

CORRECTIVE ACTION UNIT EVALUATION FOR ACIDIC WASTEWATER TREATMENT UNITS (SSAs 63, 64, 65, 66, 67 and SWMU 9)

RFAAP, Radford Virginia
RCRA Corrective Action Permit Number VA 1210020730

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1.0 EXECUTIVE SUMMARY

As defined in the February 23, 2010 meeting between representatives of RFAAP and US EPA Region III, specific Site Screening Areas (SSAs) would be grouped either programmatically or geographically to more effectively evaluate the criteria for their inclusion in the upcoming renewal of RCRA Corrective Action Permit VA 1210020730. The Units discussed herein are SSAs that are currently, or were previously, involved in the treatment of acidic wastewaters at the RFAAP Facility. They are designated as SSA 63, 64, 65, 66, 67 and Solid Waste Management Unit 9 (SWMU-9).

As described below, each of these units meet the definition of a process component in a wastewater treatment train. All of the Units are currently active, with the exception of SSA 64 which was demolished and removed from the ground. As active units, they are inspected, maintained and regulated under the Facility VPDES Permit. As the majority of these units have handled only acidic wastewater, there is limited potential for the release of hazardous wastes from these units.

SSA 66 currently only manages storm water and during its operational period it only managed neutral (non acidic) wastewater. Therefore, SSA 66 never managed acidic wastewater, and the pH of the wastewater it did treat was not considered corrosive, and by definition not hazardous.

Accordingly, as described below, it is appropriate to remove these units from further consideration under the Facility RCRA Corrective Action Permit.

2.0 INTRODUCTION AND BACKGROUND

In accordance with the RCRA Corrective Action Permit VA 1210020730, the scope of this investigation has been determined by the RFAAP and the US EPA (the parties). See Part II – *Specific Facility Conditions* – Section D.7 below. The language in bold provides the regulatory basis for the scope of this investigation:

*“D- 7. Attachment A contains a list of thirty-one (31) identified Site Screening Areas (SSAs) which may pose a threat, or potential threat to human health and the environment. The Permittee shall submit to the EPA and the VDEQ SSP Work Plan(s) which shall outline the activities necessary to determine if there have been releases of hazardous substances, solid wastes, pollutants, contaminants, hazardous wastes, or hazardous constituents to the environment from the SSAs. **The scope of the SSPs shall be determined by the Parties.** The SSP Work Plans) shall include a proposed Deadline or Milestone for the submittal of an SSP Report(s)....”*

Each of the Units described in this report are related by industrial process. **Figure 1 (see Attachment 1)** shows the process relationships of the units. The acidic wastewater that is decanted from SSA 63 flows to Buildings 1020 and 2020 of SSA 66. Once treated at SSA 65 the neutralized acidic wastewater drains to

the 42-inch acid sewer (SSA 67). The units that comprise SSA 66 did decant to the 42-inch acid sewer. They are currently inactive with respect to treatment of neutral process waters from the A-Line and B-Line operations. Currently, the units (Buildings 1025 and 2015) manage storm water flow and discharge to Stormwater Outfall 005.

SSA 64 (the former building 3054) was an in-ground acid brick reinforced structure. In 1999 the floor of the structure was leveled with concrete and a stainless steel tank was placed inside the in-ground unit. In July of 2005 Building 3058, a new upgraded wastewater collection sump, was brought on-line. Construction was performed by the United States Army Corps of Engineers (US ACE). During construction much of the ground surrounding Building 3054 was excavated by the US ACE. A month or two following the initial start up of Building 3058 in 2005, Building 3054 (both the brick and tank) was demolished and backfilled.

SWMU-9 has a process relationship to the former Building 3054, as at one time process wastewater that was collected in the former Building 3054 was treated at SWMU-9. Currently all the wastewater collected at Building 3058 (the replacement structure for 3054) is pumped to the A-B Line wastewater treatment plant for discharge under VPDES Outfall 007. **Figure 2** presents the geographic location of the SSAs.

The following presents a detailed description of the operational history of each of these units, and a rationale for their respective removal from the RCRA Corrective action Permit.

2.1 SSA 63: NITROCELLULOSE C-LINE BOILING TUB HOUSE SETTLING PITS (BOILING TUB HOUSE PITS - BUILDING 3020)

Historical Information of Site

1941-Present: The Nitrocellulose (NC) C-Line Area Acidic Water Settling Pits were constructed in 1941 to collect acidic wash water with entrained NC fines from the drains of each boiling tub in the Boiling Tub House, Building 3019. Acidic wastewater is given adequate residence time in the pit to allow the solid NC fines (pit cotton) to settle, while the wastewater is decanted and discharged to the acidic wastewater sewer system. The wastewater is later treated at the AB-Line Acidic Wastewater Treatment Plant (Site Screening Area 19). Pit cotton was either recycled back into the boiling tub process or treated on-site. The settling pits are part of the RFAAP VPDES permitted wastewater collection system, and are in active status. **Figure 3** shows the layout of SS 63. **Photographs 1 and 2 (Attachment B)** show the current condition of the units.

Spill / Cleanup Records of Site

NC Area and Wastewater Utilities personnel reported no knowledge of any spills that escaped the settling pits, nor cleanup actions performed at the site.

Historical Studies and Investigations Conducted at SSA-63

- ❖ RCRA Facility Assessment of Radford Army Ammunition Plant; 1987; Prepared by A. T. Kearney for the Environmental Protection Agency; Section IV, page 108

Migration Pathways Analysis

- ❖ Soil and Groundwater: The process units are maintained as active units and therefore receive regular inspections and maintenance, thereby eliminating the migration pathway to soil and groundwater. The entrained nitrocellulose is removed from the system as a solid.
- ❖ Surface Water: Currently regulated under the VPDES permit at Outfall 007.

Basis for Removal from the RCRA Corrective Action Permit

This SSA should be removed from the RCRA Corrective Action Permit because the unit only ever treated acidic wastewaters, is currently regulated, maintained and inspected in accordance with the Facility VPDES Permit as an active unit, and has no history or indication of release. The nitrocellulose that is entrained in the waters is removed as a solid, so there is no potential for migration of those materials into the environment.

2.2 SSA 64: NITROCELLULOSE C-LINE ACIDIC WASTEWATER COLLECTION SUMP (BUILDING 3054)

Historical Information of Site

1987-Present: The Nitrocellulose (NC) C-Line Area Acidic Wastewater Collection Sump was constructed in 1987 to collect acidic wastewater from the C-Line NC nitration, acid screening, and acid weighing processes. Additionally, acidic wastewater from the Boiling Tub Settling Pits, Building 3020 (SSA 63) were periodically pumped into the collection sump to settle out more solids. The effluent from the collection sump is pumped into the acid sewer system to be treated at the AB-Line Acidic Wastewater Treatment Plant (SSA 19). **Figure 3** shows the layout of the former Building 3054.

The facility was comprised of a below-grade, acid resistant brick-lined reinforced concrete basin (sump). In 1999, an open top stainless steel pump tank was installed to provide further settling of NC fines before the wastewater could be discharged to the AB-Line Acidic Wastewater Treatment Plant (Site Screening Area 19). The pump tank acts as primary containment for the acidic wastewater, and the sump basin provides secondary containment. Building 3054 has been demolished, and all elements associated with the NC C-Line Acidic Wastewater Collection Sump have been removed. **Photograph 3** shows the current condition of the site (a gravel lot).

Spill / Cleanup Records of Site

Process upsets have occurred at the acidic wastewater collection sump; however, Environmental and Wastewater Utilities personnel reported no knowledge of any spills, which escaped the sump basin or pump tank during its years of operation.

Historical Studies and Investigations Conducted at SSA-64

- ❖ RCRA Facility Assessment of Radford Army Ammunition Plant; 1987; Prepared by A. T. Kearney for the Environmental Protection Agency; Section IV, page 109

Migration Pathways Analysis

- ❖ Soil, Surface water and Groundwater: SSA 64 no longer exists. The unit itself and much of the soil surrounding the unit have been removed. There is no potential for migration of hazardous materials into the environment. Additionally, the SSP Study on the adjacent SWMU-6 (See **Figure 3**) indicated no impacts to the environment were present in the vicinity and No Further Action was required.

Basis for Removal from the RCRA Corrective Action Permit

This SSA should be removed from the RCRA Corrective Action Permit because Building 3054 has been demolished, and all elements associated with the acidic wastewater collection sump have been removed. During construction of Building 3058 (the replacement for Building 3054) much of the soil surrounding Building 3054 was excavated and removed. Additionally the adjacent SWMU-6 investigation did not detect any risk to human health or the environment.

2.3 SSA 65: NITROCELLULOSE A-B LINE ACIDIC WATER SETTLING PITS (BOILING TUB HOUSE PITS - BUILDINGS 1020 AND 2020)

Historical Information of Site

1941-Present: The Nitrocellulose (NC) AB-Line Acidic Water Settling Pits were constructed in 1941 to collect acidic wash water with entrained NC fines from the drains of the A-Line and B-Line Boiling Tub Houses, Buildings 1019 and 2019. The settling pits are no longer used as settling pits. When used, acidic wastewater was given adequate residence time in the pits to allow the solid NC fines (pit cotton) to settle, while the wastewater was decanted to the acidic wastewater sewer system. The wastewater was later treated at the AB-Line Acidic Wastewater Treatment Plant (SSA19). Pit cotton was either recycled back into the boiling tub process or treated on-site. Currently the settling pits are part of the VPDES acidic wastewater collection system. **Figure 4** shows the layout of SSA 65. **Photograph 4** shows the current condition of the operating unit.

Spill / Cleanup Records of Site

NC Area and Wastewater Utilities personnel reported no knowledge of any spills, which escaped the settling pits, nor cleanup actions performed at the site.

Historical Studies and Investigations Conducted at SSA-65

- ❖ RCRA Facility Assessment of Radford Army Ammunition Plant; 1987; Prepared by A. T. Kearney for the Environmental Protection Agency; Section IV, page 110

Migration Pathways Analysis

- ❖ Soil and Groundwater: The process units are maintained as active units and therefore receive regular inspections and maintenance, thereby eliminating the migration pathway to soil and groundwater. The entrained nitrocellulose is removed from the system as a solid.
- ❖ Surface Water: Currently regulated under the VPDES permit at Outfall 007.

Basis for Removal from the RCRA Corrective Action Permit

This SSA should be removed from the RCRA Corrective Action Permit because the unit only ever treated acidic wastewaters, is currently regulated, maintained and inspected in accordance with the Facility VPDES Permit as an active unit, and has no history or indication of release. The nitrocellulose that is entrained in the waters is removed as a solid, so there is no potential for migration of those materials into the environment.

2.4 SSA 66: NITROCELLULOSE A-B LINE NEUTRAL WATER SETTLING PITS (BUILDINGS 1025 AND 2025)

Historical Information of Site

1941-Present: The Nitrocellulose (NC) AB-Line Neutral Water Settling Pits were constructed in 1941 to collect neutralized wash water from the following A-Line and B-Line operations:

1. Building 1022; A-Line Beater House
2. Building 1024; A-Line Poacher and Blender House
3. Building 1046; A-Line Wringer House
4. Building 2022; B-Line Beater House
5. Building 2024; B-Line Poacher and Blender House
6. Building 2046; B-Line Wringer House

The settling facility is constructed of concrete (floors and walls) and is comprised of two settling basins for both A-Line and B-Line (total of four basins). The four basins contain pumps and piping systems to pump the neutral water from the above operations and drain the water to the acid sewer. The settling pits are no longer active, but routinely contain rainwater. When used, neutral wastewater from these operations was given adequate residence time in the pits to allow any residual NC fines to settle. Wastewater was decanted to the acidic wastewater sewer system. The settling pits were part of the RFAAP VPDES permitted wastewater collection system, and are inactive. They currently handle storm water only and discharge to Outfall 005. **Figure 4** shows the layout of SSA 66. **Photograph 5** shows the current conditions at the Unit.

Spill / Cleanup Records of Site

Process upsets have occurred at the neutral wastewater settling pits; however, Environmental, NC Area, and Wastewater Utilities personnel reported no knowledge of any spills, which escaped the basins during its years of operation.

Historical Studies and Investigations Conducted at SSA-66

- ❖ RCRA Facility Assessment of Radford Army Ammunition Plant; 1987; Prepared by A. T. Kearney for the Environmental Protection Agency; Section IV, page 111

Migration Pathways Analysis

- ❖ Soil and Groundwater: During operation, the process units were maintained as active units and therefore they received regular inspections and maintenance, thereby eliminating the migration pathway to soil and groundwater. Also the Unit treated neutral water with entrained nitrocellulose. The waters were not characteristically hazardous and the entrained nitrocellulose was removed from the system as a solid. Currently the unit only processes storm water.
- ❖ Surface Water: Currently regulated under the VPDES permit at Outfall 005 for storm water.

Basis for Removal from the RCRA Corrective Action Permit

This SSA should be removed from the RCRA Corrective Action Permit because there the unit only ever treated neutral wastewaters, was regulated, maintained and inspected in accordance with the Facility VPDES Permit as an active unit, and has no history or indication of release. The nitrocellulose that was entrained in the waters was removed as a solid, so there is no potential for migration of those materials into the environment.

2.5 SSA 67: MAIN ACID SEWER SUMPS (MANHOLES NORTH OF BUILDING 2019)

Historical Information of Site

1941-Present: The acid sewer sumps were constructed in 1941 of concrete, with acid resistant brick-lined manholes in the acidic wastewater sewer system, and are not used as sumps for treatment or settling.

Sewer lines entering and exiting these manholes are 36" diameter lines. The acid sewer sumps (manholes) are part of the RFAAP VPDES permitted wastewater collection system, and are in active status. **Figure 5** shows the layout of the SSA. **Photograph 6** shows the current condition of a typical manholes. As shown they are in excellent structural condition.

Acidic wastewater generated in the Acid and Nitrocellulose (NC) Areas is discharged to the plant-wide acidic wastewater sewer collection system, and subsequently treated at the AB-Line Acidic Wastewater Treatment Plant (Site Screening Area 19). Currently, only the Acid Area and the C-Line NC Areas are in operation and discharge wastewater. A- and B-Line NC Areas are inactive.

The acid sewer collection system runs through the formerly active A- and B-Line NC Areas, where Building 2019 is located. Acidic wastewater is now generated from the entire Acid Area and the nitration and acid screening operations of the C-Line NC Area only. The two manholes addressed in this SSA-67 are physically located near the northeast corner of the Building 2019 Boiling Tub House, and are only two of the manholes making up the plant's acid sewer network.

1998-2001: An acid sewer survey and investigation was conducted from 1998 to 2001 on the entire acid sewer infrastructure to determine the condition of the 61 year-old sewers. Videotaping of the interior of the lines was conducted and submitted to the EPA as requested. Deteriorated or broken sections of the sewer lines were subsequently repaired or replaced. No repairs were required at the site of these manholes.

Spill / Cleanup Records of Site

NC Area and Wastewater Utilities personnel reported no knowledge of any spills associated with the acid sewer manholes.

Historical Studies and Investigations Conducted at SSA-67

- ❖ RCRA Facility Assessment of Radford Army Ammunition Plant; 1987; Prepared by A. T. Kearney for the Environmental Protection Agency; Section IV, page 112
- ❖ Acid Sewer Survey and Investigation; 1998-2001; Conducted by Robinson Pipe Cleaning, Incorporated

Migration Pathways Analysis

- ❖ Soil and Groundwater: The process units are maintained as active units and therefore receive regular inspections and maintenance, thereby eliminating the migration pathway to soil and groundwater. The video survey of the system identified no damage of the sewer in the vicinity of these manholes.
- ❖ Surface Water: Currently regulated under the VPDES permit at Outfall 007.

Basis for Removal from the RCRA Corrective Action Permit

This SSA should be removed from the RCRA Corrective Action Permit because the SSA is comprised of well maintained open man holes that provide a ready access to the sewer system to allow for easy visual observation and removal of potential obstructions. They are in good repair, and are maintained, inspected and regulated under the Facility VPDES Permit.

2.6 SWMU 9: CASO₄ TREATMENT AND DISPOSAL AREA (NORTH OF BUILDING 420-2)

SWMU 9 is located in the northwest area of the RFAAP manufacturing facility and consists of two below grade, unlined, earthen lagoons. Each lagoon is 150 feet long, 75 feet wide, and 8-10 feet deep. These lagoons are utilized to retain neutralized wastewater C-Line Acidic Wastewater Treatment Plant (SSA-20), allowing calcium sulfate to settle out of solution before the wastewater is discharged to the New River via Outfall 005. When a significant accumulation of calcium sulfate sludge is present, this unit is temporarily inactivated to allow dredging. Dredging spoils and sludge are placed in adjacent drying beds pending disposal.

Historical Information of Site

1942-Present: SWMU 9 is part of the C-Line acidic wastewater treatment process, which began operations in 1942 to treat acidic wastewater (pH <2) generated from the Nitroglycerin No. 1 and C-Line Nitrocellulose production areas. Additionally, in 1985, effluent from the Sulfuric Acid Recovery Plant (Oleum Plant) Wastewater Treatment Facility (SSA-18; Bldg. 4330) was directed to the C-Line facility. SWMU 9 currently receives low volumes, intermittent volumes of neutralized wastewater from the C-Line Acidic Wastewater Treatment Plant and storm water. **Figure 6** layout of the SSA. **Photographs 7 and 8** show the current conditions at the site.

Spill / Cleanup Records of Site

No employees recalled any records of chemical spills into the ditch or cleanup actions performed in the area. The 1987 A. T. Kearney RFA noted there were no visible signs of releases in the vicinity of this site.

Historical Studies and Investigations Conducted at SWMU 9

- ❖ RCRA Facility Assessment of Radford Army Ammunition Plant; 1987; Prepared by A. T. Kearney for the Environmental Protection Agency; Section IV, pages 29 – 32

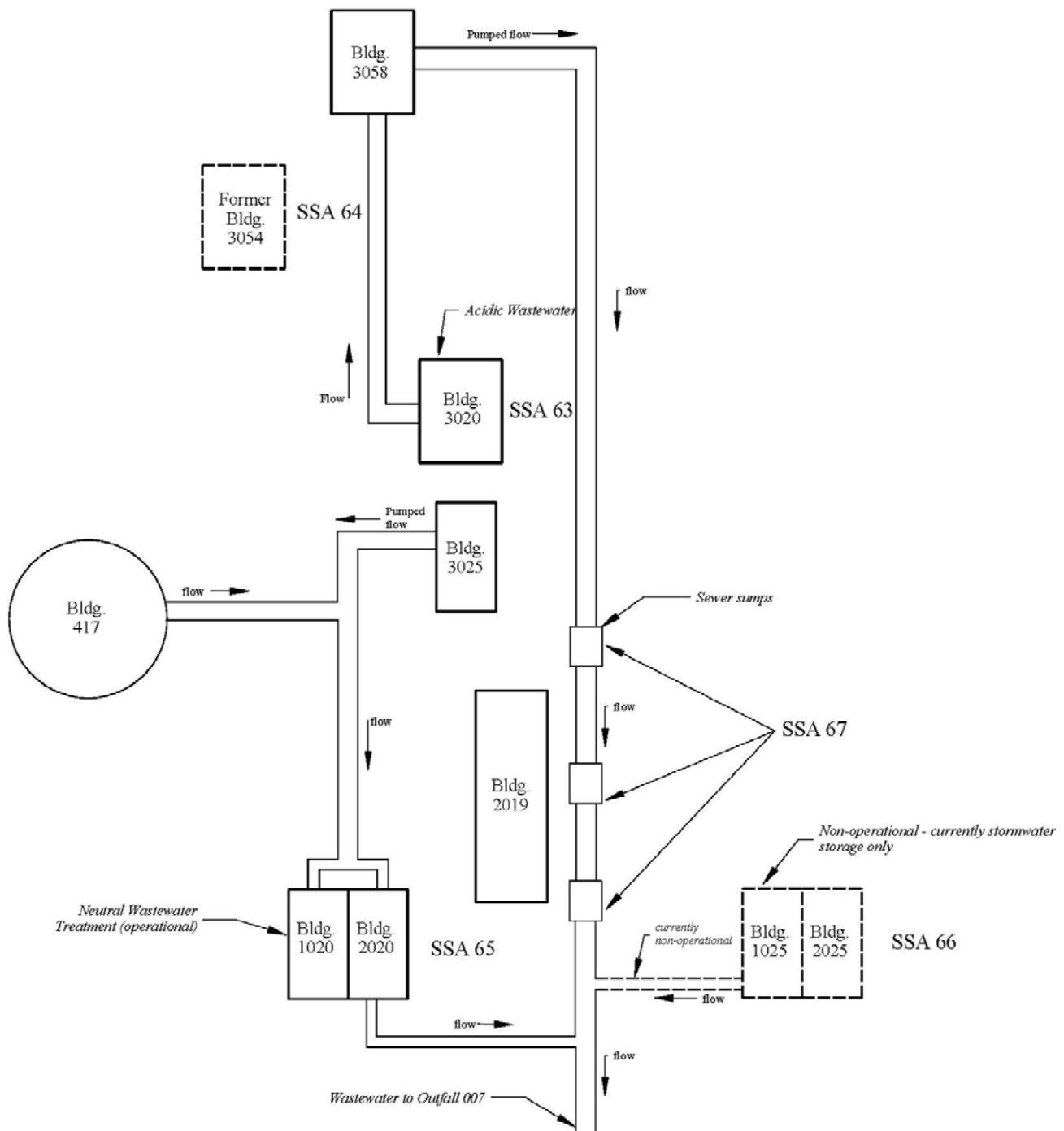
Migration Pathways Analysis

- ❖ **Soil and Groundwater:** The process units are maintained as active units and therefore receive regular inspections and maintenance, thereby eliminating the migration pathway to soil and groundwater. A Site Screening Protocol (SSP) study was performed at an essentially identical unit (SWMU-8) and that study confirmed that no impact to soil or groundwater had occurred.
- ❖ **Surface Water:** Currently regulated under the VPDES permit at Outfall 005.

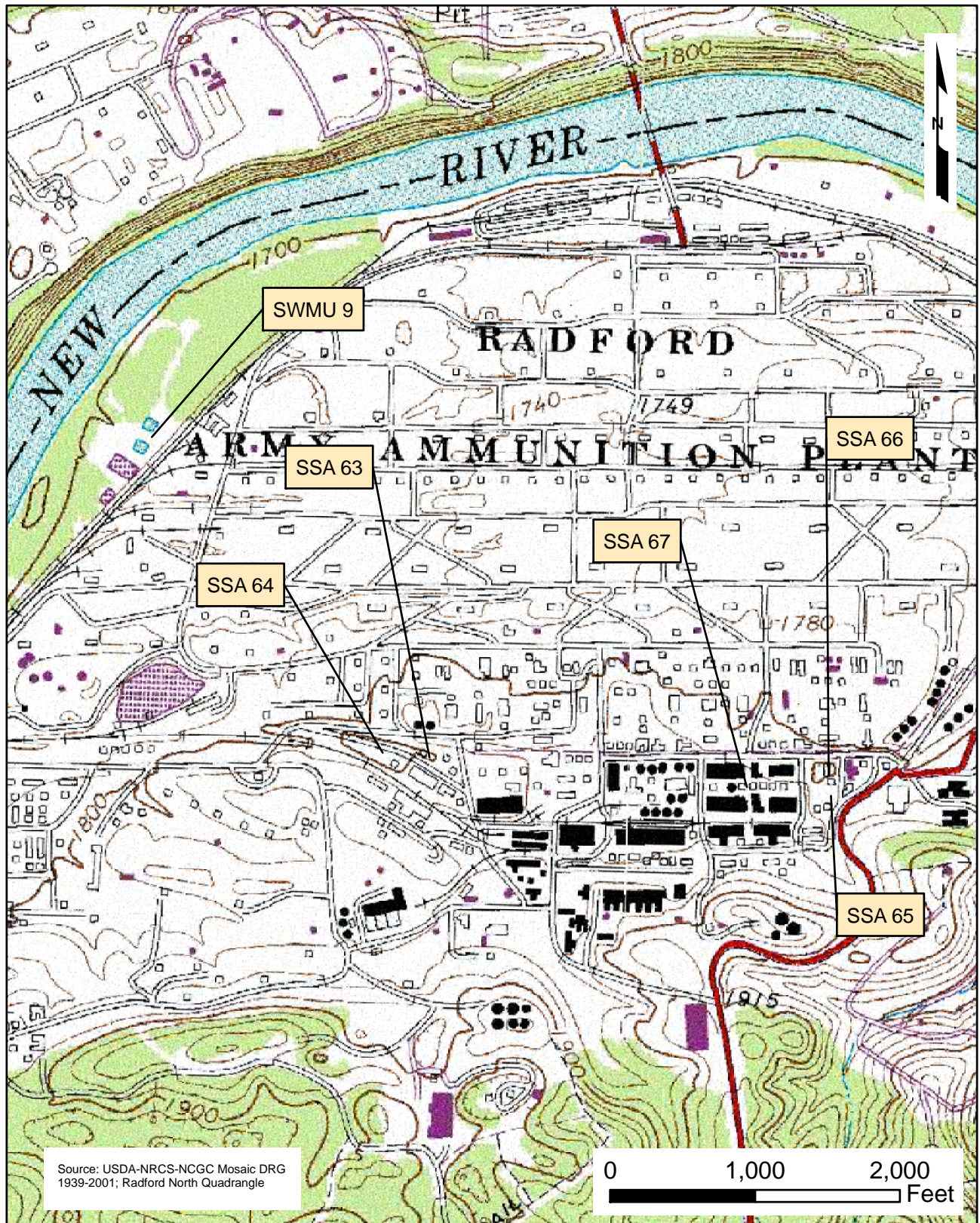
Basis for Removal from the RCRA Corrective Action Permit

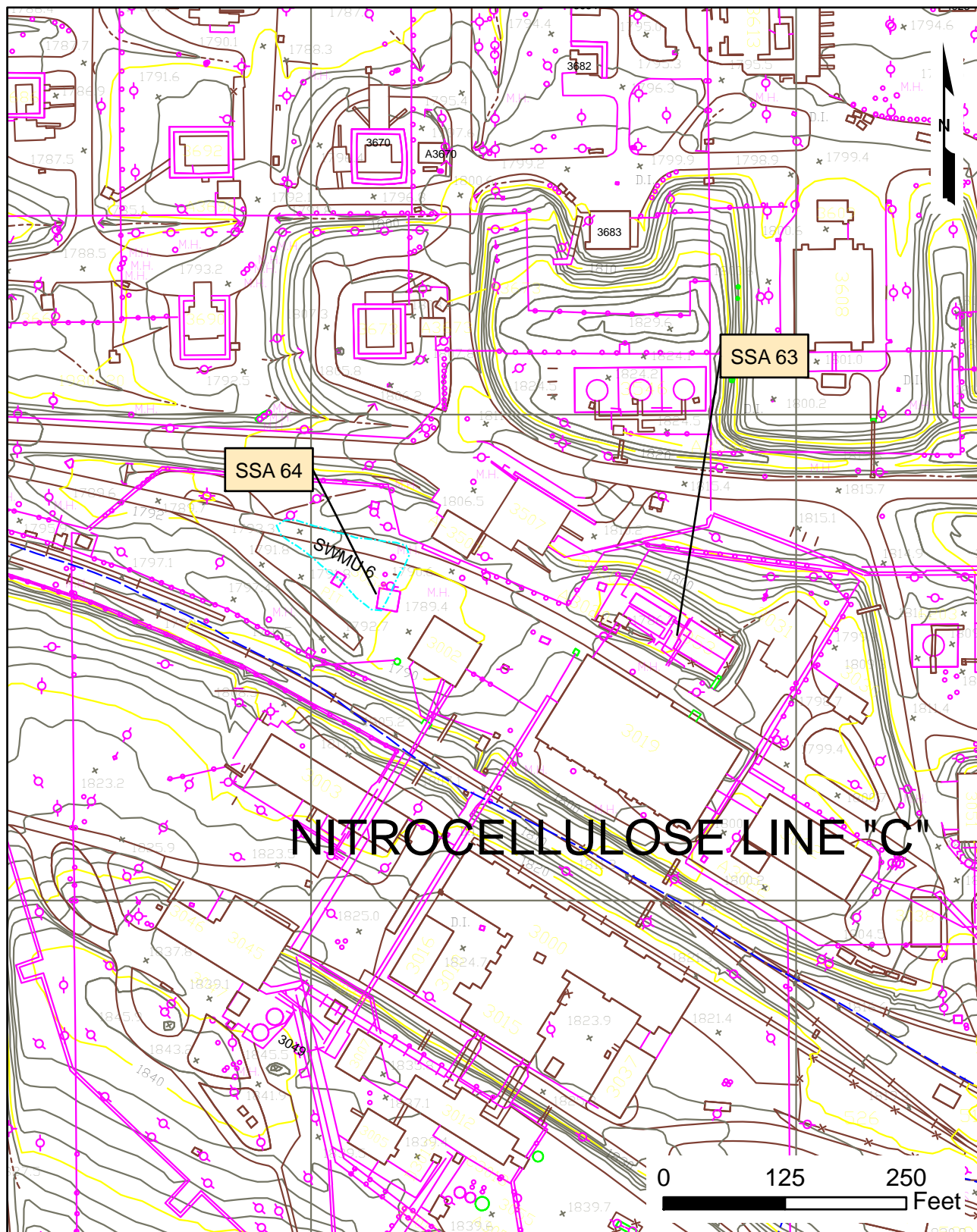
SWMU 9 is regulated as a VPDES wastewater treatment unit under the Clean Water Act. Additionally, an SSP report was prepared for an essentially identical unit (SWMU 8) and that effort resulted in a decision of No Further Action required. All these data indicate that SWMU 9 should be removed from the Corrective Action Permit.

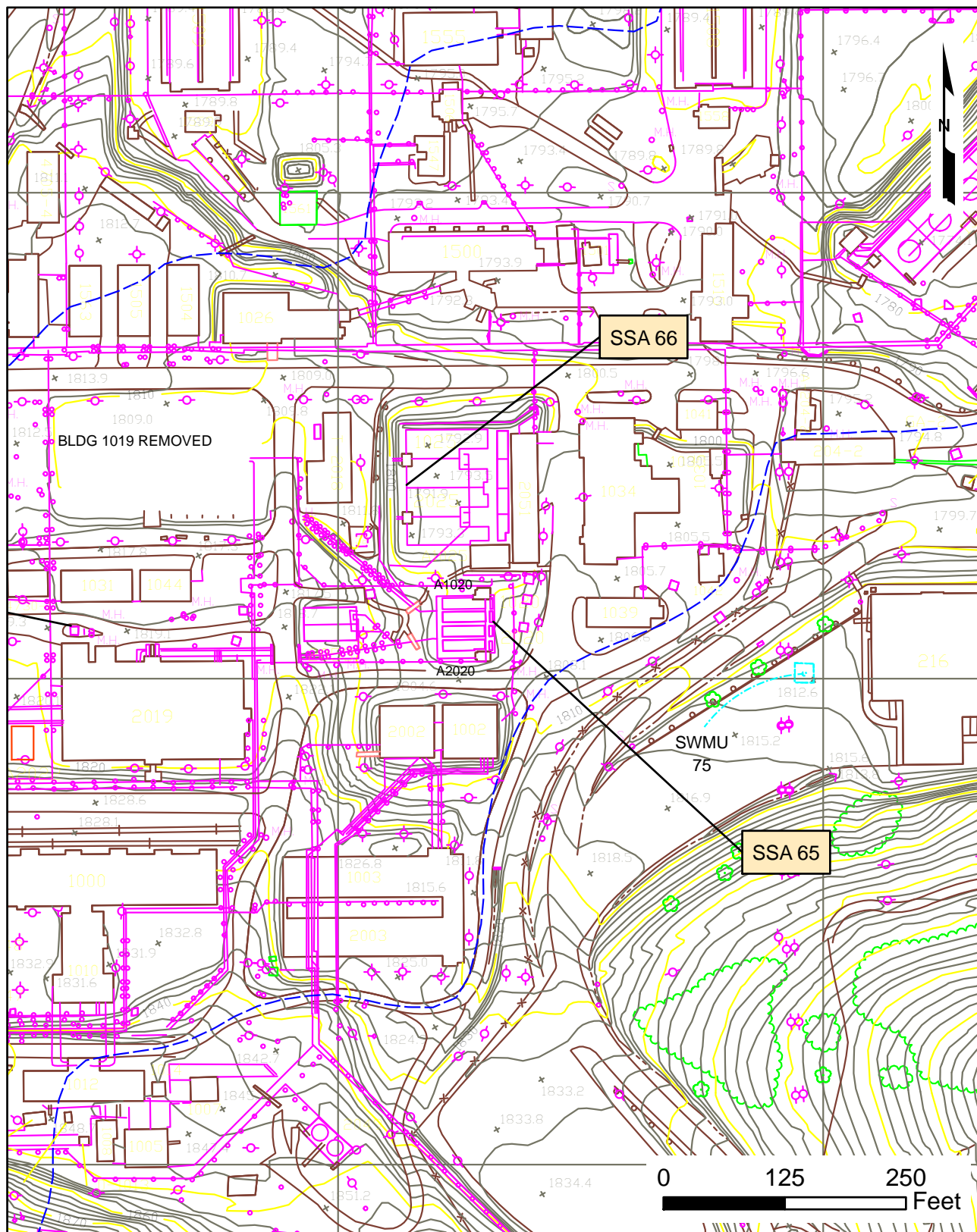
ATTACHMENT 1
FIGURES

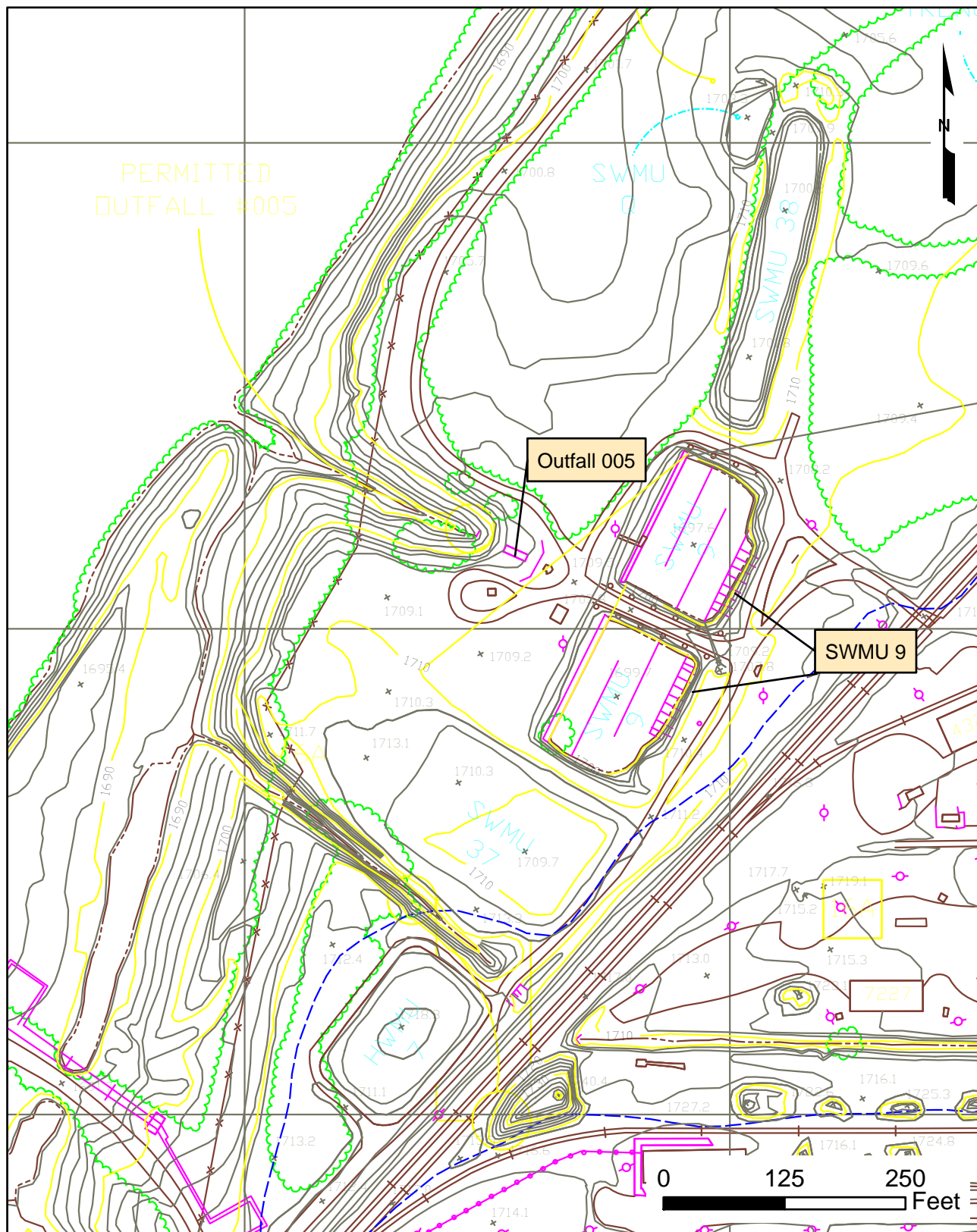


Not to Scale









ATTACHMENT 2
PHOTOGRAPHS



Photo 1. SSA 63 – Nitrocellulose C-Line Boiling Tub House Settling Pits (Bldg. 3020).



Photo 2. SSA 63 – Nitrocellulose C-Line Boiling Tub House Settling Pits (Bldg 3020).



Photo 3. SSA 64 – Former Nitrocellulose C-Line Acidic Wastewater Collection Sump Location (also known as former Bldg. 3054).



Photo 4. SSA 65 – Nitrocellulose A-B Line Boiling Tub House Settling Pits (Bldgs. 1020 and 2020).



Photo 5. SSA 66 – Nitrocellulose A-B Line Neutral Water Settling Pits (Bldgs. 1025 and 2025).



Photo 6. SSA 67 – Main Acid Sewer Sumps (Manholes North of Bldg. 2019)



Photo 7. SWMU 9 – CaSO_4 Treatment and Disposal Area (Dry Lagoon).



Photo 8. SWMU 9 – CaSO_4 Treatment and Disposal Area.