke Energy Florida, "Offsite Dose Calculation Manual (ODCM), Crystal River Unit 3, Rev 36".

CR3 ODCM.pdf

[16] Duke Energy Florida, "Annual Radiological Effluent Release Report, Crystal River Unit 3," 2014.

REMP 2014_final.pdf

[17] American Nuclear Insurers, "Nuclear Liability Insurance Inspection Report".

CR3 20090515 ANI Report.pdf

[18] Duke Energy Florida, "Spill Prevention, Control and Countermeasures Plant, Crystal River Unit 3".

CR3 SPCC 2012.pdf

10Appendices

A. Summary Table of Non-Radiological Areas

Table 8: Summary Table of Non-Radiological Areas

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
Building or Structure			
Alternate AC Diesel Generator Building	3 & 8	Diesel Fuel Constituents	NR Class 2
Auxiliary Building	3 & 8	Asbestos, Lead, Mercury, and Petroleum Products	NR Class 3
Cable Trays and Duct Banks	Not Shown	Petroleum Constituents and RCRA Metals	NR Class 3
Dry Cleaning Facility	3 & 8	Solvents	NR Class 2
Emergency Diesel Generator Building	3 & 8	Diesel Fuel Constituents	NR Class 2
Emergency Feedwater Pump 3 Building	3 & 8	Diesel Fuel Constituents	NR Class 3
Fire Service Pump House	3 & 8	Diesel Fuel Constituents	NR Class 3
Maintenance Support Building	3 & 8	RCRA Metals, Hydraulic Oil, Oil-Soaked Rags, Petroleum Constituents, Lubricating Oil, and Spent Solvents	NR Class 2
Receiving Warehouse	3 & 8	Acids-Bases, Petroleum Products, Sodium Hypochlorite, Laboratory Chemicals, and Solvents	NR Class 3
RMSW D	2 & 7	Lubricating Oil and Petroleum Products	NR Class 3
RT Bunker	3 & 8	Lead and Asbestos	NR Class 1
Sewage Treatment Plant	(2;3) & 8	RCRA Metals	NR Class 3
Turbine Building	3 & 8	Asbestos, Lead, Mercury, and Petroleum Products	NR Class 3
Chemical and Drum Storage Areas			
CRP Grease Tanker and Drum Storage Area	3 & 8	Petroleum Constituents, RCRA Metals, and Volatile Organic Compounds	NR Class 3
Hazardous Material Storage Buildings	3 & 8	Acids-Bases, Waste Oil Constituents, Laboratory Chemicals, Oil-Soaked Rags, Universal Wastes, and Spent Solvents	NR Class 2
Issue Warehouse	3 & 8	Acids-Bases, Petroleum Products, Sodium Hypochlorite, Laboratory Chemicals, and Solvents	NR Class 3

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
Exterior Area			
Area Surrounding RMSW G	3 & 8	RCRA Metals	NR Class 3
Construction Debris Dump	3 & 8	Petroleum Constituents, RCRA Metals, and Asbestos	NR Class 3
East Berm	4	Petroleum Constituents, RCRA Metals, and Solvents	NR Class 3
Firing Range	2 & 7	Lead	NR Class 1
North Berm	4	Petroleum Constituents and RCRA Metals	NR Class 3
Settling Ponds	2 & 7	Petroleum Constituents, RCRA Metals, Hydrazine, and Nalco	NR Class 2
South Berm	4	Petroleum Constituents, RCRA Metals, and Solvents	NR Class 3
Station Drain Tank Effluent Pipe Leak Area	2 & 7	Petroleum Constituents and RCRA Metals	NR Class 3
Storm Water Retention Ponds	3 & 8	Petroleum Constituents and RCRA Metals	NR Class 3
Swamp Area	3 & 8	Dielectric Oil, Petroleum Constituents, and RCRA Metals	NR Class 2
Switch Yard	(2;3) & (7;8)	Dielectric Oil	NR Class 3
Unit 4 and 5 Coal Ash Storage Area	2 & 7	Petroleum Constituents and RCRA Metals	NR Class 3
West Berm	4	Petroleum Constituents and RCRA Metals	NR Class 3
Oil-Filled Mechanical Equipment			
Auxiliary Building Elevator	Not Shown	Hydraulic Oil	NR Class 3
Conference and Cafeteria Building Elevator	Not Shown	Hydraulic Oil	NR Class 3
Control Complex Elevator	Not Shown	Hydraulic Oil	NR Class 3
Feedwater Pump Motors	Not Shown	Lubricating Oil	NR Class 3
Nuclear Administration Building Elevator	Not Shown	Hydraulic Oil	NR Class 3
Plant Administration Building-Technical Support Center Elevator	Not Shown	Hydraulic Oil	NR Class 3
Reactor Building Elevator	Not Shown	Hydraulic Oil	NR Class 3
Reactor Coolant Pump Motors	Not Shown	Lubricating Oil	NR Class 3
Site Wide Impacts			
Asbestos Containing Material	Not Shown	Asbestos	NR Class 1
Lead and Lead-Based Paint	Not Shown	Lead	NR Class 1
Mercury-Containing Components	Not Shown	Mercury	NR Class 1
Storm Drain System	6 & 10	Petroleum Constituents, RCRA Metals, and Dielectric Oil	NR Class 2
Storage Tanks			
B.5.b Diesel Water Pump Fuel Tank	5 & 9	Diesel Fuel Constituents	NR Class 3

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
DFT-1A	5 & 9	Diesel Fuel Constituents	NR Class 1
DFT-1B	5 & 9	Diesel Fuel Constituents	NR Class 1
DFT-4	5 & 9	Diesel Fuel Constituents	NR Class 3
DFT-5	5 & 9	Diesel Fuel Constituents	NR Class 2
Diesel Generator A Fuel Day Tank	5 & 9	Diesel Fuel Constituents	NR Class 3
Diesel Generator B Fuel Day Tank	5 & 9	Diesel Fuel Constituents	NR Class 3
EHC Fluid Tank	Not Shown	Electrohydraulic Control Fluid	NR Class 3
Fire Service Pump A Fuel Tank	(3;5) & (8;9)	Diesel Fuel and Petroleum Constituents	NR Class 3
Fire Service Pump B Fuel Tank	(3;5) & (8;9)	Diesel Fuel and Petroleum Constituents	NR Class 3
Hydrazine Feed Tank	Not Shown	Hydrazine	NR Class 3
IAP-4	5 & 9	Diesel Fuel Constituents	NR Class 3
LOT-1	5 & 9	Lubricating Oil Constituents	NR Class 1
LOT-2	5 & 9	Lubricating Oil Constituents	NR Class 2
MET-1	5 & 9	Diesel Fuel Constituents	NR Class 1
MET-2	5 & 9	Diesel Fuel Constituents	NR Class 3
NSOC Diesel Generator Fuel Tank	5 & 9	Diesel Fuel Constituents	NR Class 3
Poly Tanks	Not Shown	Petroleum Constituents and RCRA Metals	NR Class 3
SDT-1	5 & 9	RCRA Metals, Petroleum Constituents, and Hydrazine	NR Class 2
Turbine Building Sump Oil and Water Separator	Not Shown	Petroleum Constituents and RCRA Metals	NR Class 3
Transformers			
Concrete Batch Plant Transformers	2 & 7	Dielectric Oil	NR Class 3
Maintenance Training Facility Transformer	5 & 9	Dielectric Oil	NR Class 3
MTSH-3HA	5 & 9	Dielectric Oil	NR Class 3
MTSH-3HB	5 & 9	Dielectric Oil	NR Class 3
MTTR-1	5 & 9	Dielectric Oil	NR Class 3
MTTR-2	5 & 9	Dielectric Oil	NR Class 3
MTTR-3A	5 & 9	Dielectric Oil	NR Class 3
MTTR-3B	5 & 9	Dielectric Oil	NR Class 3
MTTR-3C	5 & 9	Dielectric Oil	NR Class 3
MTTR-3D	5 & 9	Dielectric Oil	NR Class 3
MTTR-6	5 & 9	Dielectric Oil	NR Class 3
MTTR-7	5 & 9	Dielectric Oil	NR Class 2
Off Site Power Transformer	2 & 7	Dielectric Oil	NR Class 2

B. Summary Table of Radiological Areas

Table 9: Summary Table of Radiological Areas

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
Building or Structure			
Alternate AC Diesel Generator Building	3 & 12	Gammas and HTD&Betas	Class 3
Auxiliary Building	3 & 12	Gammas, HTD&Betas, Tritium, and TRUs	Class 1
Control Complex	3 & 12	Gammas and HTD&Betas	Class 3
Discharge Structure	3 & 12	Gammas, HTD&Betas, and Tritium	Class 2
Emergency Diesel Generator Building	3 & 12	Gammas and HTD&Betas	Class 3
Emergency Feedwater Pump 3 Building	3 & 12	Gammas and HTD&Betas	Class 3
Emergency Feedwater Tank Building	3 & 12	Gammas and HTD&Betas	Class 3
Fire Service Pump House	3 & 12	Gammas and HTD&Betas	Class 3
Intake Structure	3 & 12	Gammas and HTD&Betas	Class 3
Intermediate Building	3 & 12	Gammas, HTD&Betas, and Tritium	Class 1
Maintenance Support Building	3 & 12	Gammas and HTD&Betas	Class 1
Nuclear Administration Building	3 & 12	Gammas and HTD&Betas	Class 3
Nuclear Security Operations Center	3 & 12	Gammas and HTD&Betas	Class 3
OTSG Storage Facility	3 & 12	Gammas, HTD&Betas, and TRUs	Class 1
Plant Administration Building-Technical Support Center	3 & 12	Gammas and HTD&Betas	Class 3
Reactor Building	3 & 12	Gammas, HTD&Betas, Tritium, and TRUs	Class 1
Reactor Building Spray Tank Room	3 & 12	Gammas, HTD&Betas, and Tritium	Class 1
RMSW D	2 & 11	Gammas and HTD&Betas	Class 2
RMSW G	3 & 12	Gammas and HTD&Betas	Class 2
Rusty Building	3 & 12	Gammas and HTD&Betas	Class 3
RVCH Storage Facility	3 & 12	Gammas, HTD&Betas, and TRUs	Class 2
Security CAS Building	3 & 12	Gammas and HTD&Betas	Class 3
Sewage Treatment Plant	3 & 12	Gammas and HTD&Betas	Class 3
Turbine Building	3 & 12	Gammas, HTD&Betas, and Tritium	Class 2
Units 1 and 2	3 & 12	Gammas	Class 3
Exterior Area			
Area Surrounding RMSW G	3 & 12	Gammas and HTD&Betas	Class 2
Decon Tent Area	3 & 12	Gammas and HTD&Betas	Class 2
East Berm	4 & 13	Gammas and HTD&Betas	Class 2
Nitrogen and Hydrogen Storage Area	3 & 12	Gammas and HTD&Betas	Class 2
North Berm	4 & 13	Gammas and HTD&Betas	Class 3
Protected Area Ground Surfaces	Not Shown	Gammas and HTD&Betas	Class 3
R16 Shipping Yard	2 & 11	Gammas and HTD&Betas	Class 3
SeaLand Container Storage Area	3 & 12	Gammas and HTD&Betas	Class 3

Potentially Impacted Area	Figure Number	Potential Contaminants	Preliminary Classification
Settling Ponds	2 & 11	Gammas, HTD&Betas, and Tritium	Class 3
South Berm	4 & 13	Gammas and HTD&Betas	Class 1
Station Drain Tank Effluent Pipe Leak Area	2 & 11	Gammas, HTD&Betas, and Tritium	Class 3
Storm Water Retention Ponds	3 & 12	Gammas and HTD&Betas	Class 2
Swamp Area	3 & 12	Gammas and HTD&Betas	Class 2
Unit 4 and 5 Coal Ash Storage Area	2 & 11	Gammas	Class 3
West Berm	4 & 13	Gammas and HTD&Betas	Class 3
Site Wide Impacts			
Storm Drain System	6 & 14	Gammas and HTD&Betas	Class 3

C. Document Figures

Figure 1: Location of Crystal River Energy Center

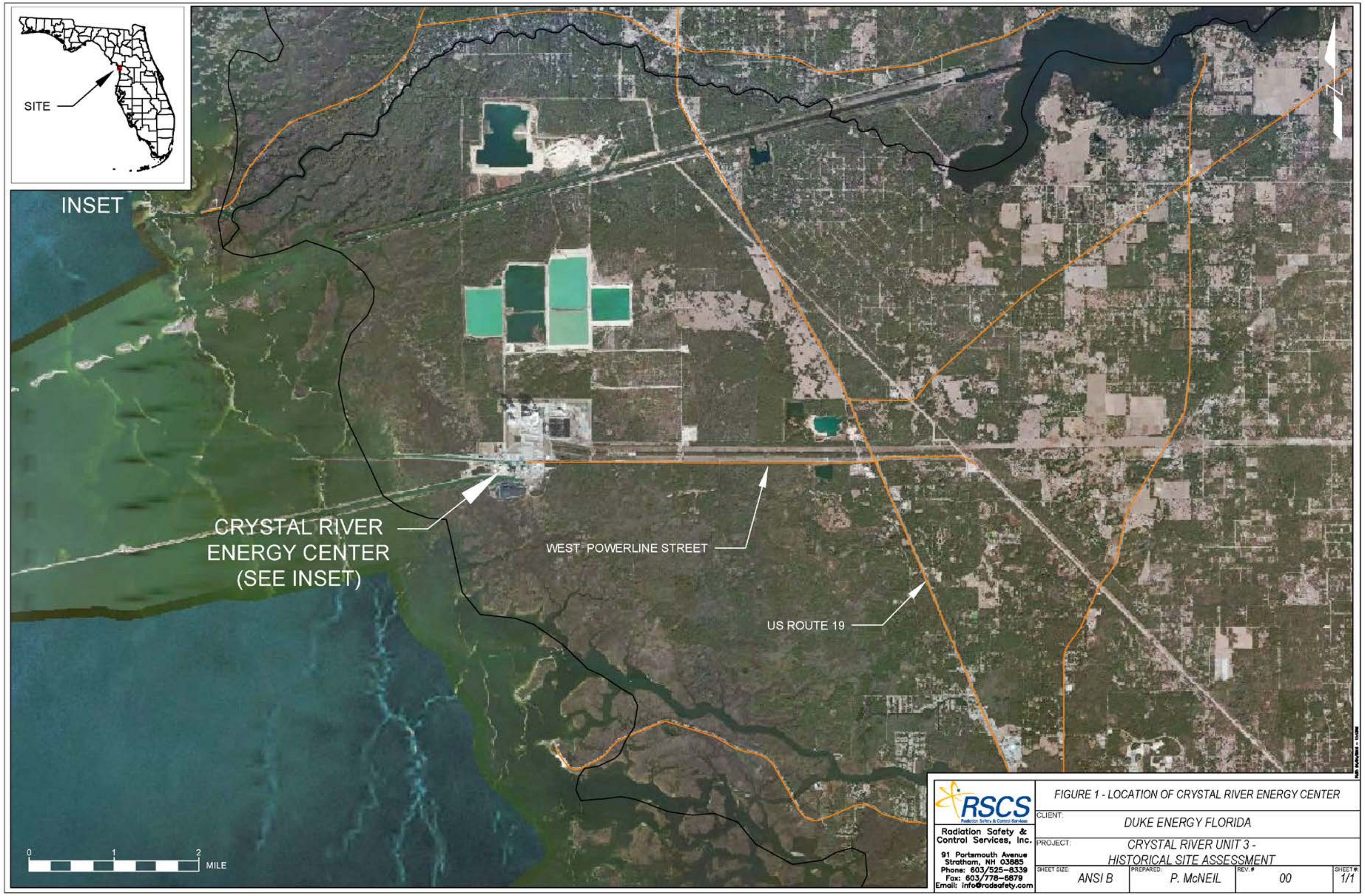


Figure 2: Crystal River Energy Center Facilities

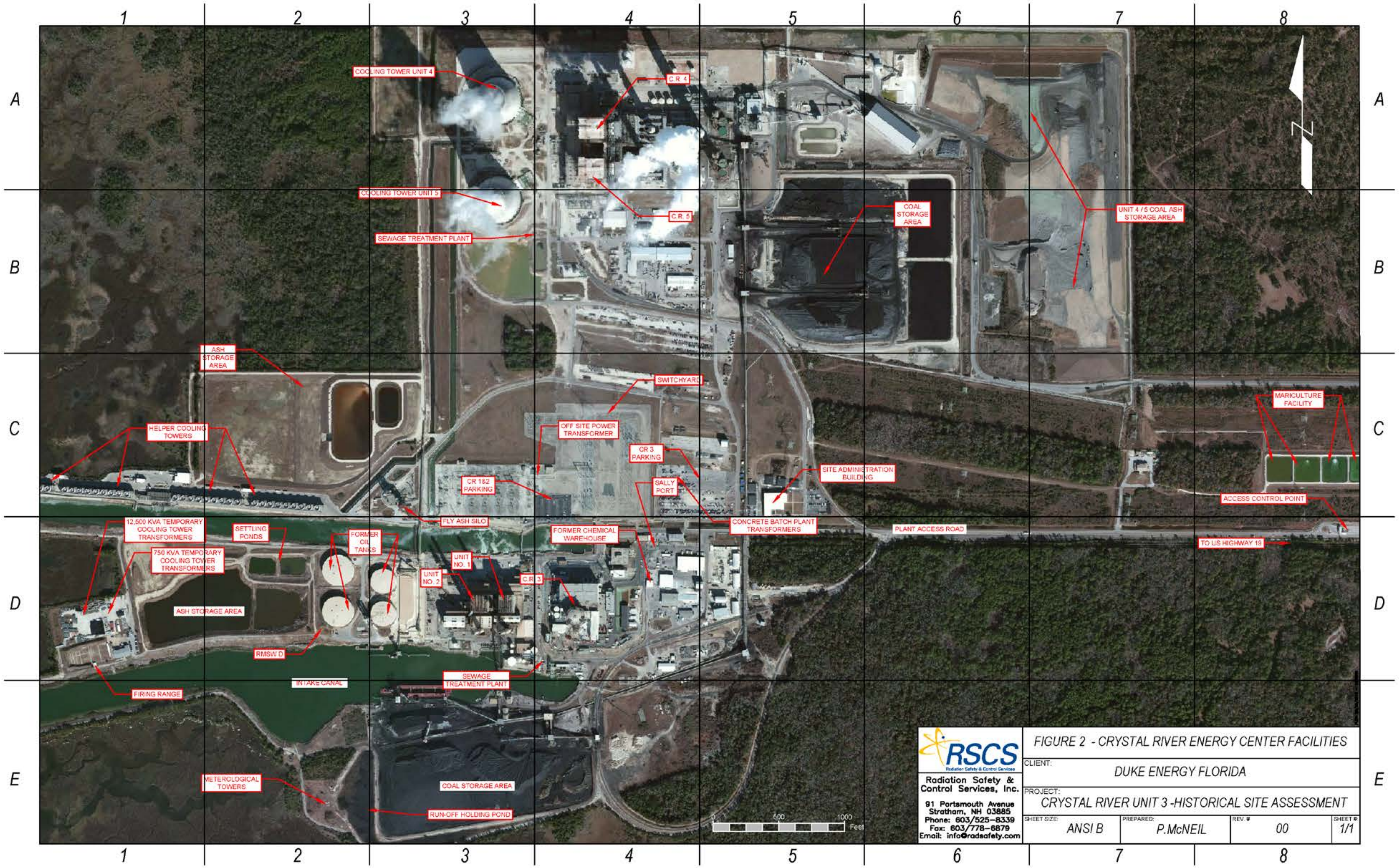


Figure 3: Crystal River Unit 3 Facilities

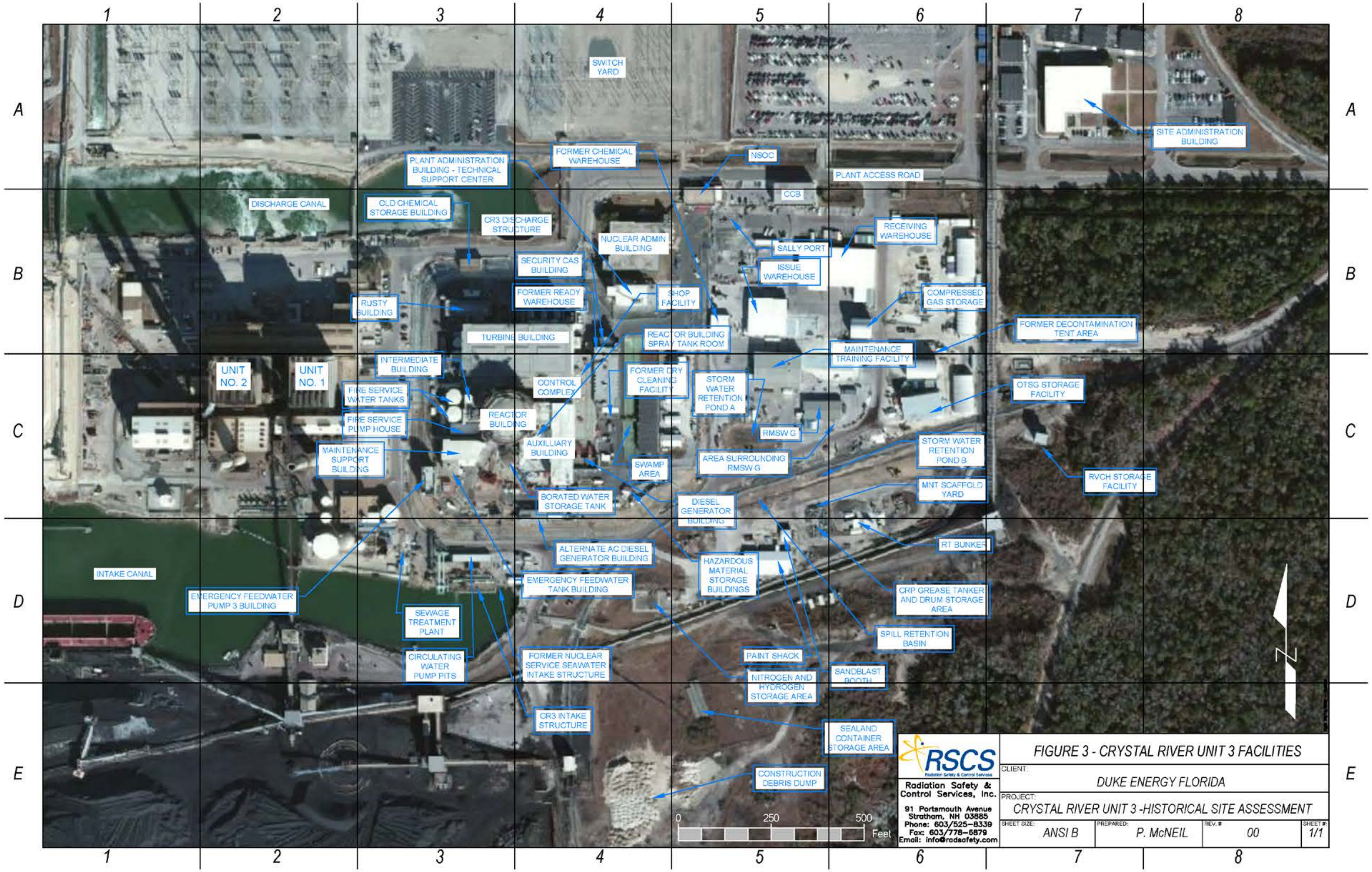
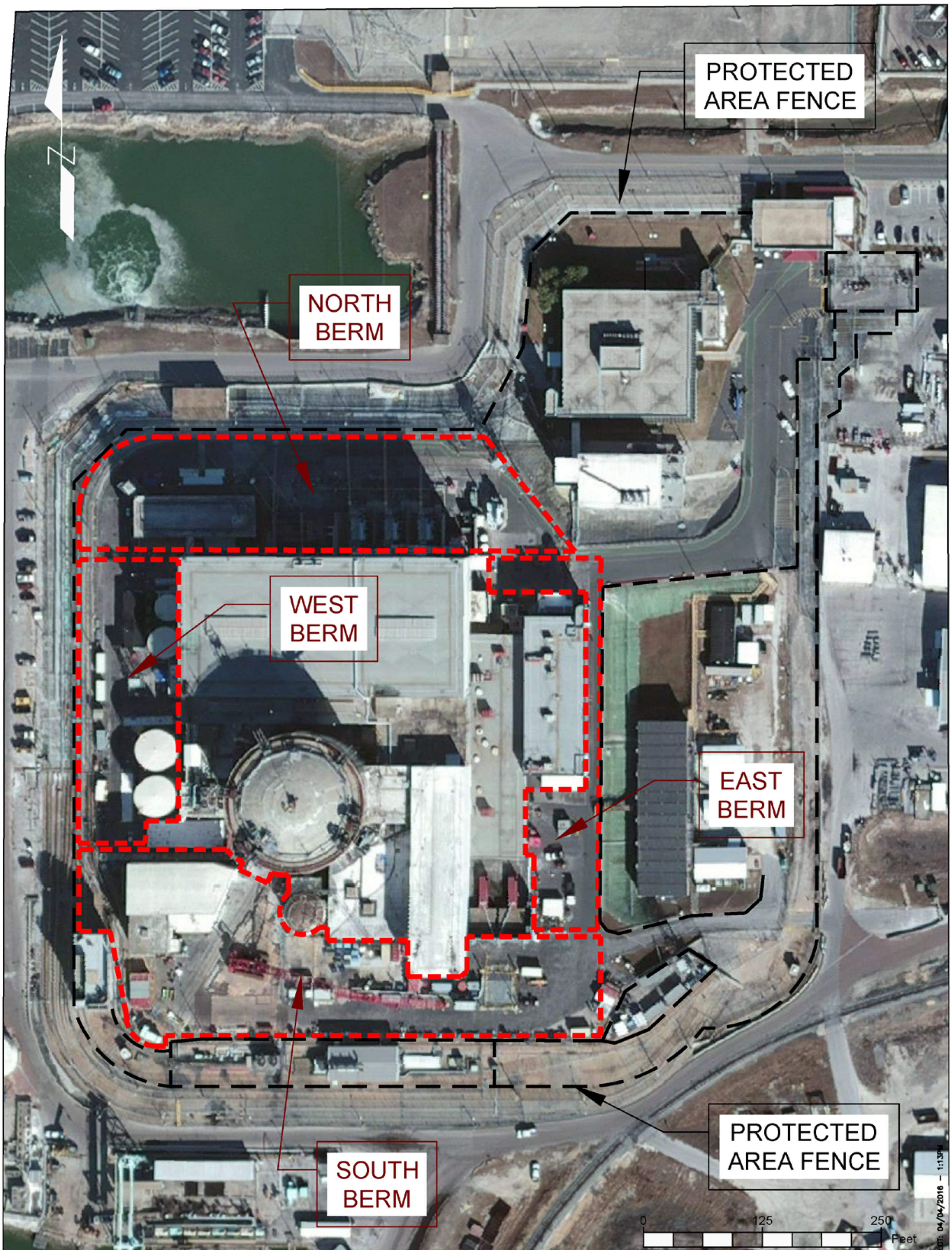


Figure 4: Crystal River Unit 3 Berm Areas



RSCS Radiation Safety & Control Services	FIGURE 4 - CRYSTAL RIVER UNIT 3 BERM AREAS		
Radiation Safety & Control Services, Inc.	CLIENT: DUKE ENERGY FLORIDA		
91 Portsmouth Avenue Stratham, NH 03885 Phone: 603/525-8339 Fax: 603/778-6879 Email: info@radsafety.com	PROJECT: CRYSTAL RIVER 3 - HISTORICAL SITE ASSESSMENT		
	SHEET SIZE: ANSI B	PREPARED: G. PAIVA	REV. #: 00	SHEET #: 1/1

Figure 5: Crystal River Unit 3 Petroleum Storage and Transformer Locations

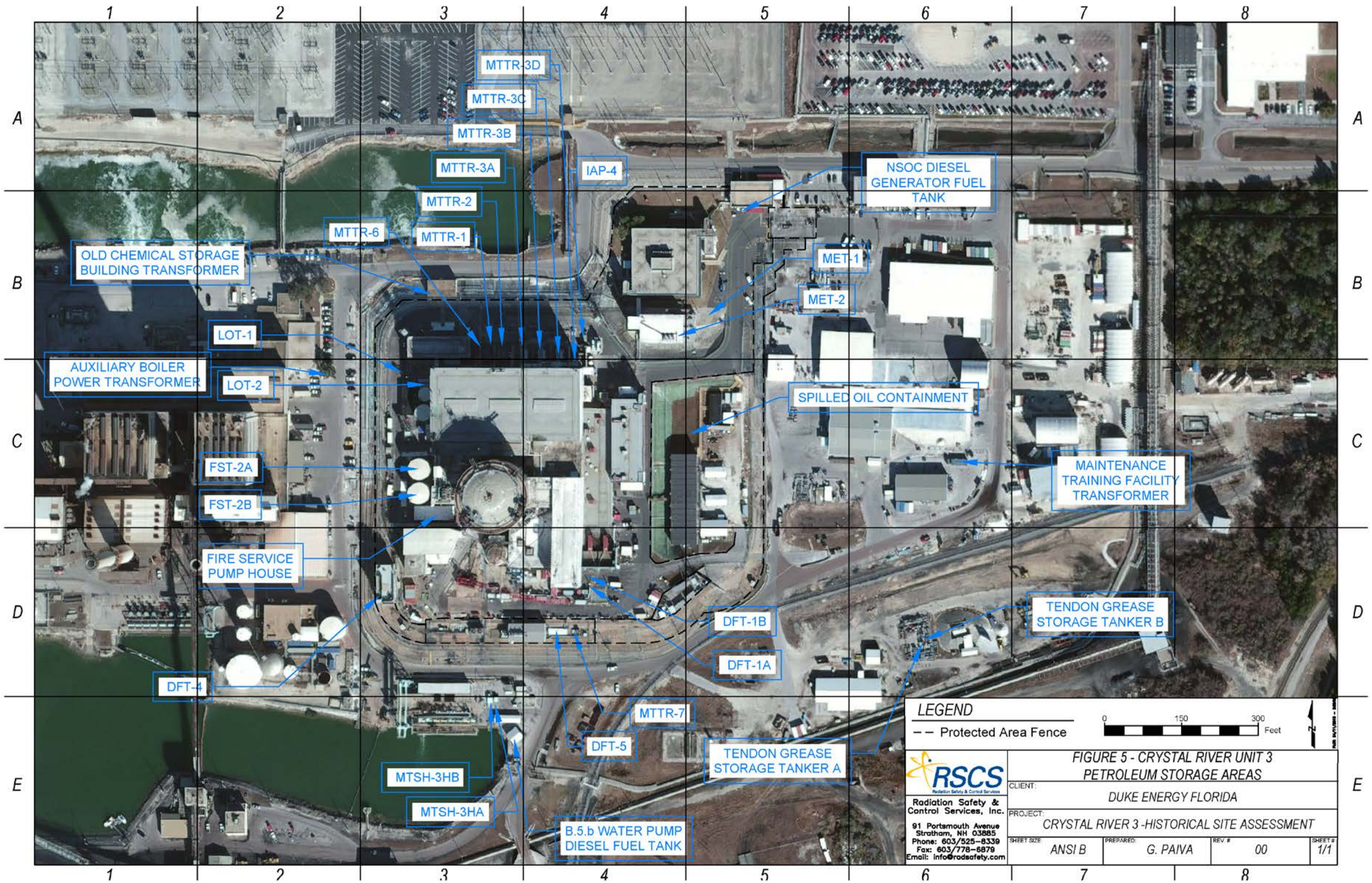


Figure 6: Crystal River Unit 3 Storm Drain Locations Within the Protected Area

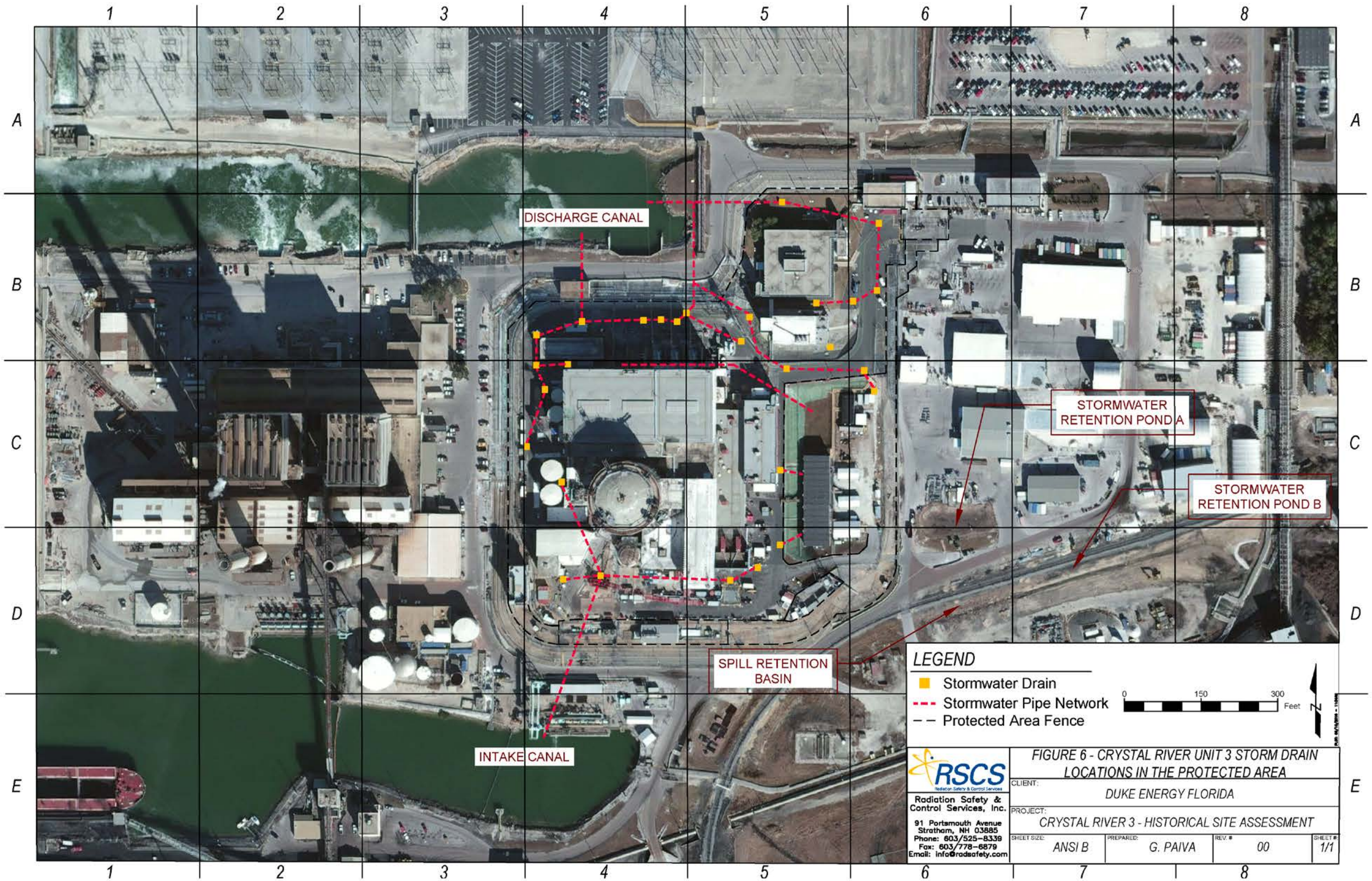


Figure 7: Crystal River Unit 3 Preliminary Classifications of Non-Radiological Impacts in Outlying Areas of the Station

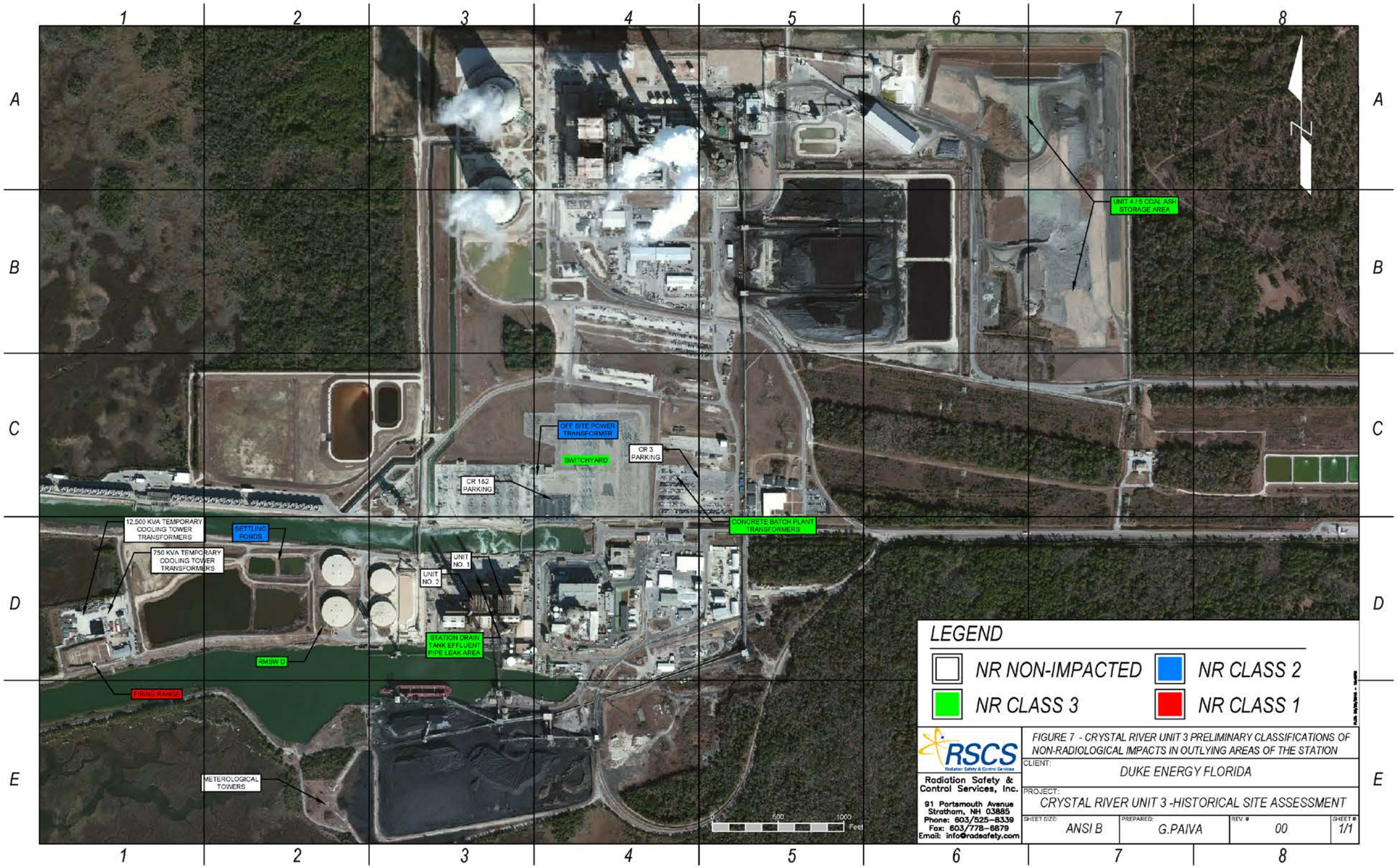


Figure 8: Crystal River Unit 3 Preliminary Classifications of Non-Radiological Impacts in the Vicinity of the Protected Area

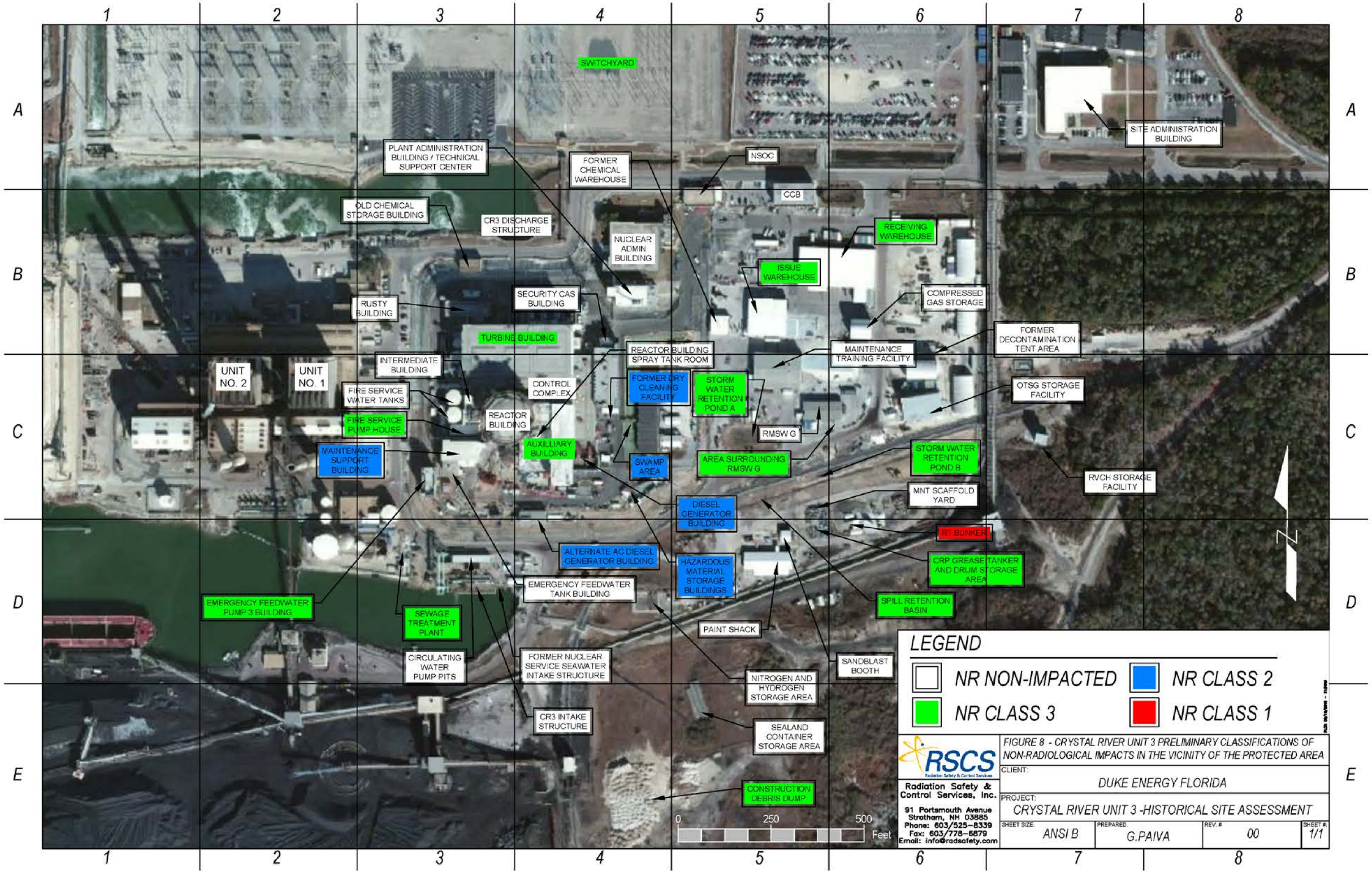


Figure 9: Crystal River Unit 3 Preliminary Classifications of Non-Radiological Impacts in the Vicinity of Storage Tanks and Transformers

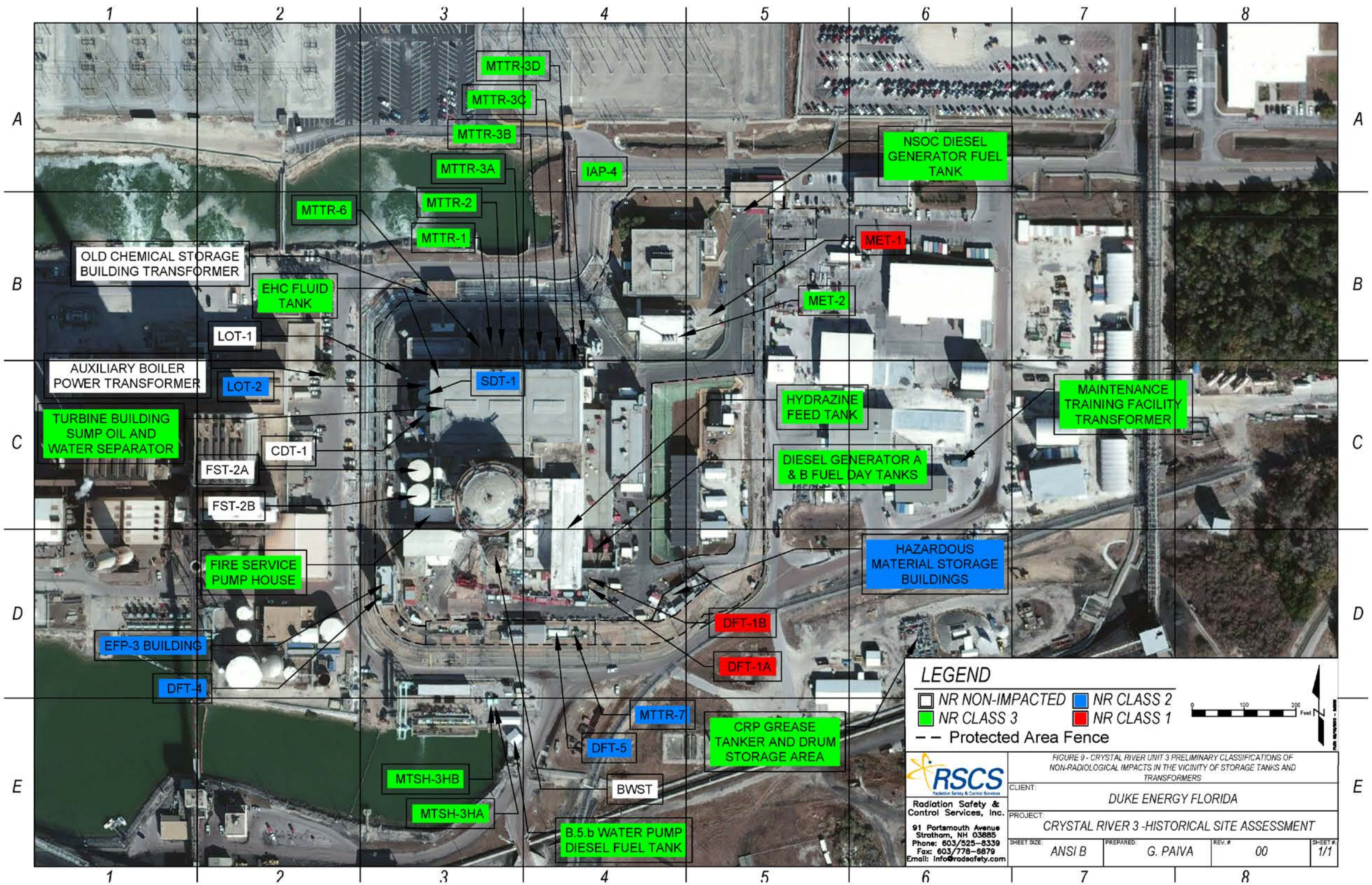


Figure 10: Crystal River Unit 3 Preliminary Classifications of Non-Radiological Impacts in the Storm Drain System

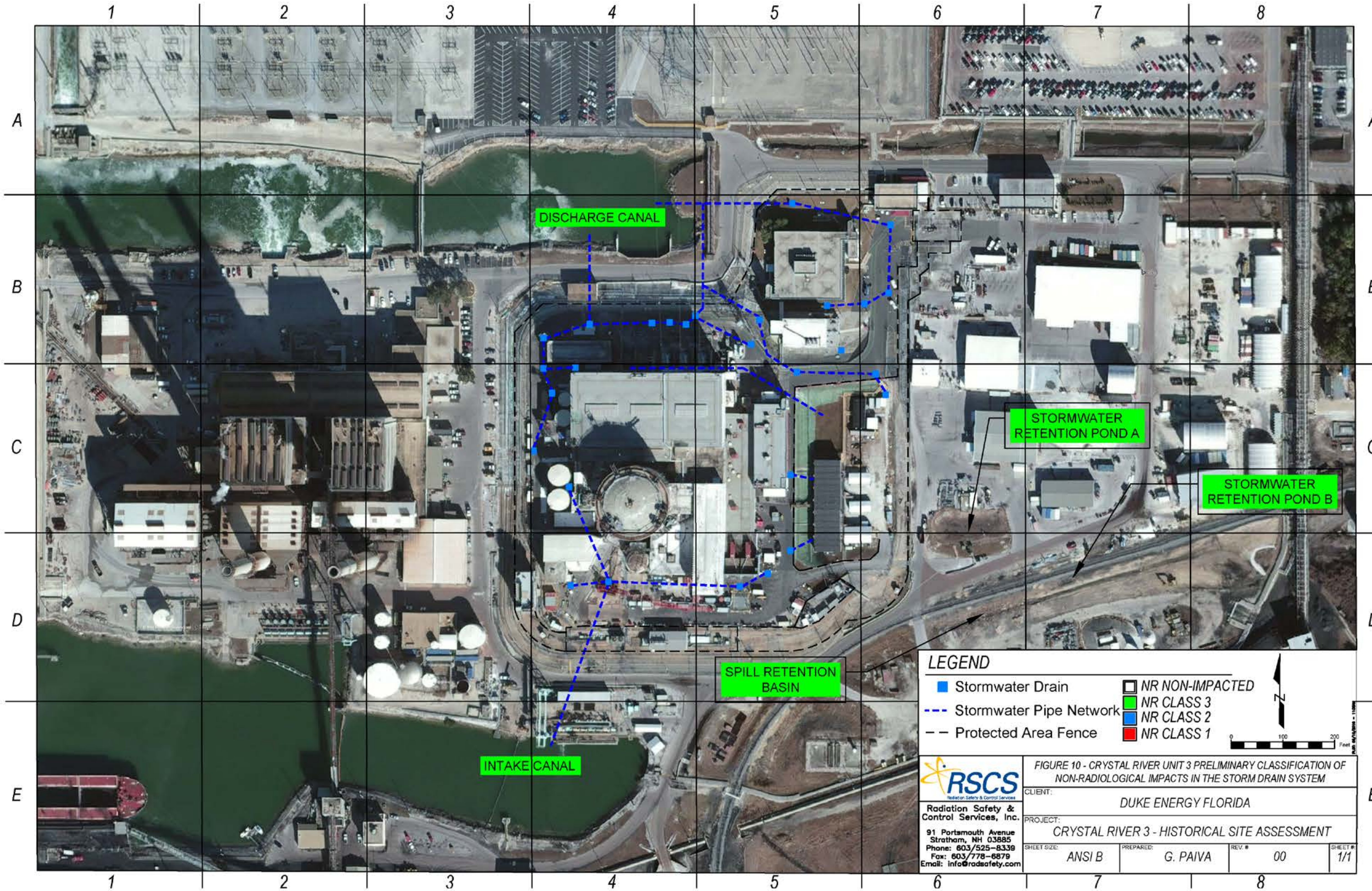


Figure 11: Crystal River Unit 3 Preliminary Classifications of Radiological Impacts in Outlying Areas of the Station

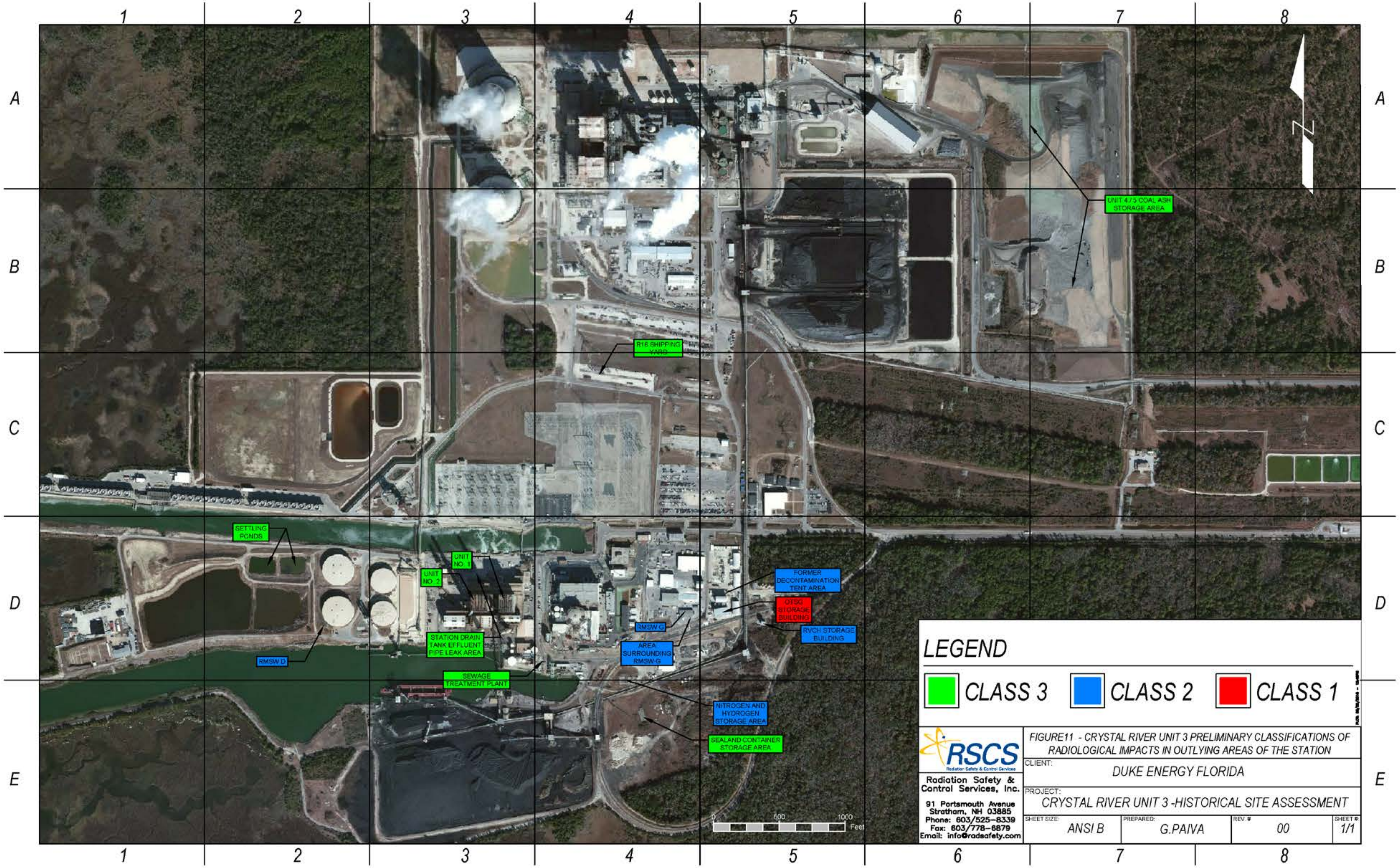


Figure 12: Crystal River Unit 3 Preliminary Classifications of Radiological Impacts in the Vicinity of the Protected Area

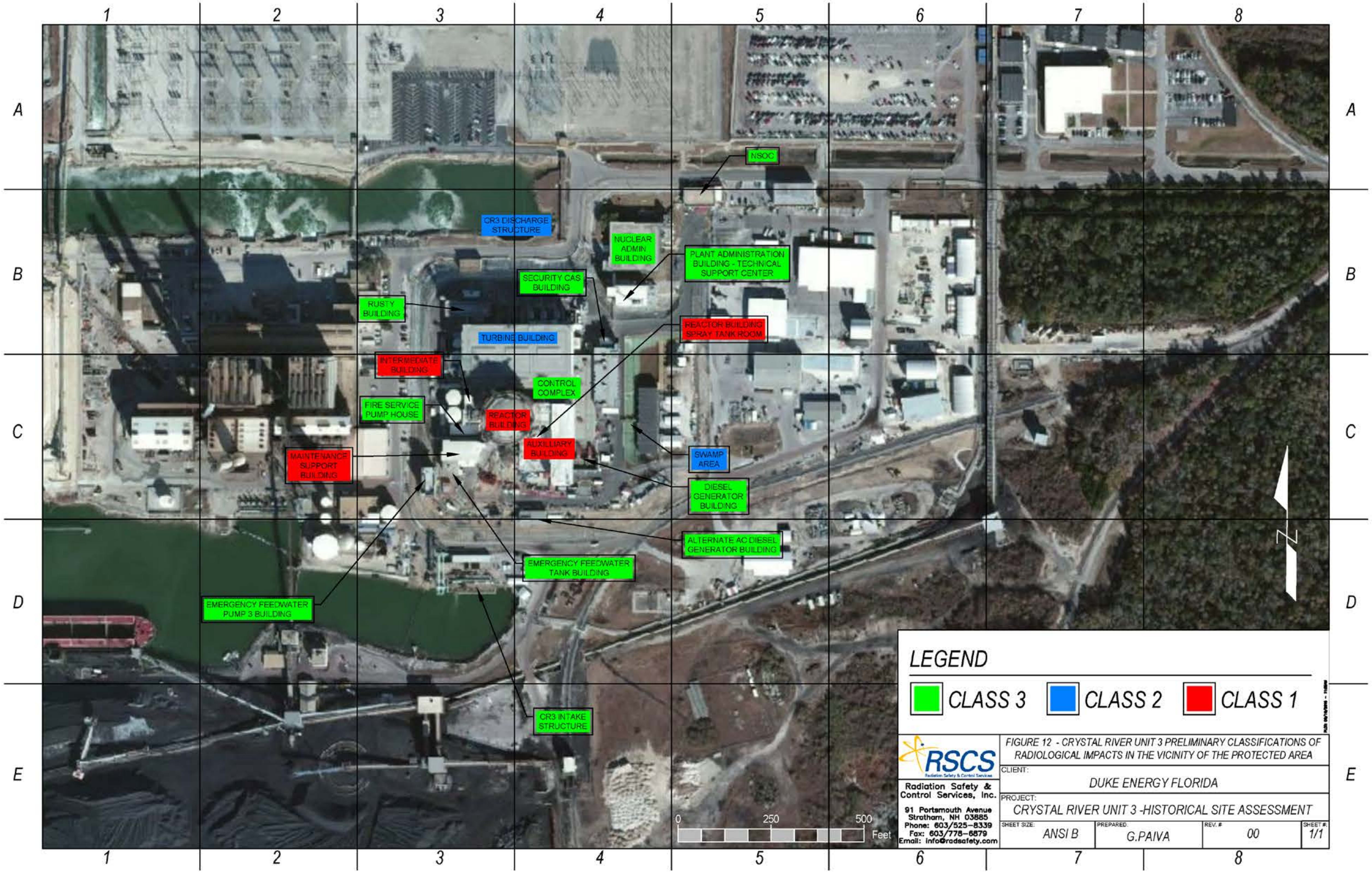
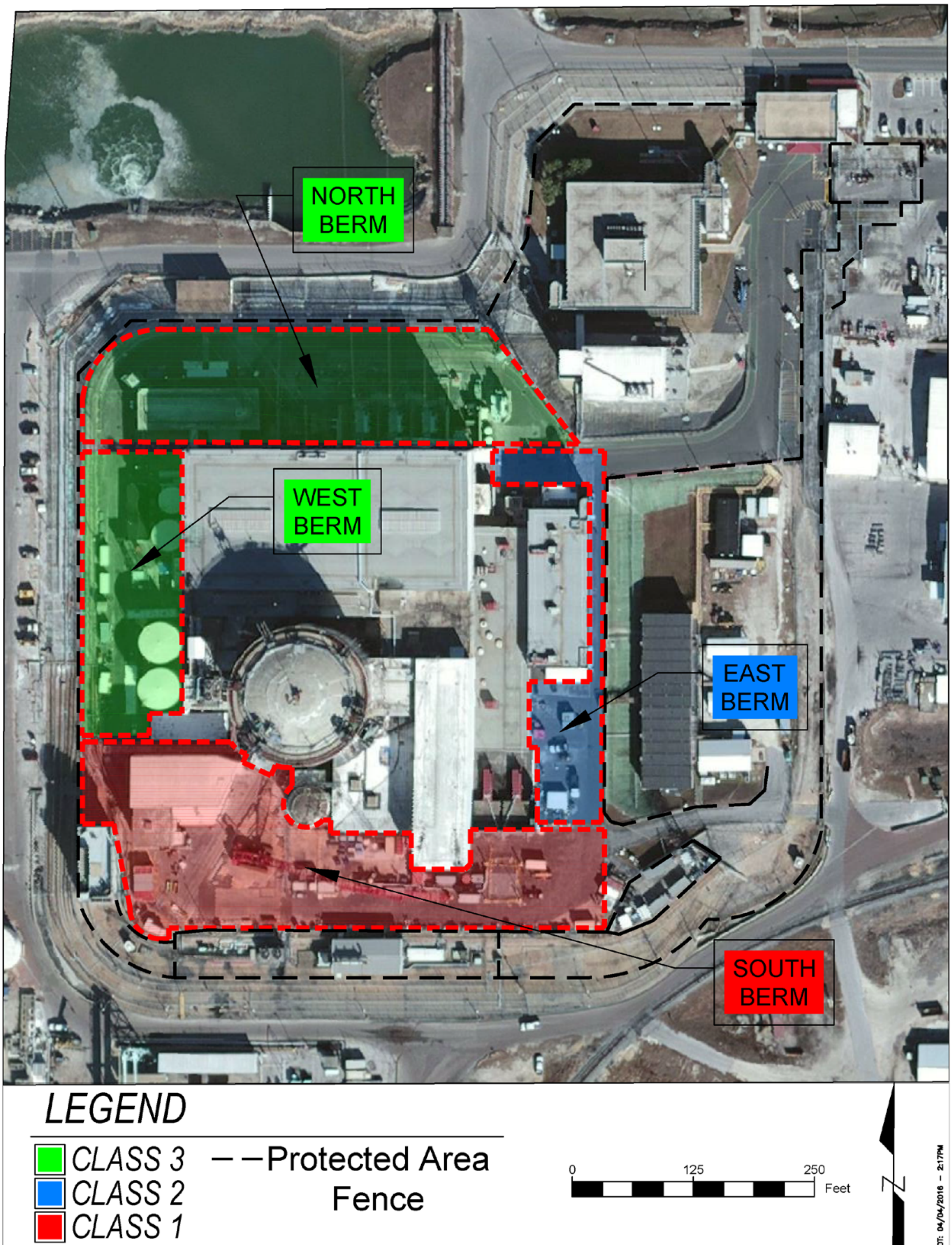


Figure 13: Crystal River Unit 3 Preliminary Classifications of Radiological Impacts in the Berm Areas



RSCS Radiation Safety & Control Services	FIGURE 13 - CRYSTAL RIVER UNIT 3 PRELIMINARY CLASSIFICATION OF RADIOLOGICAL IMPACTS IN THE BERM AREAS
	CLIENT: DUKE ENERGY FLORIDA
Radiation Safety & Control Services, Inc. 91 Portsmouth Avenue Stratham, NH 03885 Phone: 603/525-8339 Fax: 603/778-6879 Email: info@radsafety.com	PROJECT: CRYSTAL RIVER 3 - HISTORICAL SITE ASSESSMENT

SHEET SIZE:	PREPARED:	REV. #	SHEET #:
ANSI B	G. PAIVA	00	1/1

Figure 14: Crystal River Unit 3 Preliminary Classifications of Radiological Impacts in the Storm Drain System

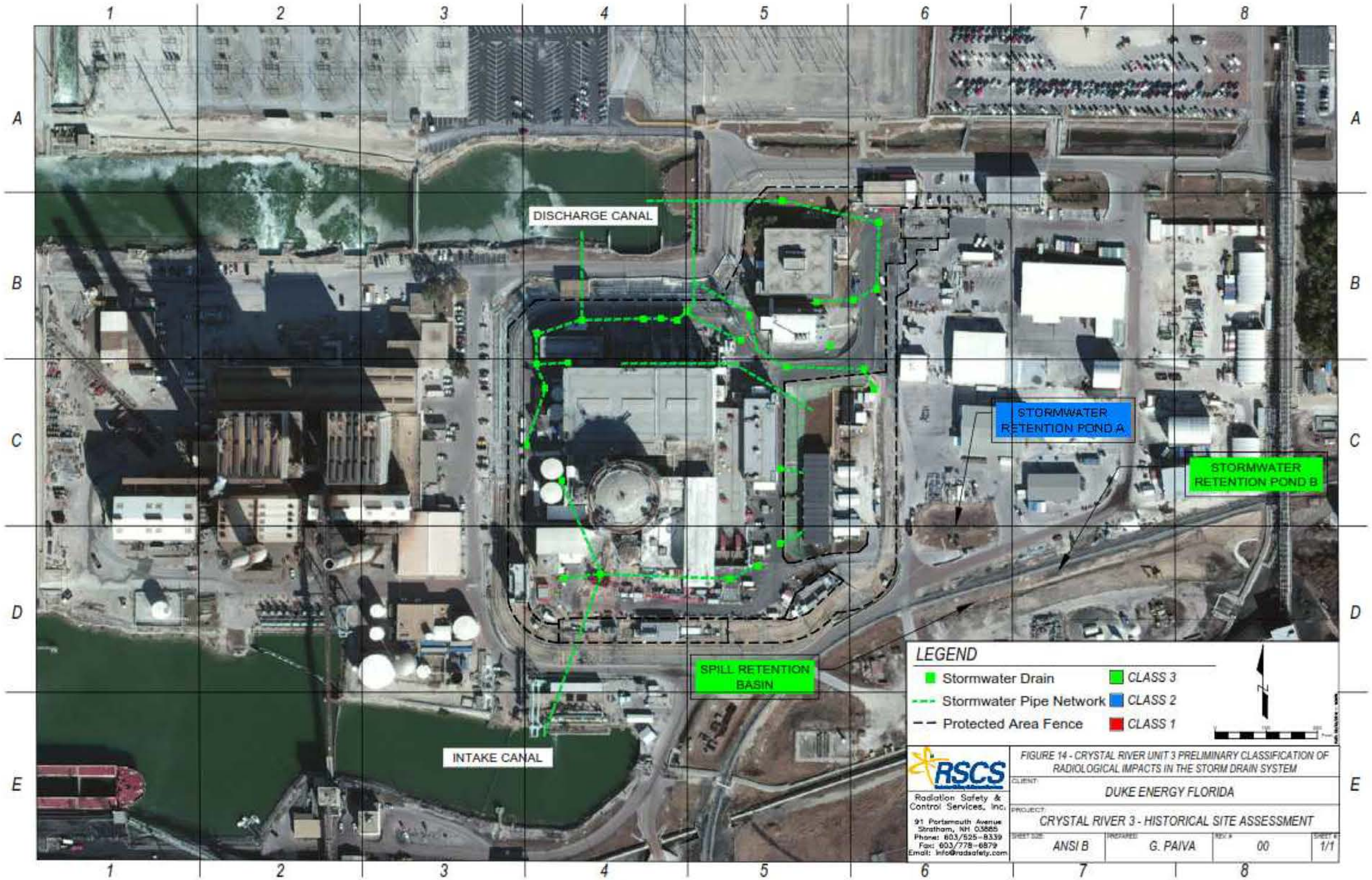


Figure 15: Exclusion Zone