

Facility Decommissioning Evaluation Building 607-1F, Sewage Treatment Plant

This is an Integrated Sampling Model Decommissioning per Facility Disposition Manual 1C


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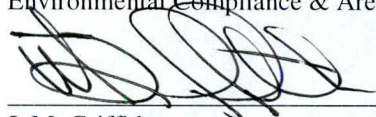
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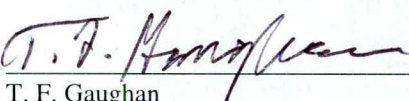
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Introduction

This document contains an evaluation of available existing information about a facility that is slated for decommissioning. This evaluation screens the project to determine whether it is appropriate to conduct the decommissioning under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or to use a simpler graded approach.

This Facility Decommissioning Evaluation (FDE) consists of three sections. Part 1 contains a description of the project scope, including a brief summary of the purpose and history of the facility and photographs of the structures that are part of the project. Part 2 encompasses a series of questions, the answers to which determine the decommissioning model (CERCLA Model, Integrated Sampling Model, or Simple Model) that will be used. The three graded approach models are described in Facility Disposition Manual 1C, Procedure 501 (Reference 1). Part 2 also includes a justification for the answers to each question. Part 3 is a list of references that were used for the evaluation.

Conclusion

This facility is minimally contaminated and the facility hazard category is Other Industrial. The project will be conducted using the Integrated Sampling Model described in Facility Disposition Manual 1C, Procedure 501. This decision is supported by the documentation found throughout the body of this document. Chemical contaminants and minimal amounts of radioactive contaminants are associated with the facility. However, 607-1F was never categorized as a Radiological facility.

Because the 607-1F sedimentation tank would be the subject of routine D&D protocols that call for underground systems like this to be filled with grout to address safety concerns and facilitate low cost surveillance and monitoring until execution of the Area Completion process, contaminant fate and transport modeling (Reference 9) was performed to determine whether those materials would pose a threat to groundwater quality once the clarifying basin is filled. That modeling was performed using the spreadsheet model VZCOMML typically used in the SRNS environmental cleanup program, and the analysis concluded that there are no contaminant migration constituents of concern (Reference 9). Because there would be no other focus to direct Final Verification Sampling and only the clean grout/concrete would be accessible for sampling, SRS proposes to use the Integrated Sampling Model to decommission 607-1F, utilizing the sampling and analyses performed on the waste and sludge of the primary settling tank; along with the risk and contaminant migration evaluation as documented in references 9 and 10. Final Verification Sampling is unwarranted due to the grouting of all below grade voids and the demolition and removal of the above-grade structure.

Part 1. Project Scope

Scope

This Evaluation has been prepared in accordance with requirements found in Facility Disposition Manual 1C, Procedure 502, "Preparing Decommissioning Decision Documents" (Reference 2). The scope of this evaluation includes Building 607-1F, and its ancillary structures the Sludge Digestion Tank and the Primary Sedimentation Tank, all of which are further described in the next section:

The proposed decommissioning end-state for this facility is a combination of predominately In-Situ Decommissioning with a small amount of demolition (i.e., the small above grade entrance structure). This combination involves demolition of the above grade portion of the entrance structure to grade and In Situ Decommissioning of the below grade portion of the building, the Primary Sedimentation Tank, and the Sludge Digestion Tank. Demolition (exhumation and disposal) of the entire facility is impractical, and consequently a portion of the facility will remain in place after decommissioning.

The below grade portion of the building will be filled with grout and then capped with a 6" thick reinforced 4,000 psi concrete cap slab. All above grade pipes, conduits, cabinets, sinks, etc. in the building enclosure will be removed and/or cut off and placed in the below grade area prior to placement of the grout and the concrete cap. All cabinets, piping, conduits, the entrance door, etc. on the outside of the building will be disposed of as scrap metal. The lamps/light fixtures/bulbs will be disposed of as Universal Waste. All above grade appurtenances (metal railing, toe boards, etc.) for the Primary Sedimentation tank will be removed and placed in the bottom of that tank prior to filling it with grout followed by a 6" thick reinforced 4,000 psi concrete cap slab. The ladder and metal platform/walkway on the Sludge Digestion Tank will be removed and disposed of as scrap metal. Those portions of the aeration ring inside the tank that protrude above the top of the tank will be cut off a minimum of 12" below the top of the tank wall, disposed of in the tank, and encapsulated by grout followed by a 6" reinforced 4,000 psi concrete cap slab. All remaining holes, sumps, drains, etc. not encapsulated are to be filled with non-shrink grout and any curbing breached.

The described decommissioning activities are not necessarily the final area closure actions. The decommissioning of a building is intended to reduce surveillance and maintenance costs, increase safety by removing excess facilities, and reduce or eliminate the potential for releases of hazardous substance to the environment.

Facility Description

The 607-1F Sewage Treatment Plant (Figure 4) is composed of a Sludge Digestion Tank, building 607-1F (stair enclosure/Pump Room) which houses a valve chamber and a stair giving access to the Pump Room floor, and a Primary Sedimentation Tank, all of which were built from 1951 to 1952.

The Sludge Digestion Tank (Figure 1) is a reinforced, cylindrical-shaped concrete structure that is twenty (20) feet deep with a cone shaped bottom and has an inside diameter of 20 feet. It formerly

contained a gas dome that surmounted a wood cover which was finished with built-up roofing. The gas dome and floating wood cover were previously removed during an earlier deactivation process. A steel ladder provides access to the top of the tank at the southeast corner of the tank, where an approximately 5' x 5' x 8' deep overflow pit is located. The overflow pit is covered by a steel grate which provides access to a steel platform that spans the top of the tank. The Primary Sedimentation Tank (Figure 2) is a reinforced concrete structure that is 10 feet wide, 25 feet long, and has an 8 ½ foot extension at the outside (south) end which houses a weir box and a meter float well. The 607-1F building pump room and stair enclosure (Figure 3) is a reinforced concrete structure located between the Sludge Digestion Tank and the Primary Sedimentation Tank and is 15 feet wide by 23 feet long and 12 feet deep. The stair enclosure over part of the pump room (valve chamber) is approximately 8 feet wide by 16 feet long and is of Class III construction with corrugated asbestos siding and roofing on a wood frame.

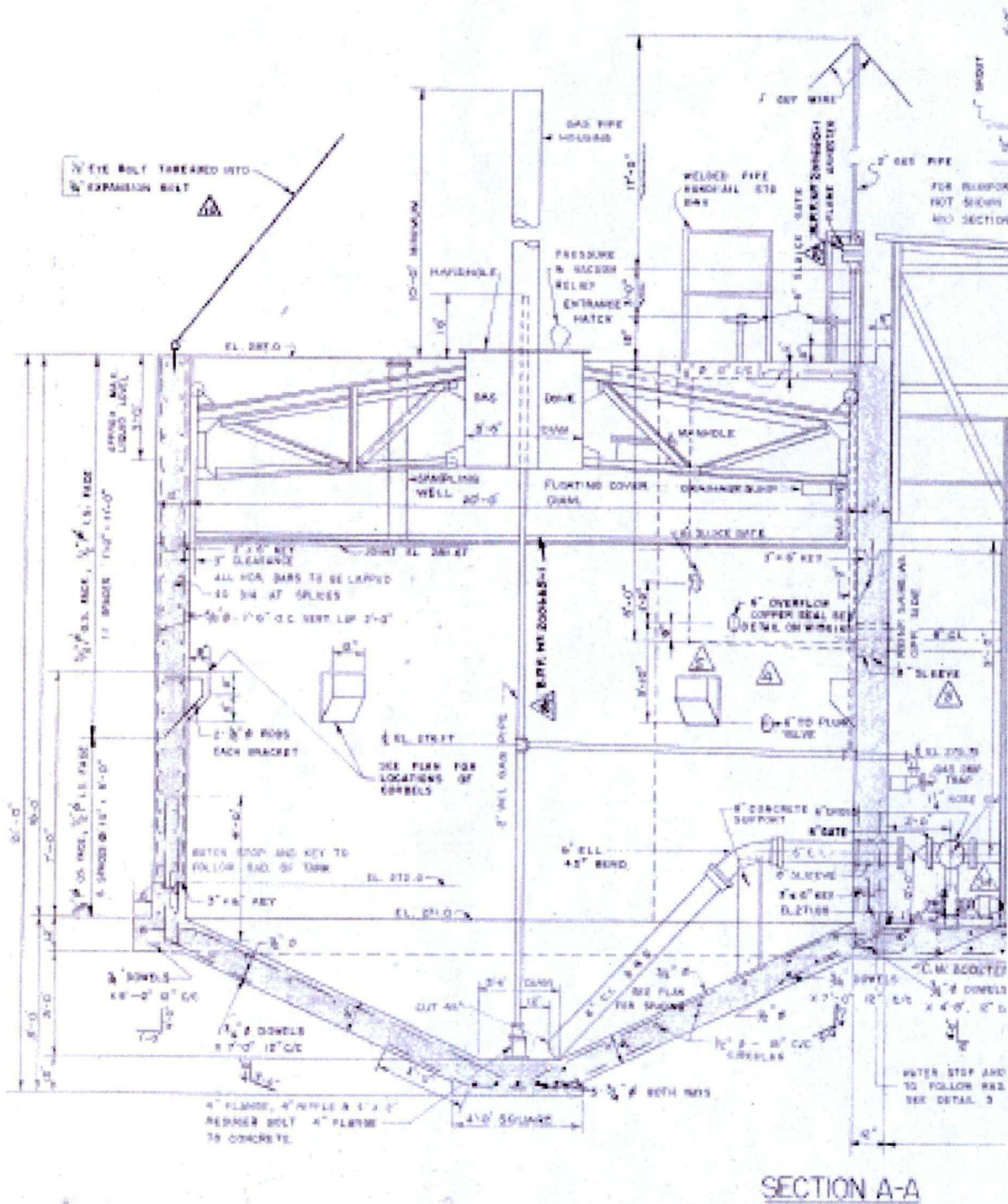


Figure 1 – Section View of Sludge Digestion Tank (from Dwg. W156164)

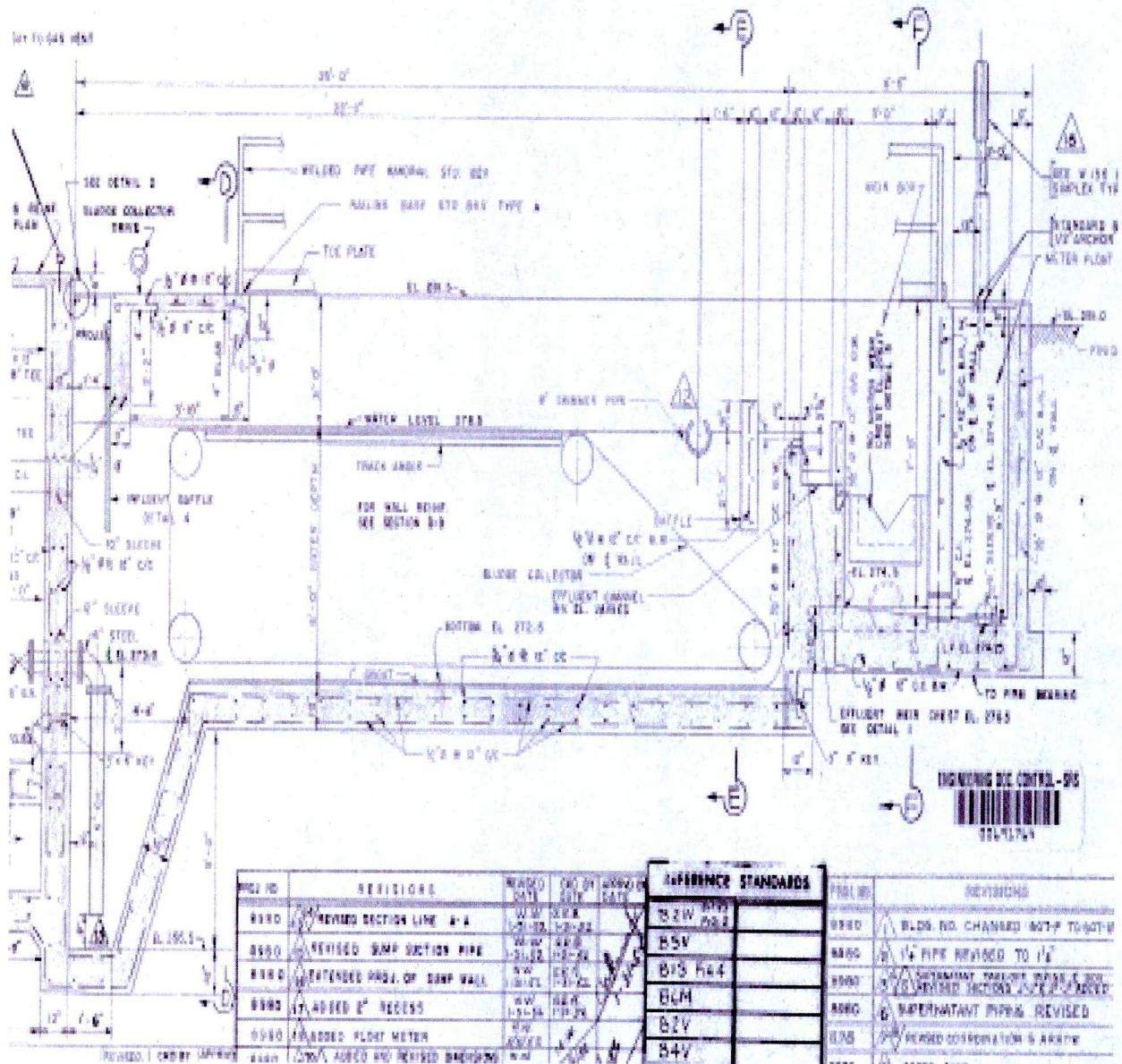


Figure 2 – Section View of Primary Sedimentation Tank (from Dwg. W156164)

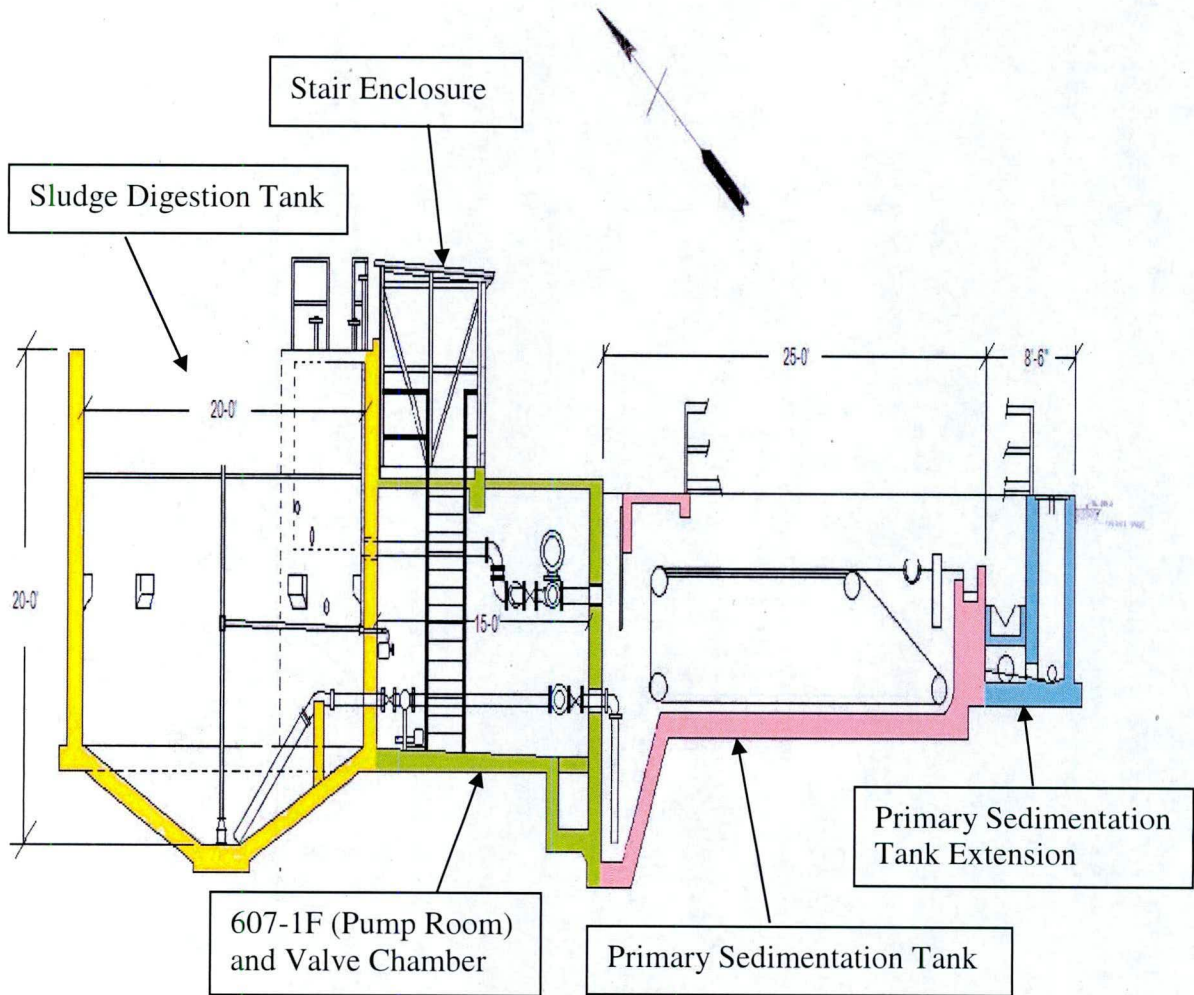


Figure 4 – Section View of 607-1F Sewage Treatment Plant

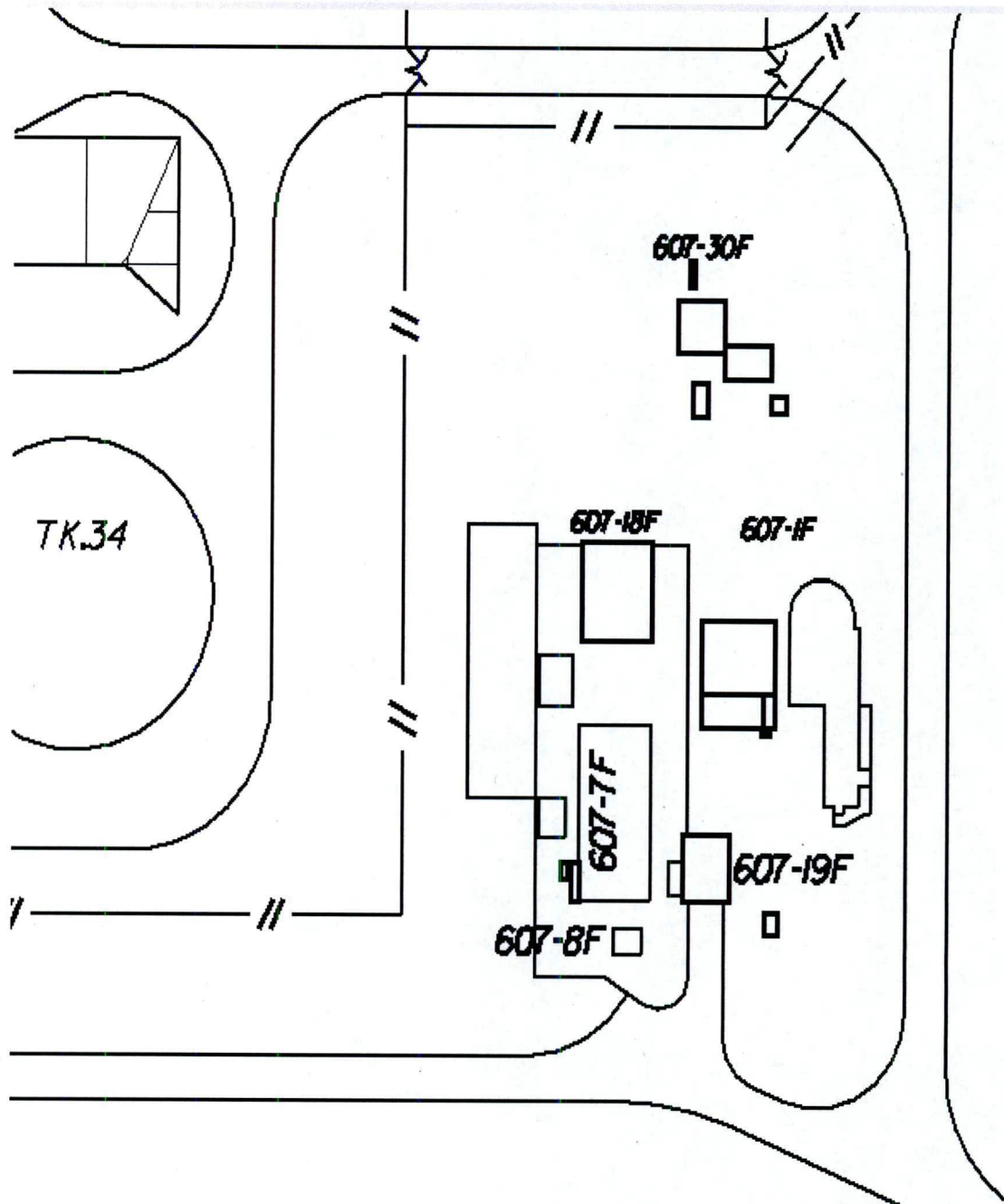


Figure 5 – Plan View of 607-1F Sewage Treatment Plant

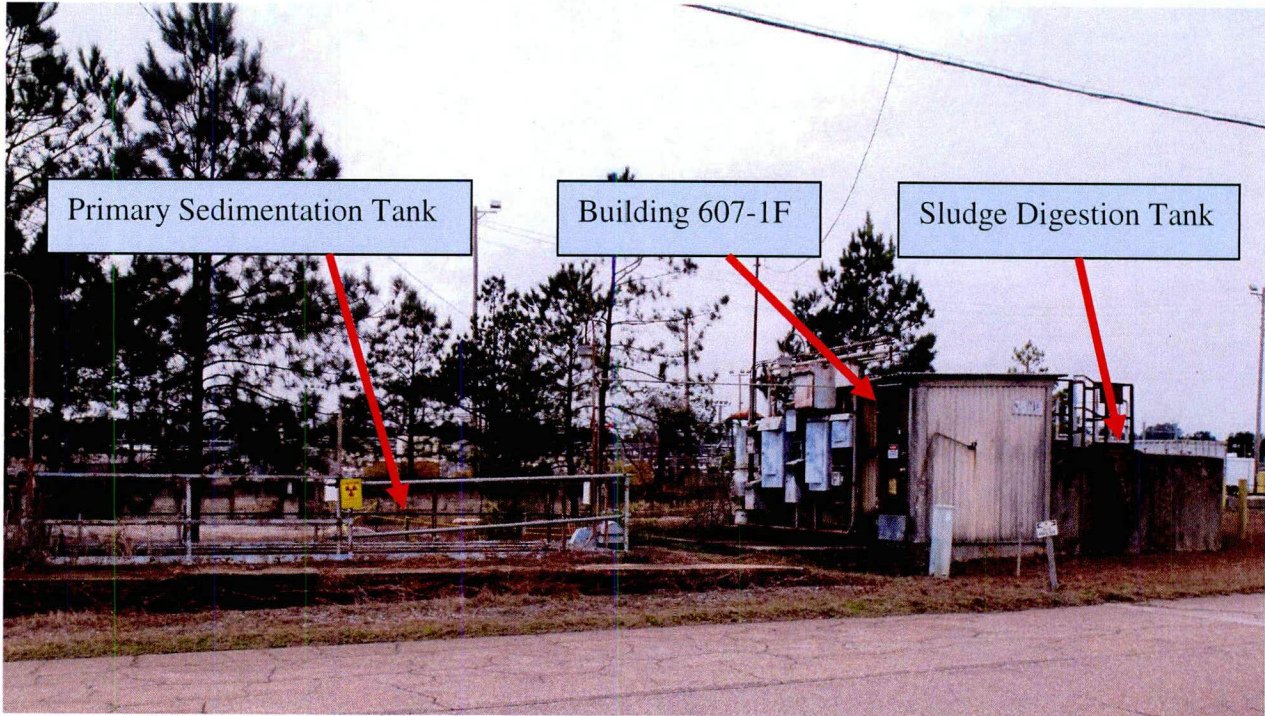


Photo 1 – 607-1F and Associated Facilities – Looking West-northwest

Process History

Review of records, walk downs, and interviews indicate that 607-1F used an industry-standard biological treatment process with the addition of standard water treatment chemicals for neutralization and disinfection. There were no radiological materials stored or processed in the Sewage Treatment Plant; however, radiological materials were inadvertently introduced to the facility twice over its lifespan, as discussed below.

A historical review of spills/releases to the environment, which included a review of the Occurrence Reporting and Processing System/ Site Item Reportability and Issue Management (ORPS/SIRIM) database (Reference 5) conducted from the effective date of the Federal Facility Agreement (FFA), August 16, 1993, to present, and a review of the FFA (Reference 6), which lists releases/spills to the environment prior to August 16, 1993, showed no record of any spills within the 607-1F building or to the external environment.

Chemical Process

| Chemical Name | Process location | Evidence of spills? |
|--|---|---------------------|
| Soda Ash, Sodium Hypochlorite, and Bromicide | Chemicals were delivered through piping from pumps and tanks in Building 607-1F | None |

Radioactive Process

| Isotope | Contaminated areas/others |
|---------|---------------------------|
| None | N/A |

Chemical contaminants and minimal amounts of radioactive contaminants are associated with the facility. However, 607-1F was never categorized as a Radiological facility. Two non-routine historical events occurred at 607-1F:

As documented in the Record of Decision (Reference 8), a release occurred on December 23, 1954, from Building 221-F (Canyon Building) as part of the start-up of the radioisotope separations process. Using a bucket, an operator drained a tank that contained liquid and Pu-239. An unknown number of buckets of liquid containing Pu-239 were dumped into the floor drain and toilet bowl in the men's room during this shift. The toilet bowl and surrounding floor as well as the primary sedimentation tank (Building 607-1F) in the 200-F waste disposal plant were contaminated with plutonium. The water and sludge in the primary settling tank of the sewage treatment plant were removed and buried in a trench at the present location of the 211-FB Pu-239 release OU. The 607-1F Sewage Treatment Plant was then returned to service.

After the 607-1F Sewage Treatment Plant was shut down, "sludge", having a consistency similar to silt, was removed from the 285-F cooling tower basin (in approximately 2005-2006 timeframe) and placed in the 607-1F primary sedimentation tank. Sampling and analysis of that material, conducted in 2018, revealed elevated levels of heavy metals and low levels of organic compounds but very little radioactivity. The highest concentrations of the contaminants of concern measured are metals, with arsenic being the primary risk driver (concentration = 2,280 mg/kg; industrial worker risk = 9.4E-04) (References 10, 11, 12, & 13).

Visual inspection of the Sludge Digestion Tank revealed no liquid or sludge to be present, therefore no sampling was performed in that tank. Interconnecting piping between the two tanks are pumped lines with isolation valves. The absence of any water/sludge in the Sludge Digestion Tank while the Primary Sedimentation Tank contained a significant amount of water/sludge, demonstrates there is no seepage through the pumps or isolation valves between tanks.

The above supports selection of the Integrated Simple Model for 607-1F.

Because the 607-1F sedimentation tank would be the subject of routine D&D protocols that call for underground systems like this to be filled with grout to address safety concerns and facilitate low cost surveillance and monitoring until execution of the Area Completion process, contaminant fate and transport modeling (Reference 9) was performed to determine whether those materials would pose a threat to groundwater quality once the clarifying basin is filled. That modeling was performed using the spreadsheet model VZCOMML typically used in the SRNS environmental cleanup program and the analysis concluded that there are no contaminant

migration constituents of concern (Reference 10). Because there would be no other focus to direct Final Verification Sampling and only the clean grout/concrete would be accessible for sampling, SRS proposes to use the Integrated Sampling Model to decommission 607-1F, utilizing the sampling and analyses performed on the waste and sludge of the primary settling tank; along with the risk and contaminant migration evaluation as documented in references 9 and 10. Final Verification Sampling is unwarranted due to the grouting of all below grade voids and the demolition and removal of the above-grade structure.

A visual inspection of the building's concrete slab will be performed as a part of decommissioning. If any oil stains are present, the stained spots/areas will be cleaned during decommissioning with a strong surfactant (Biosolve) to remove all oil residue.

Summary of Existing Characterization

Characterization has been accomplished using a combination of process knowledge/historical release information, verification walk downs, and sampling.

Confirmatory sampling will not be performed at 607-1F, since the facility is to be filled with clean grout and capped with a clean 6-inch thick concrete cap.

Contaminants and/or releases to the environment, not associated with the facility(s) being decommissioned, are not within the scope of the decommissioning project

An important part of the characterization portion of this evaluation is a historical review of spills/releases to the environment. This review includes a review of the Occurrence Reporting and Processing System/ Site Item Reportability and Issue Management (ORPS/SIRIM) database (Reference 5) conducted from the effective date of the Federal Facility Agreement (FFA), August 16, 1993 to present and a review of the FFA (Reference 6). The FFA lists all known releases/spills to the environment prior to August 16, 1993.

Wastes generated during decommissioning will be characterized and managed in accordance with Savannah River Site (SRS) procedures and state and federal regulations.

Historical Significance

A Savannah River Site review has been conducted in accordance with a Programmatic Agreement. This review resulted in the publication of a Cultural Resources Management Plan (Reference 7) in which the facilities are listed in its Table 2, Cold War Resources Inventory, as historically eligible or not eligible. This facility, 607-1F, is listed in that reference as not eligible and therefore is not historically significant.

Part 2. Evaluation

| Clean Facilities | | | | |
|------------------|---|-----|----|---|
| | Question | Yes | No | Justification |
| 1. | Has the facility ever contained or processed radioactive or hazardous material other than stored packaged material or materials of construction? <i>If yes, go to question 4.</i> | X | | Chemical contaminants and minimal amounts of radioactive contaminants are associated with the facility. However, 607-1F was never categorized as a Radiological facility. Two non-routine historical events occurred at 607-1F. As documented in the Record of Decision (Reference 8), a release occurred on December 23, 1954, from Building 221-F (Canyon Building) as part of the start-up of the radioisotope separations process. Using a bucket, an operator drained a tank that contained liquid and Pu-239. An unknown number of buckets of liquid containing Pu-239 were dumped into the floor drain and toilet bowl in the men's room during this shift. The toilet bowl and surrounding floor as well as the primary settling tank (Building 607-1F) in the 200-F waste disposal plant were contaminated with plutonium. The water and sludge in the primary settling tank of the sewage treatment plant were removed and buried in a trench at the present location of the 211-FB Pu-239 release OU. The 607-1F Sewage Treatment Plant was then returned to service. After the 607-1F Sewage Treatment Plant was shut down, "sludge", having a consistency similar to silt, was removed from the 285-F cooling tower basin (in approximately the 2005-2006 timeframe) and placed in the 607-1F primary sedimentation tank. Sampling and analysis of the material in that tank, conducted in 2018, revealed elevated levels of heavy metals and low levels of organic compounds but very little radioactivity. |
| 2. | If there was stored packaged material, has there ever been a spill? <i>If No or N/A, this is a Simple Model. Stop.</i> | | | |
| 3. | Was spill confined inside structure and cleaned to free release standard per Radiological Control Manual 5Q (for radiological) or continued occupancy per Industrial Hygiene Manual 4Q (for hazardous)? <i>If Yes, this is a Simple Model. Stop.</i> | | | |

| Contaminated Facilities | | | | |
|-------------------------|--|-----|----|---|
| | Question | Yes | No | Justification |
| 4. | Is the facility listed as a Resources Conservation and Recovery Act (RCRA)/CERCLA Unit in Appendix C of the SRS FFA? <i>If Yes, this is a CERCLA Model. Stop.</i> | | X | A review of the SRS FFA's Appendix C (Reference 6) found that Building 607-1F is not listed. |
| 5. | Is the facility listed as a Site Evaluation Area in Appendix G of the SRS FFA? <i>If Yes, this is a CERCLA Model. Stop.</i> | | X | A review of the SRS FFA's Appendix G (Reference 6) found that Building 607-1F is not listed. |
| 6. | Is there evidence that there has been a release of hazardous or radioactive materials outside the structure? <i>If Yes, this is a CERCLA Model. Stop.</i> | | X | A historical review of spills/releases to the environment, which included a review of the Occurrence Reporting and Processing System/ Site Item Reportability and Issue Management (ORPS/SIRIM) database (Reference 5) conducted from the effective date of the Federal Facility Agreement (FFA), August 16, 1993, to present; and a review of the FFA (Reference 6), which serves as a review of releases/spills to the environment prior to August 16, 1993, showed no record of any spills from 607-1F to the external environment |

| | Question | Yes | No | Justification |
|-----|---|------------|-----------|---|
| 7. | Is there a substantial threat of a release of hazardous or radioactive materials outside the structure? <i>If Yes, this is a CERCLA Model. Stop.</i> | | X | There is no threat, substantial or otherwise, of a release of hazardous or radioactive materials outside the structure. |
| 8. | Has the facility been assigned a hazard category as defined in Facility Safety Document Manual 11Q? <i>If No, stop and refer facility for evaluation to assign a hazard category, then proceed.</i> | | X | The facility is not listed in the site Facilities List (Reference 1) because it is a small sanitary sewage treatment facility, requiring no safety basis hazard controls. However, for the purposes of this screening, it meets the definition in the 11Q Appendix B Glossary (Reference 2) for Other Industrial, "A facility with all radiological and chemical hazards below 40 CFR 302.4 thresholds" |
| 9. | Is the hazard category Nuclear (HC- 2 or 3), radiological, or high hazard chemical? <i>If Yes, this is a CERCLA Model. Stop.</i> | | X | The facility is categorized "Other Industrial". |
| 10. | Has DOE-SR directed that the decommissioning be performed using the CERCLA Model? <i>If yes, this is a CERCLA Model. Stop.</i> | | X | |
| 11. | Does the complexity of the facility or the nature and extent of contamination warrant a higher than normal level of rigor and detail for decommissioning planning and evaluation? <i>If Yes, this is a CERCLA Model. Stop.</i> | | X | |
| 12. | Is the facility a formerly nuclear, radiological, or high-hazard chemical facility? <i>If Yes, this is an Integrated Sampling Model. Stop.</i> | | X | |
| 13. | Has EC&ACP's Regulatory Support Group determined that a final survey is not required for this facility? <i>If Yes, this is a Simple Model. If No, this is an Integrated Sampling Model. Stop</i> | | X | Therefore, this is an Integrated Sampling Model. |

Part 3. Review of Existing Records

The following facility records were reviewed as a part of this evaluation:

| Ref # | Document No. | Revision/Date | Title |
|-------|---------------------------------|--|--|
| 1 | Manual 1C, Procedure 501 | Rev. 5, 12/31/2014 | "Decommissioning of Facilities" |
| 2 | Manual 1C, Procedure 502 | Rev. 4, 12/31/2014 | "Preparing Decommissioning Decision Documents" |
| 3 | SRNS-RP-2008-00086-000-M&O | Rev. 17-01-MO 2/10/2017 | Standards/Requirements Identification Document FA00 Facility List |
| 4 | Manual 11Q, Appendix B Glossary | Rev. 6, 4/30/15 | "Facility Safety Document Manual" |
| 5 | N/A | N/A | SRS Site Item Reportability Issue Manual (SIRIM)/Occurrence Reporting and Processing System Information System (ORPS) 8/16/93 to Present |
| 6 | WSRC-OS-94-42 | Rev. 0, August 16, 1993, with updates through 2017 | Federal Facility Agreement for the Savannah River Site, Administrative Document No. 89-05-FF |
| 7 | N/A | N/A | Savannah River Site's Cold War Built Environment Cultural Resources Management Plan |
| 8 | WSRC-RP-2005-4090 | Rev. 1, April 2006 | Record of Decision for Remedial Alternative Selection for the 211-FB Pu-239 Release (081-F) Operable Unit (U) |
| 9 | ERD-EN-2019-0002 | Rev. 0, 1/31/2019 | 607-1F VZCOMML© Contaminant Fate and Transport Modeling |
| 10 | SDD-2019-00012 | Rev. 0, February 26, 2019 | Human Health Risk Evaluation for the 607-1F Sewage Treatment Plant |
| 11 | 456871.GEL | Rev. 0, August 20, 2018 | GEL Analytical Report for Sample 456871001 |
| 12 | 458509.GEL | Rev. 0, September 5, 2018 | GEL Analytical Report for Sample 458509001 |
| 13 | LW-AD-PROJ-180703-2 | Rev. 0, 01-August-2018 | Project Results Report, 607-1F Sediment Rad Data |
| 14 | ERD-EN-2018-0018 | Rev. 0, April 3, 2018 | Sample And Analysis Plan 607-1F Sewage Treatment Plant |
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