INL/EXT-10-20028

End State Condition Report for Materials and Fuels Complex Facilities MFC-799, 799A, and 770C

October 2010

The INL is a U.S. Department of Energy National Laboratory
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End State Condition Report for Materials and Fuels Complex Facilities MFC-799, 799A, and 770C

October 2010

Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

Prepared for the
U.S. Department of Energy
Office of Nuclear Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517

ABSTRACT

The Materials and Fuels Complex (MFC) facilities MFC-799, "Sodium Processing Facility," (a single building consisting of two areas: the Sodium Process Area and the Carbonate Process Area); MFC-799A, "Caustic Storage Area," and MFC-770C, "Nuclear Calibration Laboratory," have been declared excess to future Department of Energy (DOE) Office of Nuclear Energy (NE) mission requirements. Transfer of these facilities from DOE-NE to the DOE Office of Environmental Management, and an associated schedule for doing so, have been agreed upon by the two offices.

This report documents completion of pre-transfer stabilization actions for buildings MFC-799, 799A, and 770C, as identified in Department of Energy Guide 430.1-5, "Transition Implementation Guide," and indicates that these facilities are ready for transfer from DOE-NE to the DOE Office of Environmental Management. The facilities are in a known, safe condition and information is provided to support efficient decommissioning and demolition planning, while minimizing the possibility of encountering unforeseen circumstances during the decommissioning and demolition activities.

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ACRONYMS

DOE	Department of Energy
EM	Office of Environmental Management (DOE)
INL	Idaho National Laboratory
MFC	Materials and Fuels Complex
NE	Office of Nuclear Energy (DOE)

End State Condition Report for Materials and Fuels Complex Facilities MFC-799, 799A, and 770C

1. INTRODUCTION

This report documents the completion of pre-transfer stabilization actions for Materials and Fuels Complex (MFC) buildings MFC-799, 799A, and 770C, as identified in Department of Energy (DOE) Guide 430.1-5, "Transition Implementation Guide," and indicates that these facilities are ready for transfer from DOE's Office of Nuclear Energy (NE) to the Office of Environmental Management (EM). The facilities are in a known, safe condition, and information is available to support efficient decommissioning and demolition planning.

The following four documents, along with this report, document and describe the process used to complete facility transition:

1. Memorandum from NE-32 to EM-1, "Transmittal of Approved Schedule for Transfer of Environmental Liabilities from the Office of Nuclear Energy (NE) to the Office of Environmental Management (EM)," dated July 8, 2009 (hereinafter referred to as Transfer Memo) (DOE 2009)
2. PLN-3352, "Transition Plan for Multiple Facilities at the Material and Fuels Complex, Advanced Test Reactor, Central Facilities Area, and Power Burst Facility," Revision 1, dated March 3, 2010 (hereinafter referred to as Transition Plan)
3. INL/EXT-09-17292, *Facilities Condition and Hazards Assessment for Materials and Fuels Complex Facilities MFC-799, 799A, and 770C*, Revision 1, dated June 2010 (hereinafter referred to as the Facilities Condition and Hazards Assessment Report; see Appendix A) (INL 2010a)
4. INL/EXT-10-19590, *Hazardous Materials Verification and Limited Characterization Report on Sodium and Caustic Residuals in Materials and Fuel Complex Facilities MFC-799/799A*, dated August 2010 (hereinafter referred to as the Limited Characterization Report; see Appendix B) (INL 2010b).

The following subsections provide a summary of information contained in each of these reports.

1.1 Transfer Memo

This memorandum establishes the schedule and terms and conditions for transfer of various environmental liabilities from NE to EM. Transfer of MFC-799, 799A, and 770C were proposed for Fiscal Year 2010.

1.2 Transition Plan

This plan defines the scope, responsibilities, and methodology to be used for developing, planning, and implementing the activities required for transfer of multiple Idaho National Laboratory (INL) facilities from NE to EM. These facilities are considered excess and not needed to support future NE activities and have been identified as "contaminated facility meeting criteria in 430.1B and ancillary facilities."

It discusses transition objectives and goals, major transition steps, and transition activities and processes, including stabilization subject areas with the criteria that establish stabilization end-points related to the physical condition of the facilities.

1.3 Facilities Condition and Hazards Assessment Report

This report provides a description of the current physical condition of the facilities and any hazards (i.e., material, chemical, nuclear, or occupational) that may be associated with past operations. It

documents the conditions prior to transfer of the facilities from NE to EM and serves as the basis for disposition planning. The process used in obtaining this information included document searches, interviews, and facility walk-downs.

Based on the available information, documentation reviews, and the overall conditions observed during the facility walk-downs, it is concluded that these facilities may be disposed of at minimal risk to human health and safety and minimal risk to the environment.

1.4 Limited Characterization Report

This report is a companion to the Facilities Condition and Hazards Assessment (INL 2010a) and specifically responds to the requirement of Section 9.2, Item 6, of that document to provide an updated verification of the residual hazardous materials remaining in the Sodium Processing Facility's processing system. The hazardous materials of concern are sodium and sodium hydroxide (caustic).

The information in this report supports end-point objectives identified in the Transition Plan (PLN-3352) and the deactivation and decommissioning Critical Decision Milestone 1, as specified in DOE Guide 413.3-8, "Environmental Management Cleanup Projects."

NOTE: *Per DOE Guide 430.1-5, copies of both the Facilities Condition and the Hazardous Materials Verification and Limited Characterization Reports are included in their entirety as Appendixes A and B, respectively, of this document.*

2. MAJOR TRANSITION STEPS

DOE Guide 430.1-5 recommends an 11-step process that leads up to final facility transfer. This process is depicted in Figure 1.

Steps 1 through 8 are complete and details (to include the facilities walk-down checklists, photos, drawings, and other supporting documentation) are found in the Facilities Condition and Hazards Assessment and the Limited Characterization Reports (see Appendixes A and B). The Facilities Condition and Hazards Assessment Report also identifies open action items that need to be completed in order to satisfy the requirements of Step 9. These actions have been completed and are documented in the subsequent sections of this report.

This End State Report and a pending joint NE/EM pre-transfer walk-down of the facilities will establish the basis for completion of Step 10. Step 11 will be complete with the joint signing of a facility turnover correspondence. Both the joint walk-down and the turnover correspondence are being held in abeyance, pending EM receiving necessary funding to assume responsibility for the facilities.

3. END POINTS

The Facilities Condition and Hazards Assessment Report identified several actions that were needed in order to satisfy the stabilization criteria/end points. It also identified two administrative requirements that must be met prior to facility transfer. These are listed as follows:

1. Stabilization actions:
   - Isolate and re-route electrical service for MFC-771, "Radioactive Storage Waste Facility"
   - Remove stored equipment and property
   - Disposition Cs-137 source contained in MFC-770C, "Nuclear Calibration Instrument Laboratory"
   - Develop a limited characterization plan to verify caustic and sodium levels in MFC-799 and 799A tanks/vessels
   - Transfer MFC-799 and 799A out of the PER 116 MFC Resource Conservation and Recovery Act Permit.

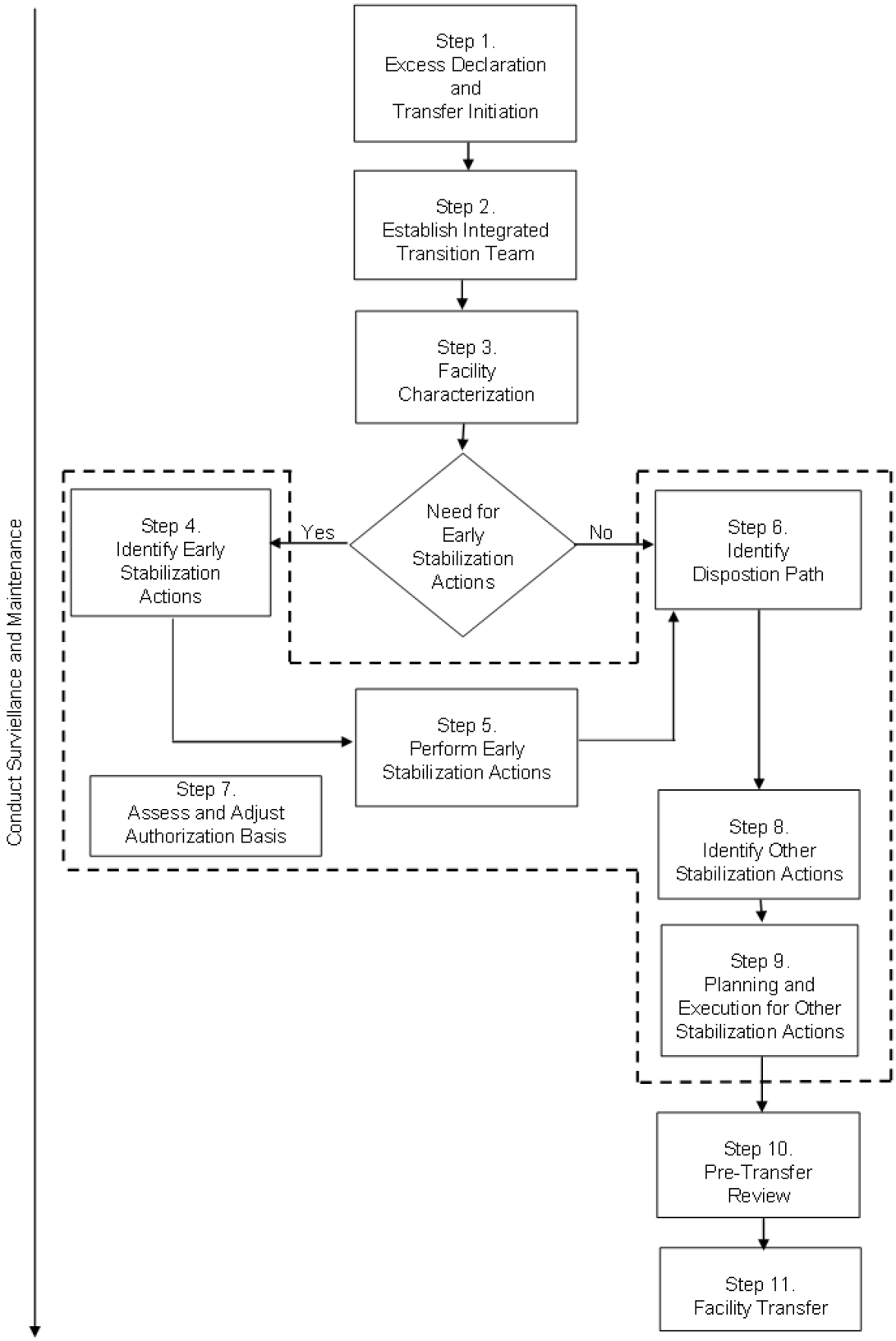

Figure 1. Facility transition steps.

2. Administrative requirements:
   - Perform joint NE/EM facility walk-down to confirm facilities are ready for transfer
   - Execute final transfer memo, documenting the date of transfer and any other information pertinent to transfer of management responsibility.

A summary of actions taken and the current status for each of these items is discussed in the following subsections.

3.1 Electrical Re-route

An integrated project team was assembled in early Fiscal Year 2010 to develop an engineered design package to re-route the electrical supply power from MFC-799 to MFC-771 to ensure uninterrupted operations at the Radioactive Scrap and Waste Facility.

The design resulted in replacing the original three-phase, 600-V power feed into the MFC-799 electrical control center with a new service that bypasses MFC-799 altogether. This bypass service feeds from a new 50-amp breaker in Power Panel 110 and transits north along the MFC roadway via a newly installed 250-ft underground ductbank, which ties back into the underground transition (ductbank to RGS buried cable) located on the north side of the Sodium Processing Facility. This new ductbank contains two conduit lines housing 600-V copper cable.

Figure 2 shows the nearly complete re-route. Power Panel 110 is in the foreground and the new feeder breaker is positioned in the upper right corner of the panel.

Figure 2. Electrical re-route for MFC-771.

Additionally, two electrical handholes were installed at each end of the ductbank to accommodate the electrical tie-in, access, and drainage. Construction, installation, removal of previous portions of electrical system, continuity testing, and final facility turnover are complete and MFC nuclear operations has accepted the project.

3.2 Equipment and Property Removal

The following excess equipment and material items associated with MFC-799 were specifically called out in the Facilities Condition and Hazards Assessment Report:

- Daewoo BC30S electric forklift and charger
- Spacemaster II 5-ton single beam overhead electric hoist
- P&H Beta HEVI-LIFT 500-lb overhead gantry crane
- P&H Spectrum 1,000-lb pedestal crane.

Excess equipment associated with MFC-770C includes:

- JL Sheperd Model 81-12 beam calibrator (Serial No. 540)
- JL Sheperd Model 155 attenuator system (Serial No. 783) (with Cs-137 source).

The forklift and charging system is being retained by NE and is being relocated to MFC-793. The hoists and cranes are excess to NE needs and have been abandoned in place. These will be transferred to EM with the facility. The beam calibrator and attenuator system have been removed and dispositioned (Figure 3), as discussed in Section 3.3.

Figure 3. Disassembly of MFC-770C calibration source.

MFC and contractor personnel walked the facilities on September 13, 2010, and confirmed that all other items of value that were previously stored in the facilities have been removed by their respective owners. Any items remaining are deemed abandoned and will be transferred for disposal with the facilities.

3.3 Cs-137 Source Disposition

Initial disposition activities focused on reuse of the beam calibrator and attenuator by transferring ownership of the equipment and source back to the original manufacturer with a resulting cost avoidance provided to the laboratory. However, the property disposition review determined that the equipment in its "as is" state was considered to be a nuclear sensitive and a non-proliferation item that could only be transferred from one government entity to another government entity. An exemption was initiated but not considered achievable in this Fiscal Year; therefore, the decision was made to disposition the source as waste.

Outside shipping services were necessary to accommodate the 94 curie quantity of cesium and the Type 'B' package. A contract was established with JL Shepherd and Associates to perform the shipment of the Cs-137 source to Nevada National Security Site for disposal in the underground burial facility. Waste profile NEID-CHCS137SS was approved on Aug 20, 2010, in a letter titled "Approval to Ship Battelle Energy Alliance (BEA) Low-Level Radioactive Waste to the Nevada Test Site (NTS)." A copy of the letter and the associated Integrated Waste Tracking System ship task are included as Appendix C.

The source was packaged and shipped to the Nevada National Security Site (Figure 4) by JL Shepherd and Associates on September 15, 2010.

Figure 4. Loading source for shipment.

3.4 Limited Characterization

The Limited Characterization Report discussed in Section 1 completes this requirement. A complete copy of this report is included as Appendix B.

3.5 Resource Conservation and Recovery Act Permit Modification

The Class 1 Permit Modification Request to remove MFC-799 and 799A from PER-116 MFC RCRA permit has been submitted to the DOE Idaho Operations Office for processing (BEA to DOE Idaho Operations Office letter dated July 29, 2010).

3.6 Joint Walk-Down and Final Transfer Memo

These actions will be completed upon confirmation that EM has received the funding required to assume surveillance and maintenance responsibility for the facilities.

4. SUMMARY

Each of the major transition steps (as presented in DOE Guide 430.1-5) has been completed for facilities MFC-799, 799A, and 770C. All pre-transfer end-points have been met; the facilities are isolated from surrounding structures and utilities; all known hazards have been identified, quantified, and stabilized to the extent practical; and the facilities are in known and stable conditions. They may be disposed of at minimal risk to human health and safety and minimal risk to the environment, and are ready for transfer from NE to EM for decommissioning and demolition.

5. REFERENCES

Battelle Energy Alliance to U.S. Department of Energy Idaho Operations Office letter, "SUBJECT: Contract No. DE-AC07-05ID14517 – Prerequisite to Facilitate Transfer of the Sodium Processing Facility, Materials and Fuels Complex 799, to CH2M-WG Idaho, LLC, per Battelle Energy Alliance, LLC Performance Evaluation and Measurement Plan," dated July 29, 2010.

DOE, 2009, Memorandum from NE-32 to EM-1, "Transmittal of Approved Schedule for Transfer of Environmental Liabilities from the Office of Nuclear Energy (NE) to the Office of Environmental Management (EM)," dated July 8, 2009.

DOE Guide 413.3-8, "Environmental Management Cleanup Projects," U.S. Department of Energy.

DOE Guide 430.1-5, "Transition Implementation Guide," U.S. Department of Energy.

Idaho National Laboratory Materials and Fuels Complex HWMA/RCRA Partial Permit PER-116, Environmental Protection Agency Number ID4890008952, dated August 16, 2004, and modified on October 2, 2008.

INL, 2010a, *Facilities Condition and Hazards Assessment for Materials and Fuels Complex Facilities MFC-799, 799A, and 770C*, INL/EXT-09-17292, Revision 1, Idaho National Laboratory, June 2010.

INL, 2010b, *Hazardous Materials Verification and Limited Characterization Report on Sodium and Caustic Residuals in Materials and Fuel Complex Facilities MFC-799/799A*, INL/EXT-10-19590, Idaho National Laboratory, August 2010.

PLN-3352, “Transition Plan for Multiple Facilities at the Material and Fuels Complex, Advanced Test Reactor, Central Facilities Area, and Power Burst Facility,” Revision 1, Idaho National Laboratory, March 3, 2010.

U.S. Department of Energy National Nuclear Security Administration to U.S. Department of Energy Idaho Operations Office letter, “Approval to Ship Battelle Energy Alliance (BEA) Low-Level Radioactive Waste to the Nevada Test Site (NTS),” dated August 20, 2010.

Appendix A

Facilities Condition and Hazards Assessment Report

INL/EXT-09-17292
Revision 1

Facilities Condition and Hazards Assessment for Materials and Fuel Complex Facilities MFC-799, 799A, and 770C

June 2010

INL/EXT-09-17292
Revision 1

Facilities Condition and Hazards Assessment for Materials and Fuel Complex Facilities MFC-799, 799A, and 770C

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Idaho National Laboratory
Idaho Falls, Idaho 83415

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ABSTRACT

The Materials and Fuel Complex (MFC) facilities MFC-799, Sodium Processing Facility (a single building consisting of two areas: the Sodium Process Area and the Carbonate Process Area); MFC-799A, Caustic Storage Area; and MFC-770C, Nuclear Calibration Laboratory, have been declared excess to future Department of Energy Office of Nuclear Energy mission requirements. Transfer of these facilities from NE to the Department of Energy Office of Environmental Management, and an associated schedule for doing so, have been agreed upon by the two offices. The prerequisites for this transfer are removal of nonexcess materials and chemical inventory, deinventory of the calibration source in MFC-770C, and rerouting or isolation of utility and service systems.

This report provides a description of the current physical condition and any hazards (material, chemical, nuclear, or occupational) that may be associated with past operations of these facilities. This information will document the conditions at the time of transfer of the facilities from the Office of Nuclear Energy to the Office of Environmental Management and will serve as the basis for disposition planning. The process used in obtaining this information included document searches, interviews, and facility walk-downs.

MFC-799, 799A, and 770C are all structurally sound and associated hazardous or potentially hazardous conditions are well defined and well understood. All installed equipment items (e.g., tanks and filters) used to process hazardous materials remain in place and appear to have maintained their integrity. There is no evidence of leakage and all openings are properly sealed or closed off and connections are sound. The pits appear clean with no evidence of cracking or deterioration that could lead to migration of contamination.

Based on the available information/documentation reviewed and the overall conditions observed during the facility walk-downs, it is concluded that these facilities may be disposed of at minimal risk to human health and safety and the environment.

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FIGURES

TABLES

ACRONYMS

DOE	Department of Energy
EBR-II	Experimental Breeder Reactor-II
EM	Office of Environmental Management (DOE)
HEPA	high-efficiency particulate air
INL	Idaho National Laboratory
MFC	Materials and Fuels Complex
Na	sodium
NaK	sodium-potassium
NE	Office of Nuclear Energy (DOE)
RCRA	Resource Conservation and Recovery Act

Facilities Condition and Hazards Assessment for Materials and Fuel Complex Facilities MFC-799, 799A, and 770C

1. INTRODUCTION

1.1 Purpose

The purpose of this report is to provide a detailed description of the Materials and Fuel Complex (MFC) facilities MFC-799, Sodium Processing Facility (a single building consisting of two areas: the Sodium Process Area and the Carbonate Process Area); MFC-799A, Caustic Storage Area; and MFC-770C Nuclear Calibration Laboratory. It also provides details of their current physical condition and any hazards (material, chemical, nuclear, or occupational) that may be associated with past operations. This information will document the conditions at the time of transfer of the facilities from the U.S. Department of Energy (DOE) Office of Nuclear Energy (NE) to the DOE Office of Environmental Management (EM) and will serve as the basis for disposition planning. The process used in obtaining this information included document searches, interviews, and facility walk-downs. A copy of the facility walk-down checklist is included in Appendix A of this report.

1.2 Location and Boundaries of Facilities Being Transferred

These structures as shown in Figure 1 are all part of or adjacent to the Sodium Processing Facility (SPF), which is located in the northwest corner of the MFC complex at the Idaho National Laboratory (INL) and are fairly isolated from the adjoining structures and facilities.

2. FACILITIES DESCRIPTIONS

2.1 Physical Structures Being Transferred

The Sodium Processing Facility (Building MFC-799) consists of one building with two designated areas used for hazardous waste/mixed waste container and tank storage, repackaging, and treatment. The two areas are the Sodium Process Area and the Carbonate Process Area. MFC-799A, Caustic Storage Area, consists of a single building containing a caustic storage tank over a spill containment pit and associated piping and pumping equipment. A separate exterior carbonate storage tank rests on a concrete pad next to the building. The Nuclear Calibration Laboratory (MFC-770C) is a 240-ft^2 single structure that is not directly associated with the operations or function of the Sodium Processing Facility. However, it is adjacent to these facilities and excess to mission requirements. Therefore, it is included in this transfer as a matter of efficiency. Descriptions of each building are provided in the following subsections.

2.1.1 Sodium Process Area

The Sodium Process Area was used for storage and treatment of hazardous waste/mixed waste in both containers and tanks. This area consists of an original four-roomed, L-shaped structure. An enclosed and covered, carbon steel-lined, concrete pad was later constructed where process equipment is located. The building is supported on a thickened-edge, reinforced-concrete pad. Three rooms in the Sodium Process Area were used for hazardous waste/mixed waste storage and treatment: the Barrel Holding Room, Sodium Melting and Draining Room, and Sodium Process Equipment Room. The fourth room is the Sodium Processing Facility Control Room. Each of these rooms is described briefly in the following subsections. Approximate overall dimensions of the enclosed Sodium Process Area are 65 × 57 ft. Most

of the exterior of the Sodium Processing Facility is constructed of galvanized-steel siding and roof panels on a structural steel frame. However, the Sodium Melting and Draining Room (the central room along the north wall) has 12-in. thick reinforced-concrete block walls and an 8-in. thick reinforced-concrete slab roof.

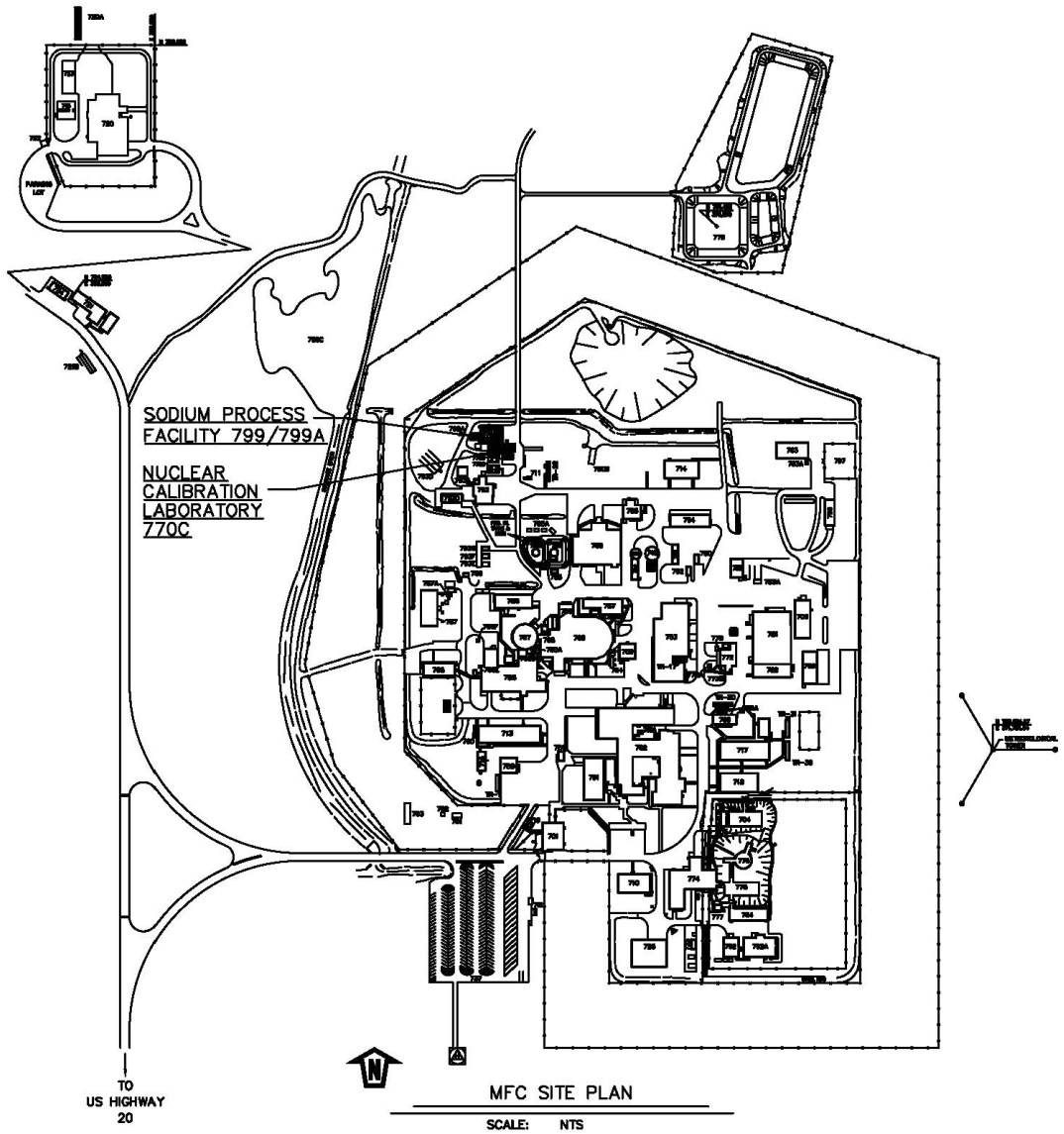


Figure 1. Location of facilities being transferred at the Materials and Fuels Complex.

2.1.1.1 Barrel Holding Room. The Barrel Holding Room was used to receive (store up to) 32 drums of hazardous waste/mixed waste. The dimensions of the room are 20 ft 6 in. × 25 ft. The hazardous waste/mixed waste was brought into this area through a 10 × 10-ft sliding service door (east exterior wall), removed from the skid where they were received, and placed onto individual barrel dollies. Once placed on the dollies, the drums were moved into the Sodium Melting and Draining Room (the Sodium Processing Facility typically processed sodium [Na] and sodium-potassium (NaK) alloy waste, but was permitted to process other alkali metals) through a 6 × 6-ft sliding door on the west wall of the Barrel Holding Room. In addition, the Barrel Holding Room also was the pathway for removal of the drained drums from the Sodium Melting and Draining Room as discussed in the next section. A 1,000-lb lift capacity jib crane is available for moving full drums (as needed) for sodium processing activities and maintenance support.

2.1.1.2 Sodium Melting and Draining Room. The Sodium Melting and Draining Room was used to melt and drain drums of alkali metal hazardous waste/mixed waste. The dimensions of the room are 25 × 22 ft. There were eight barrel container assemblies used to hold the drums of hazardous waste/mixed waste (typically Na and NaK) while they melted and drained. There is a bridge crane used to transfer the drums into the barrel container assemblies. The crane has a capacity of 1,000 lb and coverage of 15 ft laterally and 18 ft along the rail. The barrel container assemblies are arranged in two banks of four. A barrel draining manifold, which is insulated, served each of the two banks of four barrel assemblies. A flexible, stainless-steel line is provided at each barrel container assembly to connect the drum to the manifold. Each manifold (Manifold "A" on north side, Manifold "B" on south) is constructed of 3/4-in., Series-300, stainless steel pipe. A nitrogen purge is provided for each of the flexible barrel drain lines. The two barrel draining manifolds are combined into an insulated 1-in., Series-300, stainless-steel pipe, and, in turn, connected to the 5,000-gal sodium storage tank. The manifolds and 1-in. pipe are all sloped to drain into the 5,000-gal sodium storage tank. One drum can be drained through each manifold simultaneously.

2.1.1.3 Sodium Process Equipment Area. The Sodium Process Equipment Area was used to store and treat alkali metal hazardous waste/mixed waste. There are several major components in the sodium process area, including a 5,000-gal sodium storage tank, two 730-gal sodium day tanks (Tank A on west side, Tank B on east), sodium reaction vessel, 1,000-gal caustic cooling tank, 4,000-gal caustic storage tank, and the caustic off-gas system. The dimensions of the area are approximately 20 × 57 ft in an L-shaped configuration. The process area floor is a concrete pad and the process area secondary containment pits are lined with welded 3/16-in. carbon-steel plate. The building is supported on a thickened-edge, reinforced-concrete pad.

The sodium storage tank is a carbon-steel tank that received alkali metal from the barrel drain stations. The storage tank filled the day tanks, which fed the alkali metal to the reaction vessel at a rate of approximately 0.75 to 1.0 gal/min. The reaction vessel converted the alkali metal to a liquid hydroxide waste form, which was then loaded into drums and allowed to cool to solidify. The caustic cooling tank and the caustic storage tank allowed for storage of caustic during reaction vessel shutdowns. The caustic storage tank was used for backup storage only. The caustic storage tank is located in a separate building (MFC-799A) just west of the Sodium Process Equipment Area.

The caustic off-gas system is composed of several components designed to remove moisture, entrained caustic, and caustic vapor, and provides a vent path for hydrogen from the reaction vessel. The caustic off-gas system is located on the wall, in the southwest corner of the Sodium Process Equipment Area.

2.1.1.4 ***Control Room.*** The dimensions of the Control Room are approximately 20 × 10 ft. The Sodium Processing Facility Control Room houses the control computer and input/output front-end computer. An

operator was in attendance whenever the process system was in operation. The control computer was programmed to provide the control and operator interface for the Sodium Processing Facility that allowed control of system pressures, valves, temperatures, and so forth. More detailed information as to interlocks, pressure, level, and temperature controls is provided in Appendix A, the process description, and Subsection D-2(d) of the Resource Conservation and Recovery Act (RCRA) Permit.

The primary power distribution panel is located in the control room. It should be noted that this power distribution panel is used for the main power distribution to the Radioactive Waste Storage Facility, which is located about 800 ft to the northeast of the Sodium Processing Facility. The Radioactive Waste Storage Facility is a Security Category 1 facility; therefore, the power must be maintained and controlled at all times.

2.1.2 Carbonate Process Area

The Carbonate Process Area is an addition to the Sodium Processing Facility and is adjoined to the original structure to the south. Doors allow access between the original Sodium Processing Facility and the Carbonate Process Area. The Carbonate Process Area accommodated equipment for filling drums and provided storage of the hydroxide solution while it solidified. The Carbonate Process Area includes approximately 23 × 25 ft of main processing area with an associated upper mezzanine level and a shielded staging area of approximately 17 × 16 ft.

The building height in the main processing and staging areas is approximately 31 ft. The other wing of the L-shaped structure adds approximately 30 × 72 ft of drum storage and handling area with room for forklift operations. There are two 5-ton trolley cranes in this area that were used for supporting maintenance operations. The building height in the second wing is approximately 12 ft. The building is placed on a reinforced-concrete pad capable of supporting a uniform live load of 500 lb/ft^2. All sections of the Sodium Processing Facility meet the requirements of the UBC and Seismic Zone 2 or 2B.

Storage of empty and filled hydroxide drums was provided by two storage bays in the southeast area of the Carbonate Process Area. The storage bays are placed on a reinforced concrete pad with cinder block walls. Roll-up doors provide access to the Carbonate Process Area side of each bay, and an external roll-up door is available on the west bay. Permanent carbon-steel pans provided secondary containment for the liquid caustic drums stored in the bays. Poly platforms were placed inside the pans to allow forklift operation in the secondary containment areas and to elevate the caustic drums off the floor.

2.1.3 Caustic Storage Area (MFC-799A)

The Caustic Storage Area is a pre-engineered metal building that was added as part of the 1996 Sodium Processing Facility upgrade in support of the Experimental Breeder Reactor-II (EBR-II) shutdown. This conversion is discussed in detail in the following subsection. The facility is a single story, single room structure used to house a 4,000-gal storage tank within a containment pit and the associated piping and pumping equipment. There also is an external storage tank located on a concrete pad adjacent to the building. The exterior storage tank was never used.

2.1.4 Nuclear Calibration Laboratory (MFC-770C)

The Nuclear Calibration Laboratory is a 240-ft^2, single story facility constructed in the mid-1960s. MFC-770C houses a JL Sheperd Model 81-12 Beam Calibrator (Serial No. 540) and Model 155 Attenuator System (Serial No. 783), as well as a Cs-137 Source. This Cs-137 source was validated to be 200 Ci on August 19, 1975. Based on a 30.3-year half-life, the Cs-137 Source should be approximately 94 Ci in strength.

3. OPERATING HISTORY

3.1 Sodium Process Facility Basic Process Description

The Sodium Processing Facility was originally designed and built in the 1980s for reacting the 290 m^3 (77,000 gal) of primary sodium from the Fermi-1 Reactor in Detroit, Michigan, into a 50 wt% sodium hydroxide solution. This solidified sodium had been stored in 55-gal drums at Argonne National Laboratory-West (is now MFC) near Idaho Falls, Idaho since the early 1970s.

The sodium hydroxide was scheduled to be used to neutralize acid produced in the PUREX process at the Hanford site in Washington State. Because of a change in the PUREX mission, the sodium hydroxide was no longer required and the mission was abandoned before the Sodium Processing Facility became operational.

With the shutdown of EBR-II, the necessity for a facility for reacting the primary and secondary sodium was identified. In 1996, Argonne National Laboratory-West engineering and operations undertook the task of upgrading the existing Sodium Processing Facility to convert the sodium hydroxide to a dry, nonhazardous sodium carbonate waste that is acceptable for burial in the State of Idaho. Using thin film evaporator technology, the 50 wt% sodium hydroxide was combined with carbon dioxide in the reaction section of the thin film evaporator to form sodium carbonate product and water.

The sodium carbonate product and water were heated in the evaporation section of the thin film evaporator to remove the water and dry the sodium carbonate product into a powder. After testing the thin film evaporator for approximately 1 year, it was determined that this technology was not suitable due to plugging of equipment, minimal throughput, and powder containment issues. In 1998, it was decided to convert the sodium to a 70 wt% sodium hydroxide, a substance that solidifies at 65°C (150°F) and is acceptable for burial in Idaho.

The Sodium Processing Facility was modified and initial testing of the new process was successfully completed in November 1998 with nonradioactive sodium. Full production operations with FERMI sodium began on December 20, 1998.

Sodium could be introduced into the Sodium Processing Facility from two sources. The first source was the 208-L (55-gal) FERMI-1 barrels, which were melted and drained at the Sodium Processing Facility. The second source was the EBR-II primary and secondary sodium, which was transferred to the Sodium Processing Facility through a transfer line. The sodium was then injected into a nickel reaction vessel into a 70 wt% solution of sodium hydroxide. Water also was injected, maintaining the 70 wt% concentration by controlling the boiling point of the solution.

The sodium hydroxide was transferred from the reaction vessel into specially fabricated 269-L (71-gal) square drums, four to a pallet, and allowed to cool. The square drums occupied the same volume as the standard 208-L (55-gal) cylindrical drums; however, the square drums maximized utilization of the space on a pallet, minimizing the landfill space required for disposal. As part of the hazardous waste permit, daily drum samples were required to ensure solid sodium hydroxide was produced.

After completion of the secondary sodium processing, drum sampling revealed some liquid in drums that should have been solid. Upon investigation, it was determined that the liquid was due to inadvertent water addition into the reaction vessel, which diluted the sodium hydroxide concentration. In addition, the process was operated at temperatures that were too low, causing the sodium hydroxide concentration to fall below 69 wt% (the sodium hydroxide monohydrate crystallization concentration). At the lower sodium hydroxide concentration, not all of the solution solidifies at nominal ambient temperatures.

The Sodium Processing Facility was shutdown in August 1999 to undergo upgrades to the process to ensure the cooled product drums solidify and liquid is not present. Process system upgrades included increasing the operating temperature from 177°C (350°F) to 191°C (375°F) and installing physical and computer controls to prevent inadvertent water addition. During this shutdown, modifications to the off-gas system also were performed. Sodium hydroxide carryover in the off-gas system attacked the borosilicate glass high-efficiency particulate air (HEPA) filters and required replacement after approximately 7 days. Off-gas system modifications included changing the HEPA filter media to Teflon, which is resistant to sodium hydroxide, and installing parallel HEPA filters to increase the operating time between HEPA filter changeouts.

The sodium was scheduled to be processed in five separate and distinct campaigns, based on their radiation levels. The FERMI-l and EBR-II secondary sodium contained only low levels of radiation, while the EBR-II primary sodium had radiation levels of approximately 40 millirem per hour at 1 meter. Approximately 145 m^3 (38,000 gal) of FERMI-1 primary sodium was processed initially to gain operator experience with the least radioactive sodium. Second, all of the 50 m^3 (13,000 gal) EBR-II secondary sodium was processed. Next, approximately 106 to 125 m^3 (28,000 to 33,000 gal) of FERMI-l primary sodium was processed to validate modifications made to the Sodium Processing Facility. This was scheduled to start in June 2000. Fourth, all of the 330 m^3 (87,000 gal) of EBR-II primary sodium was processed. Finally, the remaining FERMI-1 primary sodium, approximately 20 to 39 m^3 (5,000 to 10,000 gal) was processed as a flush of the Sodium Processing Facility systems.

In March 2001, the Sodium Processing Facility was placed in standby pending decisions on sodium treatment associated with the Remote Treatment Project/Remote-Handled Waste Disposition Project.

Table 1 summarizes the information related to materials handled and the various vessels used in the conversion of sodium to sodium hydroxide.

Table 1. Sodium Processing Facility summary operations details.

Allowed Waste Types	Sodium Processing Facility Sodium Storage Tank: Ignitable reactive, corrosive, or toxic metal waste: Na NAK, NAOH, KOH Sodium Day Tanks (2): Ignitable reactive, corrosive, or toxic metal waste: NA NAK, NAOH, KOH Sodium Reaction Vessel: Toxic metal waste: NA NAK, NAOH, KOH Caustic Cooling Tank: Na NAK, NAOH, KOH Sodium Processing Facility Caustic Storage Tank: Na NAK, NAOH, KOH Water Holding Tank: Corrosive or toxic metal waste
Hazardous Waste Codes	Sodium Processing Facility Sodium Storage Tank: D001, D002, D003 Sodium Day Tanks (2): D001, D003 Sodium Reaction Vessel: D001, D002, D003 Caustic Cooling Tank: D002 Sodium Processing Facility Caustic Storage Tank: D002 Water Holding Tank: D002
Process Codes	Sodium Processing Facility Sodium Storage Tank: S02 Sodium Day Tanks (2): S02 Sodium Reaction Vessel: T01 Caustic Cooling Tank: S02 Sodium Processing Facility Caustic Storage Tank: S02 Water Holding Tank: S02

Table 1. (continued).

Maximum Volume	Sodium Processing Facility Sodium Storage Tank: 5,000 gal (24-ft long × 6-ft diameter) Sodium Day Tanks (2): 730-gal each (10-ft high × 4-ft diameter) Sodium Reaction Vessel: 1,080-gal (11.5-ft high × 4-ft diameter) Caustic Cooling Tank: 4,000-gal (13-ft long × 7-ft diameter) Sodium Processing Facility Caustic Storage Tank: 4,000-gal (13-ft long × 7-ft diameter) Water Holding Tank: 500-gal (7.33-ft high × 4-ft diameter)
Tank Construction Material	Sodium Processing Facility Sodium Storage Tank: Carbon steel (0.25 in.) Sodium Day Tanks (2): Carbon steel (0.25 in.) Sodium Reaction Vessel: S-200 nickel (0.25 in.) Caustic Cooling Tank: S-200 nickel (0.13 in.) Sodium Processing Facility Caustic Storage Tank: S-300 stainless steel (0.25 in.) Water Holding Tank: S-304 stainless steel (10 gauge)
Activities Allowed	Storage, deactivation (ignitable/reactives), melt/drain, and neutralization
Secondary Containment System Description	Sodium Processing Facility Sodium Storage Tank and Sodium Day Tanks (2): Carbon steel (0.19 in.) over sand floor and concrete walls – dimensions: 41 ft × 16 ft × 1.5 ft – capacity: 7,360-gal Sodium Reaction Vessel and Caustic Cooling Tank: Type – Carbon steel-lined (0.19 in.) compacted-sand floor pit and formed concrete walls – dimensions: 21.5 ft × 13 ft × 14 ft – capacity: 2,440-gal Sodium Processing Facility Caustic Storage Tank: Type – carbon-steel lined – dimensions: 12 ft × 17 ft × 3 ft – capacity: 4,580-gal Water Holding Tank: Capacity – drain into the Caustic Tank Pit. Caustic Tank Pit: 2,440-gal – dimensions: 21.5 ft × 13 ft × 14 ft

Table 2 provides a reference to major system drawings and photographs contained in Appendices B and C, respectively.

Table 2. Sodium Processing Facility system descriptions.

System	Drawings	Photos
Sodium Process Facility General Arrangement Sodium Process Flow Diagram	W7990-0207-ED-01 E5274-0006-ED-06	P1015404 through -444
Sodium Drum Melting and Draining System	E5274-0047-ED-01	P1015389 through -394 and -402
Drum Fill and Handling Systems	W7990-0229-ED-01	P1015298 through -300, -302, and -307
Service and Suspect Water Systems	E5274-0179-ED-07	P1015405 and -415
Off-Gas Systems	E5274-0054-ED-06	P1015318, -319, -321, -330, -337, and -343
Steam and Condensate System	E5274-0180-ED-03	P1015312 and -322
Nitrogen System	E5274-0049-ED-08	P1015392, -401, -402, and -414

The following subsections provide information regarding the major systems for the Sodium Processing Facility.

3.1.1 Sodium Melting and Draining System

Containerized Na/NaK generally arrived at Sodium Processing Facility in 55-gal drums. The sodium melting and draining system was used to do the following:

- Melt NA/NaK (which is solid at room temperature) in its storage container
- Remove Na/NaK from its storage container
- Transfer it to the 5,000-gal sodium storage tank.

The same process occurred for the NaK, except NaK is liquid at room temperature; therefore, "melting" NaK was not necessary. The transfer of containerized liquid Na/NaK was by vacuum pump to the 5,000-gal sodium storage tank.

3.1.2 Sodium Transfer System

The sodium transfer system was used to transfer the waste (Na/NaK) from the 5,000-gal sodium storage tank to the 730-gal sodium day tanks. Following completion of the melting and draining operation from the drums to the 5,000-gal sodium storage tank, the 5,000-gal sodium storage tank was pressurized with nitrogen. The pressurization provided the driving force to transfer the Na/NaK from the 5,000-gal sodium storage tank to the selected 730-gal sodium day tank. The transfer rate was approximately 39 gallons per minute.

3.1.3 Sodium Reaction System

The sodium reaction system was used to do the following:

- Transfer Na/NaK from the 730-gal sodium day tanks to the 2,440-gal reaction vessel, where it was converted to a hydroxide solution
- Transfer hydroxide to the drum fill station
- Transfer 50 wt% hydroxide to the 1,000-gal caustic cooling tank and from the caustic cooling tank to the reaction vessel during startup.

When the reaction vessel was in operation, the 730-gal sodium day tank supplying the waste to the reaction vessel was pressurized with nitrogen gas. This provided the driving force for the Na/NaK transfer and injection into the reaction vessel.

In the reaction vessel, the Na/NaK reacted with water to produce sodium hydroxide/potassium hydroxide and hydrogen (H_2). Reaction: $Na + 2H_2O + caustic \Rightarrow NaOH + KOH + H_2$.

Nitrogen/steam was introduced into the injection nozzles to atomize the Na/NaK upon injection into the reaction vessel to ensure the Na/NaK would react completely beneath the surface of the hydroxide solution. The nitrogen left the reaction vessel via the caustic off-gas system along with the reaction-produced hydrogen and some water vapor.

The hydroxide in the reaction vessel was recirculated with approximately 1 to 2 gallons per minute of the 8 to 10 gallons per minute recirculated solution continuously diverted to either the drum fill station (during operation) or to the 1,000-gal caustic cooling tank (during shutdown operations).

3.1.4 Caustic Transfer System

The caustic transfer system began at the reaction-vessel solution caustic recirculation pump and piping where a portion of the hydroxide being recirculated was diverted to the drum fill station or to the

1,000-gal caustic cooling tank. The caustic metering pump transferred the 50 wt% hydroxide solution form the 1,000-gal caustic cooling tank directly to the reaction vessel upon startup, or if backup hydroxide storage was needed. The 4,000-gal caustic storage tank was used (in an emergency only) to transfer hydroxide solution to or from the caustic storage tank to the reaction vessel. The caustic recirculation pump, metering pump, and the caustic cooling tank are located in the sodium process area and the caustic storage tank and caustic transfer pump are housed in MFC-799A, a building on the west side of Sodium Processing Facility.

3.1.5 Drum Fill and Handling System

The hydroxide solution was transferred to the drum fill station through a concentric pipe heat exchanger. The heat exchanger is an inner pipe (nickel) for high-temperature hydroxide and an outer pipe (stainless steel) for the coolant (water).

The high-temperature hydroxide (i.e., 360 to 375°F) flowed from the caustic recirculation line to the drum fill station. At the drum fill station, the hydroxide exited into the drums at an approximate temperature of 200 to 225°F. The reduction of the hydroxide temperature was by the counter-flow of coolant (water). Heat was removed from the cooling medium of the concentric pipe heat exchanger system via a shell and tube water heat exchanger.

The suspect exhaust off-gas system collected vapors from the enclosures (hood) for the drum fill and capping stations. From the hoods, the effluent (consisting mainly of minute quantities of hydroxide vapor and potentially some entrained particulate) was exhausted through a baghouse and HEPA filter to the atmosphere.

The product from the caustic transfer system was placed in drums via the drum fill and handling system, which included the drum filling station, capping station, survey and decontamination station, drum palletizing area, and storage areas.

3.1.6 Service and Suspect Water Systems

Two separate water systems – the service and suspect water systems – comprised the Sodium Processing Facility water system. The service water system was a clean potable water system and had the following two main functions in the sodium process area:

- Cooled the off-gas condenser
- Served as a heat sink for the shell and tube (concentric pipe) heat exchanger.

The service water supply delivers water to Sodium Processing Facility at approximately 100 psig through galvanized-steel piping.

The suspect water system was potentially contaminated with radioactive constituents from the processed Na/NaK. Makeup water was supplied to a 500-gal holding water holding tank from the MFC deionized water system. [NOTE: This tank is shown on facility drawings, but was not observed on facility walk-down]. The suspect water system's main function was to provide water from the 500-gal water holding tank for the following uses:

- Hydrolyze Na/NaK in the reaction vessel
- Dewater and cleanse off-gas emissions from the reaction vessel
- Maintain water level in the scrubber.

Sources of suspect water in the Sodium Processing Facility include the following:

- Condensed water vapor that is removed from the off-gas streams of the reaction vessel
- Water associated with cleanup activities associated with potentially-contaminated areas or surfaces.

The water system was used for cooling the vacuum pump inlets, off-gas condenser, caustic transfer system shell, tube heat exchanger, and for use in the scrubber.

3.1.7 Off-Gas Systems

Two separate off-gas systems were used to control effluent release from Sodium Processing Facility treatment operations. The system controlled effluents from the sodium process area and the suspect exhaust system controlled effluents from the sodium carbonate process area as described in the following subsections.

3.1.7.1 Caustic Off-Gas System. The caustic off-gas system was used to contain the gases and water vapor resulting from the conversion of Na/NaK to hydroxides in the reaction vessel. It condensed and recovered water vapor for reuse and removed radioactive aerosol prior to the release of filtered gases to the atmosphere. Principle constituents in the caustic off-gas stream, as it exited the reaction vessel, were water vapor, hydrogen, and nitrogen. Hydrogen was a reaction product. Nitrogen was used to atomize the Na/NaK in the reaction-vessel injection nozzles and to purge the reaction vessel to maintain low oxygen concentrations. The caustic off-gas system processed this stream and ultimately released hydrogen and nitrogen to the atmosphere and returned the condensed water vapor to the reaction process. Condensate was returned to the 500-gal water holding tank through a series of drain lines.

3.1.7.2 Suspect Exhaust System. The purpose of the suspect exhaust system was to control effluents that may be generated during the drum filling and capping processes. The off-gas consisted primarily of hydroxide vapor and particulate. The off-gas stream from the drum fill and capping stations exited the hoods surrounding the drum into the suspect exhaust system. This effluent was processed through a HEPA filtration system prior to release to the atmosphere. The effluent gas from the baghouse then passed through a HEPA filter that removed remaining particulate prior to discharge to the atmosphere.

3.1.7.3 Vent Systems. There are two independent vent systems associated with the Sodium Process Area (MFC-799) and 4,000-gal caustic storage tank (MFC-799A). All vent system piping is made of carbon steel. In the sodium process area, the vent systems collected gaseous effluents from all of the following tanks:

- 5,000-gal sodium storage tank
- 730-gal sodium day tanks
- 1,000-gal caustic cooling tank
- 4,000-gal caustic storage tank
- 500-gal water holding tank.

Effluent from the 5,000-gal sodium storage tank included vacuum pump exhaust, normal operational venting, or effluent from the poppet check valve. Effluent from the 730-gal sodium day tanks and 1,000-gal caustic cooling tank included normal operational venting or over-pressurization release from their respective poppet check valves. Effluent from the 500-gal water holding tank included normal operational venting through its own HEPA filter on top of the tank. These effluent streams vented to the caustic off-gas system upstream of the HEPA filters.

In the sodium carbonate process area addition, the sources of effluents were the drum fill and capping station hoods. All vent piping in this area is made of stainless steel.

3.1.7.4 Steam and Condensate System. Steam was used for the following:

- Atomization of the Na/NaK
- Clearing of the injection nozzles in the reaction vessel in the sodium process area.

The 175-psig steam from the site steam supply was reduced in pressure to 30 to 50 psig for the injection process in the reaction. The steam system piping is made of carbon steel. Solenoid, ball, globe, and gate valves were used in the system. Relief valves provided overpressure protection.

3.1.7.5 Nitrogen System. Nitrogen gas was used in the sodium melting and draining room and sodium process area as follows:

1. Sodium Melting and Draining Room – Nitrogen was applied to the drums of Na/NaK (while being heated) and flexible drain lines (when not in use). It was supplied at 3 to 5 in. H_2O.
2. Sodium Process Area – Nitrogen was used in the sodium process area to transfer sodium from the following:
   a. 5,000-gal sodium storage tank to the 730-gal sodium day tanks (nitrogen was supplied at 15 psig)
   b. 730-gal sodium day tanks to the injection nozzles (nitrogen was supplied at 10 to 30 psig).

3.1.7.6 Support Systems. The support systems for operation of the Sodium Processing Facility are described in the following subsections.

3.1.7.6.1 Compressed Air System–The compressed air system was used to do the following:

- Operate the barrel tilting mechanism for the melting-draining operation
- Operate the pneumatically actuated valves in the Na, caustic, and vacuum piping
- Operate the pneumatic tilting device to move drums of hydroxide to the drum palletizing area.

3.1.7.6.2 Heater System–The following five types of heaters were used throughout the process: drum strap-on heaters, disc heaters, strip heaters, mineral insulated wire, and heating tape.

3.1.7.6.3 Fire Suppression System–A fixed fire suppression system was provided in the sodium melting and draining room. Two ANSUL MET-L-X, Model 101-30, dry-powder fire extinguishers were provided to discharge through four modified ANSUL F-1 nozzles directly into each barrel container assembly. A single actuator was provided for each of these pairs of extinguishers. A fire hazard analysis of other Sodium Processing Facility areas determined that additional fire suppression systems were not required.

3.1.7.7 Major Spills or Leaks

There has been only one incident of a spill or leak that qualified for the filing of an Occurrence Report. It was a Na leak associated with a small crack at the root of the reducer connecting the 3/4-in. stainless steel piping to the 3/8-in. nickel tubing for the sodium injection nozzle on the Sodium Reaction Vessel in MFC-799. Evaluation of the failed reducer by a materials characterization engineer confirmed the failure (crack) was fatigue induced by excessive movement in the piping runs from the sodium day tanks to the sodium reaction vessel.

Approximately 4 oz of sodium were leaked; the total amount was contained in the reaction vessel secondary containment. The sodium did not react and burn when exposed to air. The smoke appeared to come from the outside material of the pipe lagging. No hazardous material was released to the environment nor was the health and safety of personnel ever compromised.

Details of this occurrence may be found in Occurrence Report Number: NE-CH-AA-ANLW-EBR-1999-0001, "Sodium Leak in the Sodium Process Facility."

There also was a small leak associated with the failure of the caustic pump. No Occurrence Report was filed as this failure happened during testing with clean caustic. The record of the leak is in the log book that will be turned over to CH2M-WG Idaho, LLC with the building.

3.2 Caustic Storage Area Process Description

The purpose of the Caustic Storage Area was to house the caustic storage tank, pump, and associated plumbing to transfer the caustic from the storage tank to MFC-799 for use in the sodium processing operation. The pad-mounted, exterior, caustic storage tank (A23-T-203) was intended to provide additional storage capacity, but it has never had any caustic or any other hazardous or radioactive material placed in it.

3.2.1 Major Spills or Leaks

There have been no spills or leaks associated with the Caustic Storage Area.

3.3 Nuclear Calibration Laboratory Basic Process Description

The laboratory was used to calibrate radiation detection/measurement instruments. The calibration equipment consists of a JL Sheperd Model 81-12 Beam Calibrator and Model 155 Attenuator System and a Cs-137 Source. This Cs-137 source was validated to be 200 Ci on August 19, 1975. Based on a 30.3 year half-life, the Cs-137 source should be approximately 94 Ci in strength.

3.3.1 Major Spills or Leaks

There have been no spills or leaks associated with the Nuclear Calibration Laboratory.

4. EXISTING PHYSICAL CONDITIONS

4.1 Structures

4.1.1 Condition Assessments

All facilities appear to be structurally sound and secure. There is no evidence of any damage or deterioration other than normal wear and tear incident to age and the normal effects of weather.

4.1.2 Engineered Protective Barriers and Systems

All installed equipment items (e.g., tanks and filters) used to process hazardous materials remain in place and appear to have maintained their integrity. There is no evidence of leakage and all openings are properly sealed or closed off and connections are sound. The pits appear clean with no evidence of cracking or deterioration that could lead to migration of contamination.

4.2 Required Follow-up Activities

The MFC-799 and MFC-799A facilities are still covered under the MFC Hazardous Waste Management Act RCRA Storage and Treatment Permit, No. ID4890008952, dated August 16, 2004, and modified on October 2, 2008. Therefore, inspections related to these two facilities as specified in Appendix D of that permit will need to be complied with until such time as the facilities meet the RCRA Closure criteria. MFC-770C is not part of the RCRA permit.

The primary power line that supplies power to the Radioactive Waste Storage Facility will need to be rerouted prior to transition of ownership for the Sodium Processing Facility.

5. EXISTING HAZARDOUS RADIOLOGICAL AND CHEMICAL CONTAMINATION

MFC-799 and -799A both contain radiological and nonradiological hazardous materials and MFC-770C contains a sealed Cs-137 source. The hazardous materials in MFC-799 and MFC-799A are processing "heels" that are contained within enclosed tanks. The MFC-770C source is properly contained, and MFC-770C is a secure, controlled-entry building. The radiological hazards associated with MFC-799 and MFC-799A are less than Hazard Category-3 quantities per DOE-STD-1027-92, "Hazard Categorization and Accident Analysis Techniques for Compliance With DOE Order 5480.23, Nuclear Safety Analysis Reports," whereas the quantity of source material in MFC-770C designates that facility as Hazard Category-3. Inventories are provided in Section 7 of this report.

5.1 MFC-799

While radiological surveys indicate no external contamination of concern, past operational surveys have indicated significant counts (up to 40,000 cpm) on internal components, particularly the caustic recirculation pump at the bottom of the sodium reactor. The MFC-799 sodium tanks were drained as low as practical and have only "heels" remaining in the tanks. There is an estimated residual of approximately 200 to 240 gal of 50% by weight sodium hydroxide solution present in these tanks that will be transferred to EM with the facility.

5.2 MFC-799A

The 4,000-gal caustic storage tank within MFC-799A is estimated to contain a residual "heel" of approximately 50 gal of 50% by weight solution of sodium hydroxide that will be transferred to EM with the facility.

5.3 MFC-770C

MFC-770C has no contamination.

6. SPECIAL NUCLEAR AND FISSIONABLE MATERIALS INVENTORY

The only special nuclear material associated with these facilities is the Cs-137 source material in the Nuclear Calibration Laboratory (MFC-770C). Currently, the following four disposition options are available:

3. Relocate source "as is" to another INL laboratory
4. Ship source back to supplier for refurbishment and return to service within the DOE complex
5. Ship source back to supplier for disposition

6. Ship source to the Off-site Source Recovery Project at the Los Alamos National Laboratory, New Mexico, for disposition.

NE will make the appropriate determination of which option is most cost effective and complete this action prior to facility transfer.

7. HAZARDOUS MATERIALS, WASTE, AND CHEMICAL INVENTORIES

Table 3 summarizes the hazardous materials, waste, and chemical inventories for the facilities being transferred. Note that some materials have been exempted from further consideration due to the relatively small quantities remaining.

Table 3. Hazardous material, waste, and chemical inventory.

Location	Material	Maximum Quantity	Threshold Quantity	Threshold Quantity Reference	Basis for Exemption from Further Consideration
MFC-799 and MFC-799A	Radiological	Less than Hazard Category-3	NA	DOE-STD-1027.92	MFC-799 and MFC-799A are less than Hazard Category-3 facilities
MFC-770C	Radiological	100 Ci	60 Ci for Hazard Category-3	DOE-STD-1027.92	Not exempted
MFC-799 and MFC-799A	Sodium	NA	NA	NA	The MFC-799 sodium tanks have been drained to an "as low as practical" level; this is judged to be reasonable to exempt the sodium from further evaluation
MFC-799	Sodium hydroxide	1,522 lb	5,000 lb (5 × 1,000)	Less than five times the reportable quantity of the screening threshold in 40 CFR 302.4, Table 302.4; however, material has a National Fire Protection Association Health Hazard Rating of 3 with a quantity greater than laboratory quantity (approximately 5 gal or 40 lb)	NA

Table 3. (continued).

Location	Material	Maximum Quantity	Threshold Quantity	Threshold Quantity Reference	Basis for Exemption from Further Consideration
MFC-799A	Sodium hydroxide	317 lb	5,000 lb (5 × 1,000)	Less than five times the reportable quantity of the screening threshold in 40 CFR 302.4, Table 302.4; however, material has a National Fire Protection Association Health Hazard Rating of 3 with a quantity greater than laboratory quantity (approximately 5 gal or 40 lb)	NA

8. FIXED OCCUPATIONAL HAZARDS

The only occupational hazards noted on the walk-down were two uncaged ladders and miscellaneous tripping hazards due to clutter in some areas. The first ladder is on the north exterior wall of MFC-799 and the second is located inside MFC-799 on the west side of the mezzanine. The tripping hazards will be eliminated as excess equipment is removed from the facility prior to transfer.

9. TRANSFER CONSIDERATIONS

9.1 Documents

9.1.1 Permits, Licenses, and Agreements

MFC-799 and MFC-799A are included in the following permits:

- MFC Hazardous Waste Management Area RCRA Storage and Treatment Permit, No. ID4890008952, dated August 16, 2004, and modified on October 2, 2008
- Air Quality Tier I Operating Permit, No T1-030520, Facility ID Nos. 023-0001, 011-00022.

9.1.2 Outstanding Commitments

There are no outstanding commitments related to MFC-799, MFC-799A, and MFC-770C.

9.1.3 Excess Equipment and Material

Excess equipment associated with MFC-799 and 799A includes the following:

- Daewoo BC30S electric forklift and charger
- Spacemaster II 5-ton single beam overhead electric hoist
- P&H Beta HEVI-LIFT 500-lb overhead gantry crane
- P&H Spectrum 1,000-lb pedestal crane.

Excess equipment associated with MFC-770C includes the following:

- JL Sheperd Model 81-12 beam calibrator (Serial No. 540)

- JL Sheperd Model 155 attenuator system (Serial No. 783) (with Cs-137 source).

9.2 Stabilization and Other Required Actions Required for Transfer

The criteria/end points that must be met prior to facility transfer, the current status of each, and the actions that remain to be completed are listed as follows.

1. ***Facility Structure/Personnel Safety*** – Structural integrity is such that (1) inspection personnel are safe, and (2) engineered protective barriers and containment systems (for example, but not limited to, safety class systems) are sufficient to prevent the release of radiological or hazardous chemical substances.

   Status: Facilities have been walked down and determined to be structurally sound. Hazardous materials are safely and effectively contained and present minimal risk as long as enclosures (tanks in the case of MFC-799 and 799A and sealed source in the case of MFC-770C) are not breached.

   Actions to be Completed: None.

2. ***Process Systems and Equipment*** – Process systems and equipment are systematically shut down, isolated, sealed off, or removed (if there is a compelling reason to do so) to establish a stable and known condition.

   Status: MFC-799 and 799A process systems and equipment were systematically shut down when these facilities were placed in standby in March 2001. The source contained in MFC-770C is secure. The systems and equipment for all three facilities are in stable and known conditions.

   Actions to be Completed: None.

3. ***Service and Utility Systems and Equipment*** – Only systems required to support disposition and surveillance and maintenance and maintain the stable condition (such as lighting, exhaust ventilation, and sump pumps) are operational. Equipment that has been judged to be valuable for future decommissioning is left available for future use. Other utility systems are isolated or sealed off for safety of future personnel or removed (if there is a compelling reason to do so).

   Status: All three facilities are in stable condition and necessary support systems remain operational.

   Actions to be Completed:

   - Modification of electrical service for the Radioactive Storage Waste Facility(MFC-771)
     - Electrical engineering and design
     - Install new underground power duct bank for power to MFC-771
     - Install new power panel and disconnects
     - Outage – disconnect old power/reconnect new power systems and re-energize new power supply system
     - Final burial of manholes and final cleanup of site areas
     - As built drawings/final report
   - Disposition of equipment and property
     - Delisting of excess property – disposition of equipment to other programs
     - Removal of applicable excess equipment
     - Removal of stored materials and equipment – interior of MFC-799, 799A and 770C
     - Removal of stored materials and equipment – exterior of MFC-799 and 799A.

4. ***Radiation Protection*** – Barriers and so forth are established in accordance with standard procedure per the site/DOE radiological control manual. Radioactive contamination remaining in the facility is contained in limited areas or has been stabilized against release.

   Status: Radioactive contamination in MFC-799 and 799A is internal to tanks and systems, is properly placarded, and is considered stabilized against release. There is no radioactive contamination at MFC-770C.

   Actions to be Completed: None.

5. ***Radioactive Materials*** – Radioactive materials are removed.

   Status: There are no radioactive materials in MFC-799 or 799A. MFC 770C contains a sealed Cs-137 source.

   Actions to be Completed: Removal and disposition of the Cs-137 source (assuming the source will be excessed).

6. ***Hazardous Materials and Waste*** – Hazardous materials and chemicals are removed in accordance with environmental regulations. The only liquids remaining are minor quantities that cannot be readily removed with installed equipment. Where feasible, RCRA closure has been achieved for listed materials. Hazardous materials remaining in the facility are contained in limited areas or have been stabilized against release. Documentation of the amount and location of remaining hazardous material is complete.

   Status: The hazardous materials and chemicals remaining are residuals (i.e., heels) within the processing and storage vessels in MFC-799 and 799A. These are minor quantities that cannot be readily removed, are in a stabilized condition, and will be transferred to EM with the facilities. Estimated quantities are documented and are presented in this report. RCRA closure activities will be performed by EM post-transfer.

   Actions to be Completed:

   - Limited characterization plan development
   - Verification of caustic and sodium levels in tanks/vessels
   - Transfer MFC-799 and 799A out of the PER 116 MFC RCRA Permit.

7. ***Housekeeping and Miscellaneous Materials*** – Classified and valuable materials are removed. Remove all classified documents, materials, and tools and downgrade security requirements.

   Status: There are no classified materials in any of these facilities. Other housekeeping activities will be completed as part of the disposition of equipment and property activities associated with Item 3 in the list above.

   Actions to be Completed: Prepare end state condition report.

9.3 Cost Estimates

Cost estimates prepared for actions to be completed before transition of MFC-799, MFC-799A, and MFC-770C are provided in Appendix E. The estimates support project execution of facility transition pre-requisite work scope and are classified as AACEI Class 3 cost estimates. The duration for completing the pre-requisite work scope is approximately 22 weeks. The total estimated cost for completing the work scope, excluding management reserve, is $535,000.

10. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

MFC-799, 799A, and 770C are excess to future NE mission requirements. These facilities are in good overall physical condition, and associated hazardous or potentially hazardous conditions are well defined and well understood. Transfer of these facilities from NE to EM and an associated schedule for doing so have been agreed upon by the two offices. The prerequisites for this transfer are the removal of nonexcess materials and chemical inventory, deinventory of the calibration source in MFC-770C, and the rerouting or isolation of utility and service systems.

Based on the available information/documentation reviewed and overall conditions observed during the facilities walk-down, it is concluded that these facilities may be disposed of at minimal risk to human health and safety or the environment.

Therefore, the following is recommended:

1. NE proceed with stabilization activities that will ensure the identified pre-transfer end states are met
2. Upon completion of these pre-transfer requirements, NE and EM perform a joint pre-transfer review, which will include a joint facility walk-down
3. NE and EM execute a final transfer memo documenting date of transfer and any other information pertinent to the transfer of management responsibility.

11. REFERENCES

40 CFR 270, "EPA Administered Permit Programs: the Hazardous Waste Permit Program," *Code of Federal Regulations,* Office of the Federal Register, 2000.

IDAPA 58.01.05, July 2000, "Rules and Standards for Hazardous Waste," *Idaho Administrative Code,* Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

MFC Hazardous Waste Management Act RCRA Storage and Treatment Permit, No. ID4890008952, dated August 16, 2004, and modified on October 2, 2008.

Air Quality Tier I Operating Permit, No T1-030520, Facility ID Nos. 023-0001, 011-00022 (Section 3.4).

EHA-70, Appendix R, "Emergency Management Hazards Assessment for MFC-799, Sodium Process Facility, and MFC-799A, Caustic Storage Tank Building," Rev 0, Effective Date July 05, 2006.

DOE-STD-1027-92, "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports," U.S. Department of Energy, December 1992.

Appendix A

Facilities Walk-Down Checklist

DOE Guide 430.1-5 ===> Facility Checklist

Projected Cost for DD&D of MFC-770C, -799, -799A - Transition Plan Cost

Prepared by DJ Kenoyer, Revision 0, 30-Oct-09

Based upon Observations by DJ Kenoyer / G Mecham during Facility Walk-down Wednesday, 28-Oct-09

	Subject of Survey	*Notes*
1	***Exterior Structure***	
1.01	Roof Condition (Integrity)	Exterior Not available for Observation
1.02	Roof Leakage	No Signs of Roof Leakage - No discolored Roofing Insulation or Office Suspended Ceiling Tiles or Staining of floor areas
1.03	Foundation (cracks, crumbling)	Not Visible
1.04	Walls (air and water tight)	Walls were all air and water tight as observed
1.05	Doors	Significant Air/Dust leakage under and around older style Sliding Doors - Barrel Holding Room / Good Seals on New Rollup Doors [Photos P1015376, 5388]
1.06	Hatches	None Observed
1.07	Windows	Only windows were Personnel Door Lites and Interior Office / Observation Windows - All in good condition
1.08	Loading Docks	None Observed
1.09	Ladders and Stairs	Exterior Ladder on North side of Facility does not have a Personnel Cage [Photo P1015494] ==> Drawing W7990-0209-ED-06 Sheet S-4 aand S-5
1.1	Piping Supports	None Observed
1.11	Power Poles	Main Power Poles providing power to MFC-799 in good condition - No signs of excessive weathering, warpage, overloading by tension, etc. [Photos P1015500-5502, 5506, 5509-5510]
1.12	Transmission lines	Main Power Transmission lines into MFC-799 in good condition - No signs of excessive wear and tear due to wind / tension, etc. [Photos P1015500-5502, 5506, 5509-5510]
1.13	Transfer piping	None Observed
1.14	Walkways and Roadways	Sidewalks (concrete) and Roadways (AC Pavement) in good condition / Roadways (gravel) on North and West side of MFC-799 are not in good condition … significant differential settlement, pot holes and bare spots [Photos P1015470-5472, 5488-5489, 5494-5496, 5505-5506, 5511-5512]
1.15	Tanks and piping	Abandoned Caustic Storage Tank (A23-T-203) in good condition / above ground tank with no Secondary Containment [Photos P1015471-5473, 5481]
1.16	Piping insulation	None Observed
1.17	Valve boxes or pits	None Observed
1.18	Manholes and Drains	Drain - Grate on NW corner of Barrel Washing Pad (concrete) [Photo P1015480]
1.19	Cribs, ditches and trenches	Area Drainage Ditch (gravel) located North of MFC-799 was utilized for area drains - 2 each 4-inch diameter pipes observed Ditch flow is to the West and there is a ditch wier (concrete) 20 yards to West of the 4-inch diameter pipes / Ditch has significant sedimentation at concrete wier [Photos P1015490-5492]
1.2	Waste sites	None Observed
1.2	Animal Nesting	None Observed
1.21	Paint chipping	None Observed
1.22	Paved or Painted Contamination	None Observed
2	***Interior Structure***	
2.01	Ceilings	Suspended Ceilings in Office and Control Rooms in good condition … No signs of discoloration indicating water leakage
2.02	Floors	Concrete floors in good condition - No Craking and/or Spalling of surfaces
2.03	Walls (load bearing)	All CMU walls were observed to be in Good Condition - No visible signs of cracking and/or spalling
2.04	Foundations	Not Visible
2.05	Mezzanines	Mezzanine above Drum Loading Area in good condition - Grate Steel platform in Good Condition / Intermediate Stairs and Ladders for access to interior Mezzanine were in Good Condition / Area needs to Cleanup of Operations Clutter / Storage Cabinets [Photos P1015259-5260, 5279]
2.06	Cat Walks	None Observed
2.07	Ladders and Stairs	Stairways to Mezzanine Deck in the CSPF (above the Drum Loading Area) were in good condition … Pinch Points at handrail and Structual Steel interface (Operations had installed padded foam at these locations) No Observed Ladders (other than Mezzanine above Drum Loading Area) - Operations utilized a portable ladder for access to HEPA Filter Units Platform in the Sodium Reaction Area [Photos P1015282, 5309]
2.08	Doors	Personnel Doors in Good Condition, Seals Tight, Swing Operations Functional, did not check funtional locking mechanisms Mechanised Rollup Doors in Good Condition and Functional [Photos P1015258, 5265, 5272-5274]
2.09	Fire Doors & Air Locks	None Observed
2.1	Vaults	None Observed
2.11	Cells	None Observed
2.12	Hot Cells	None Observed
2.13	Pits and Crawl spaces	The Secondary Containment Concrete & Steel Lined Pits (MFC-799 Sodium Storage Tank, Sodium Day Tanks, Sodium Reaction Tank, Caustic Cooling Tank & MFC-799A Caustic Storage Tank) ALL looked in Good Condition - No Observed Staining and/or Accumilated Debris Settlements
2.14	Sumps	Sump Pits at Secondary Containment Concrete & Steel Lined Pits (MFC-799 Sodium Storage Tank, Sodium Day Tanks, Sodium Reaction Tank, Caustic Cooling Tank & MFC-799A Caustic Storage Tank) ALL looked in Good Condition - No Observed Staining and/or Accumilated Debris Settlements
2.15	Office and Maintenance Shops	Office and Control Room looked in Good Condition
2.16	Elevators	None Observed
	General Appearance/Conditions	

2.17	Housekeeping	Observed Areas - Good Housekeeping - All Areas keep neat and orderly / Some Limited Cleanup Required ==> NOTE: Need to Relocate ALL Storage Items from this Facility to Other Storage Locations in Preparation for Transition / Transfer ... Equipment Laydown Area [Photos P1015258-5267, 5324-5325] ... Barrel Holding Area [Photos P1015376-77, 5381-5385, 5445-5446] ... Melting Draining Room [Photos P101597-5400, 5403] ... Sodium Reaction Room [Photo P1015406]
2.18	Maintenance	Observed Areas - Good S&M being Maintained
2.19	Lighting	Observed Areas - Good Lighting / All Lighting Fixtures working properly - No Observed burned out ballasts, etc.
2.2	Signage	Observed Signage Seemed up to date and adequate
2.21	Access Control	Access to Facility is Limited by Locked and Controlled Access
3	***Environmental Compliance***	
	Liquid Effluents	
3.01	Liquid Discharge Points	See 1.19
3.02	Cribs, Ditches, Ponds	See 1.19
3.03	Sampling and monitoring	None Observed
3.04	Abandoned systems	None Observed
3.05	Marking and Mapping	Not Know a This Time
3.06	Characterization info	Not Know a This Time
3.07	Storm water Management	Not Know a This Time
3.08	Records Retention	Not Know a This Time
	Gaseous Effluents	
3.09	Discharge Points (stacks)	Stack Not Observed - Known to have 2 Stacks on MFC-799 ==> 1) Sodium Reactor Off-Gas and 2) Carbonate Drum Loading Off-Gas Both these OffGas systems included Pre-Filters and HEPA Filters prior to discharge into Stack
3.1	Fugitive Emission sources	Not Know a This Time
3.11	Sampling and monitoring	Low Oxygen Monitoring in the Sodium Reaction Room with Low Oxygen Alarm #1307 [Photo P1015432]
3.12	Abandoned systems	The CO_2 Storage Tank Pad (50 ton tank capacity) located East of the MFC-799 facility shown on Drawings W7990-0207-ED-01, W7990-0209-ED-06 Sheet 3 of 32, sheet 5 of 32, sheet 7 of 32 ... is still in place however the CO_2 Storage Tank itself has been removed previously. This CO_2 Storage Tank provided the CO_2 for the Carbonate Sodium Process [Photo P1015501 ... CO_2 Storage Pad shows a wrapped electrical manlift stored in tank location]
3.13	Records Retention	Not Know a This Time
3.14	Characterization info	Not Know a This Time
3.15	Filter calibration	Not Know a This Time
3.16	Filter loading info	Not Know a This Time
	Chemical Management	
3.17	Spills and Releases	Two Know Spills / Releases ==> 1) Leak in Magnetic Seals of Caustic Recirculation Pump in Sodium Reactor Subsystem and 2) Leak in Sodium Injector on Sodium Reactor Subsystem
3.18	Chemical Storage	None Observed
3.19	Underground Tanks	None Observed
3.2	Records Retention	Not Know a This Time
	Regulatory	
3.21	Permitted Area boundary	MFC-799 / MFC-799A - All Physical Boundaries in Place
3.22	TSCA –PCB Labels	None Observed
3.23	Hazard Labels	Caustic and Sodium Hazards Labels throughout the MFC-799, MFC-799A
3.24	Calibration records/stickers	Observed Calibration Stickers - Facility in Operational Layup Status
4	***Process Systems***	
4.01	Process Control Room	General Observation - Good Condition / Operations Manuals in Place / Drawings in Place / File Cabinets Locked / Storage Cabinets containing Electronics Spare Parts / Old Components, etc.
4.02	Exhaust Systems	See 3.09 / Drawing E5274-0013-ED-19 4 Sheets shows the various Exhaust Details E5274-0054-ED-?? E-402 Sht 1(C-8) / E5274-0180-ED-?? R-605 Sht 1(D-8) /
4.03	Fans	Did NOT Check These
4.04	Motors	Did NOT Check These
4.05	Stacks	See 3.09
4.06	Ductwork	Building HVAC Duct work in Good Condition - Duct Insulation is in place and in Good Condition
4.07	HEPA Filters	See 3.09 - The SPF Operations Manual has a Skematic of the latest physical configuration of the 2 each Pre-Filters and 2 each HEPA Filters for the Sodium Reactor Off-Gas subsystem prior to discharge into the Stack {the existing drawings found so far do NOT reflect correct configuration} [Photos P1015440-5441 - Pre-Filters / Main HEPA Filters on Platform]
4.08	Off Gas Scrubber	None Observed
4.09	Stack Monitoring	None Observed
4.1	Glove Boxes	Glove Box stored on floor of Equipment Storage Area of CSPF - To be Relocationed Prior to Turnover / Other Gloveboxes are part of Drum Filling Room [Photos P1015292-5296, 5300-5303]
4.11	Lab Hoods	None Observed
4.12	Fume Hoods	None Observed
4.13	Vacuum Pumps	Vacuum Pump (A11-P-401) Appeared in Good Condition [Photo P101xxxx dod Not Take Picture]
4.14	Vessels or tanks	Main Tanks and Vessels shown on Drawing E5274-0006-ED-06 SPF Process Flow Diagram - ALL in Good Condition [Photos P1015405, 5410, 5413, 5417-5420, 5423-5424, 5458]
4.15	Pumps	Main Pumps shown on Drawing E5274-0006-ED-06 SPF Process Flow Diagram - ALL in Good Condition
4.16	Motors	Motor Control shown on Drawing E5274-0169-ED-04 Normal Power Single Line Diagram ==> Specifically MCC-AN1 / MCC-AN2 - All in Good Condition *NOTE: RSWF Bldg 771 Powered from MCC-AN1 3B 100AF 50AT labeled as 3B AN0117*
4.17	Piping	Caustic Piping has High Nickel content / Sodium Piping
4.18	Level Detection	Level Detection Instrumentation is shown on Drawing E5274-0013-ED-19 Sheets 1 thru 4 ==> High / Low Level Indicators on Tanks and Vessels - Did Not Check these in Field

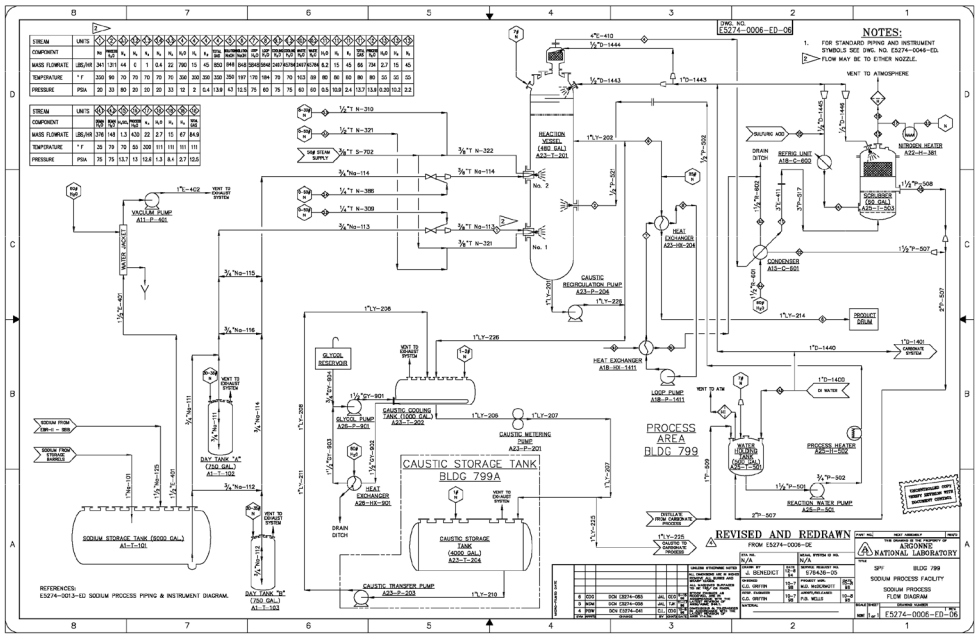
4.19	Inert Gas Systems	NITROGEN - Inert Gas is shown on Drawing E5274-0013-ED-19 Sheets 1 thru 4 - Did Not Check these in Field ==> Additional Reference Drawings for Inert Gas subsystems Drawing E5274-0049-ED-07 N-303 Sht 2(D-1) Sodium Storage Tank {20-25 psig} / N-305 Sht 2(B-1) Day Tank "A" {0-35 psig} / N-306 Sht 2(B-1) Day Tank "B" {0-35 psig} / N-317 Sht 2(D-1) Caustic Storage Tank {0.5-1.0 psig} ==> N-304 Sht 2(C-1) Water Holding Tank {7 psig} / N-310 Sht 3(C-1) Sodium Reactor {50 psig} / N-386 Sht 3(D-1) SR {0-50 psig} / N-309 Sht 3(D-1) SR {0-50 spig} / N-321 Sht 3(D-1) SR {0-50 psig} / N-375 Sht 3(B-1) Caustic Recirculation Pump {0-25 psig} N-388 Sht 3(C-1) {from Nitrogen Supply} ==> N-374 Sht 3(B-1) Caustic Transfer Pump {0-25 psig} / N-301Sht 3(A-1) Caustic Cooling Tank {203 psig} / N-312 Sht 3(C-1) Caustic Cooling Tank {0-85 psig} / N-373 Sht 3(B-1) Caustic Cooling Tank {0-25 psig}
4.2	Heat Detection Systems	
4.21	Compressed Air Systems	Check these in Field ==> Additional Reference Drawings for Compressed Air subsystems Drawing 5274-0057-ED-07 A-849 Sht 1(C-1) Sodium Storage Tank {110 psig} / A-820 Sht 1(C-1) {110 psig} / A-849 Sht 1(C-1) {110 psig} ==> Sodium Reactor A-805 Sht 1(B-1) {120 psig} / A-851 Sht 1(D-1) {110 psig} / A-826 Sht 1(C-1) {110 psig} / ==> A-842 Sht 1(D-1) {120 psig} / A-844 Sht 1(D-1) Caustic Cooling Tank {110 psig}
		Main Air Compressor supporting the (AFFF) Aqueous Film Forming Foam Alcohol Type Concentrate Fire Supression subsystem is located in the MFC-770B Building located just South of the MFC-770C / -779 facilities ==> Drawing W7990-0209-ED-06 sheet 32 of 32 / Photos P1015459 thru P1015466
4.22	Containment Systems	The Drum Filling Room served as a Secondary Containment for the Sodium / Carbonate Drum Filling Operations ==> This included Shielding Walls (Concrete 8-inch to 12 inch thickness) / Gloveports / Liquid Filled Lead Glass Viewing Window, etc. [Photos P1015291-5307]
4.23	Conveyer Systems	Barrel Transfer Trolley Subsystem Associated with the Drum Filling Room Appeared in Good Condition [Photos P1015268, 5291, 5298]
4.24	Waste Handling Systems	None Observed
4.25	Waste Assay Systems	None Observed
4.26	Reactor	None Observed {This being a Nuclear Reactor} The Sodium Reaction Vessel / Tank was observered to be in Good Condition
4.27	Storage Pool or basins	None Observed
4.28	Manipulators	None Observed
4.29	Water Filtration	Not Know a This Time
4.3	Water Treatment	Not Know a This Time
4.31	Assay Requirements	Not Know a This Time
5	***Infrastructure & Support Systems***	
5.01	Electrical Distribution	See 1.11 & 1.12 / Main Power Transmission lines into MFC-799 in good condition - [Photo P1015509] Power Pole PP110 Fed from PP111 CKT#1 480V (underground High Voltage)
5.02	Normal Power	Normal Power shown on Drawing E5274-0169-ED-04 [Photo P1015349-5351] ==> MCC-AN1
5.03	UPS	None Observed
5.04	Emergency Generators	Emergency Power Diesel Generator shown on Drawing E5274-0182-ED-00 SPF Bldg. 799 Stand-By Power Conduit & Equipment ==> NOTE: emergency Diesel Generator Previously Removed [Photos P1015511-5512]
5.05	Steam Turbines	None Observed
5.06	Switchgear	See 5.02
5.07	Breaker Panels	See 5.02
5.08	General Wiring	General Observation - ALL Wiring in Good Condition
5.09	Emergency Lighting	Emergency Lighting in Place - Exit Signs Above Doorways, etc. [Photo P1015278]
5.10	Security Power	None Observed
5.11	Steam and Water Systems	Still Active and Observered to be Active and in Good Condition [Photo P1015444]
5.12	Potable Supply	Did Not Observe
5.13	Process Supply	Process Water Still under Pressure in Sodium Reactor Area {Observed Pressure of 70 psig}
5.14	Distiller	None Observed
5.15	Floor and Sanitary Drains	None Observed
5.16	Process Drains	Process Drain at corner of Secondary Containment Pit / Sodium Reactor Vessel Pit and Sodium Storage & Sodium Day Tanks "A" & "B" Pit [Photos P101xxxx Did NOT Take Photos of Sumps / Drains] Shown on Drawing W7990-0207-ED-01, W7990-0124-ED-00 Sheets 1 & 2 of 3
5.17	Cranes	Several Cranes ==> CSPF Equipment Laydown Room & Mezzanine - 2 each Spacemaster II 50-ton Overhead Single Rail Electric Hoist Cranes [Photos P1015279, 5346] / SPF Barrel Holding Room - 1 each P&H Spectrum 0.5-ton Pedistal Electric Hoist Crane [Photos P1015376, 5386] / SPF Sodium Melting & Draining Room 1 each P&H Beta Hevi-Lift 0.5-ton Overhead Gantry Electric Hoist Crane [Photos P105447-5451] / Shown on Drawing W7990-0209-ED-06 Sheet 25 of 32
5.18	Moving Platforms	None Observed
5.19	Elevators	None Observed
5.2	**Security**	
5.21	Communication Systems	Emergency Paging / Communications System was in Good Working Condition - Several Announcements were made during Walk-down and could be Clearly Heard in ALL Areas
5.22	Phone and Computer Networks	Did NOT Check these Networks at this time
5.23	Fire Systems	MET-L-X was ONLy Observed Fire Subsystem in Place
5.24	Fire Detection	Fire Detection in Place in the Sodium Melting and Draining Room
5.25	Fire Suppression	The Sodium Melting and Draining Room has its own Specialized Fire Suppression System specifally designed for Sodium Fires. The MET-L-X is shown on Drawings [Photos P1015368-5369, 5390-5391, 5394]
5.26	Fire Maintenance	Not Know a This Time
5.27	Criticality Alarms	None Observed
5.28	Industrial Alarms	O2 Sensors in Sodium Reactor Area
5.29	Emergency Broadcasting	Emergency Paging / Communications System was in Good Working Condition - Several Announcements were made during Walk-down and could be Clearly Heard in ALL Areas

5.3	HVAC Supply	The HVAC was provided by two main sources … 1) MFC-799 Carbonate Sodium Process (CSP) via a NEW Trane Unit that utilized the plant Steam and Consensate Return subsystems [Photos P1015323, 5345] … NEW Trane unit located outside of MFC-799 (CSP) providing Chilling Subsystem for HVAC [Photos P1015497, 5503] … 2) MFC-799 Sodium Processing via the existing HVAC units installed on the roof as shown on Drawings W7990-0123-ED-11 sheets 15-16 of 20 [Photos P1015488, 5495-5496 … No CLOSE photos were taken of these HVAC Units due to NO Access to Roof Areas during this Walk-down]
5.31	Air filtering	Existing Building Louvers ALL had Filters on them to eleminate dust intrusion / infiltration into the building area … some filters had become displaced and were no onger functional (Sodium Reactor Area - North wall behind the Sodium Storage Tank, etc.) [Photos P1015423-5424, 5438] / Main Building Exhaust Units were runnthrough HEPA Filter Units as shown on Drawings W7990-0123-ED-11 sheets 15-16 of 20 [Photos P1015488, 5495-5496]
5.32	Building Heat	SFP MFC-799 Building Heat was being maintained during Winter months / Plant Steam and Condensate Return subsystems were operational [Photos P1015323, 5444] / Main Trane HVAC Units working / Individual Electrical Heater Units Operational in Sodium Reactor Area for additional heat
5.33	Building A/C	Not Observered as Operational since this was Winter Season
5.34	Freon Systems	None Observed
5.35	Shop systems	None Observed
5.36	Supply Storage	There were two 20 foot cargo containers located to NW of the MFC-799 Faicility that serve as Storage Units for the SPF … Inventories Not Known at this time … no access to locked stroage containers during walk-down [Photos P1015495-5499]
5.37	Change Rooms	None Observed
5.38	Emergency Response Org	Not Know a This Time
5.39	Temporary Structures	None Observed
5.4	Site Services/Support i.e. Rigging	None Observed
6	***Nuclear Safety & Materials***	
	Plutonium	
6.01	Material in Storage	None Observed - Plutonium N/A
6.02	In Solution	None Observed - Plutonium N/A
6.03	In Equipment	None Observed - Plutonium N/A
6.04	In Glove Boxes	None Observed - Plutonium N/A
6.05	In Hot Cells	None Observed - Plutonium N/A
6.06	In Cells, Sumps	None Observed - Plutonium N/A
6.07	In Ducts	None Observed - Plutonium N/A
6.08	In HEPA Filters	None Observed - Plutonium N/A
6.09	Sump or Pool Sludge	None Observed - Plutonium N/A
	Uranium or Thorium	
6.1	Material in Storage	None Observed - Uranium or Thorium N/A
6.11	In Solution	None Observed - Uranium or Thorium N/A
6.12	In Equipment	None Observed - Uranium or Thorium N/A
6.13	In Glove Boxes	None Observed - Uranium or Thorium N/A
6.14	In Hot Cells	None Observed - Uranium or Thorium N/A
6.15	In Cells, Sumps	None Observed - Uranium or Thorium N/A
6.15	In Ducts	None Observed - Uranium or Thorium N/A
6.16	In HEPA Filters	None Observed - Uranium or Thorium N/A
6.17	Sump or Pool Sludge	None Observed - Uranium or Thorium N/A
	Nuclear Fuel	
6.18	New in Storage	None Observed -Nuclear Fuel N/A
6.19	In Reactor	None Observed -Nuclear Fuel N/A
6.2	In Wet Storage	None Observed -Nuclear Fuel N/A
6.21	In Dry Storage	None Observed -Nuclear Fuel N/A
	TRU – (am, cm, bk, cf)	
6.22	Material in Storage	None Observed - TRU N/A
6.23	In Solution	None Observed - TRU N/A
6.24	In Equipment	None Observed - TRU N/A
6.25	In Glove Boxes	None Observed - TRU N/A
6.26	In Hot Cells	None Observed - TRU N/A
6.27	In Cells, Sumps	None Observed - TRU N/A
6.28	In Ducts	None Observed - TRU N/A
6.29	In HEPA Filters	None Observed - TRU N/A
6.3	Sump or Pool Sludge	None Observed - TRU N/A
	Other Nuclear Materials	
6.31	Deuterium, Tritium, Lithium 6	None Observed
6.32	Sealed Sources	MFC-770C - Nuclear Calibration Laboratory
6.33	Source Accountability	Not Known at this Time
6.34	Neutron Monitors	None Observed
6.35	Neutron Absorbers	None Observed
6.36	In line Neutron Source	None Observed
7	***Hazardous Material***	
	Process Chemicals	
7.01	Acids	None Observed
7.02	Caustics	Caustic Subsystem - Chemical makeup ⟹ Specific Chemical Constituents and Concentrations are being provided by BEA / See MSDS (Material Safety Data Sheets) on Caustic
7.03	Sodium	Sodium Subsystems - Limited amounts of Radioactive Contamination / See MSDS (Material Safety Data Sheets) on Sodium Metals
7.04	Hydrazine	None Observed
7.05	Lab Reagents	None Observed
7.06	Misc. Chemicals or Explosives	None Observed
	Environmental Hazards	
7.07	Lead, Heavy Metals	None Observed
7.08	Potassium Chromate	None Observed
7.09	PCBs	None Observed
7.1	Solvents and thinners	None Observed
7.11	Freon, CFC's	None Observed
7.12	Paints, Sealants, Adhesives	None Observed

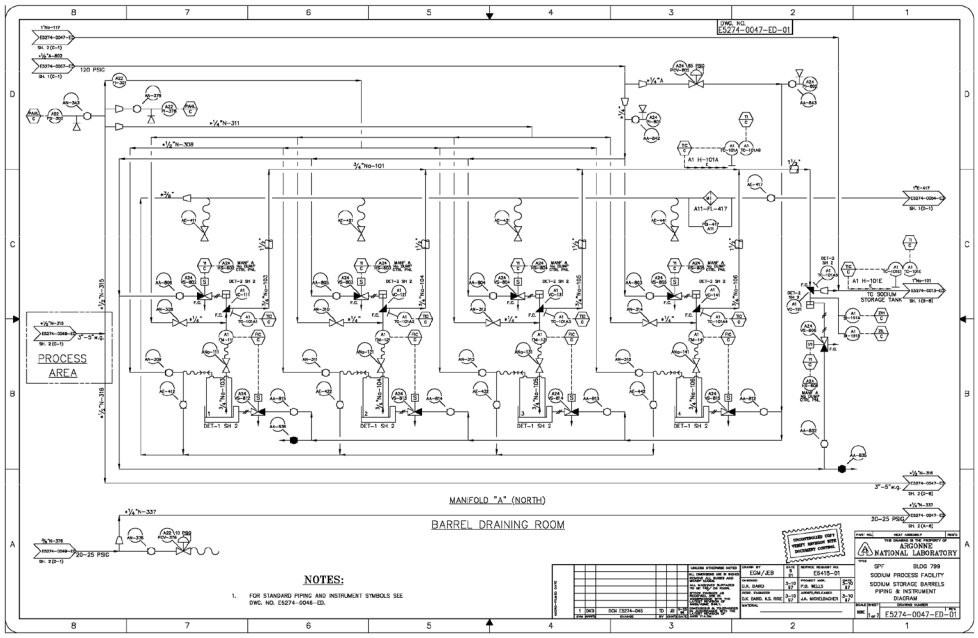
7.13	Decontamination Agents and Cleaners	None Observed
7.14	Pesticides and Herbicides	None Observed
	Industrial Hazards	
7.15	Asbestos	None Observed
7.16	Beryllium	None Observed
7.17	Magnesium	None Observed
7.18	Chlorine	None Observed
7.19	Toxic/Air Deficient Atmospheres	Potential in "Confined Space" Areas only ... None Observed during Walk-down
7.2	Carcinogens	None Observed
	Biological Hazards	
7.21	Animal and Rodent Feces	None Observed
7.22	Bird Droppings	None Observed
7.23	Snakes	None Observed
7.24	Spiders & Insects	None Observed
7.25	Molds and Mildew	None Observed
	Hazardous Waste	
7.26	Profiles/Types	None Observed
7.27	Packaged	None Observed
7.28	Not Packaged	None Observed
7.29	Disposal Path Availability	None Observed
7.3	Excess Material	None Observed
7.31	90 Day Pad w/material*	None Observed
7.32	Satellite Area	None Observed
7.33	Containment	None Observed
7.34	Shipping Records	None Observed
8	***Radioactive Contamination & Waste***	
	Radioactive Contamination/Materials	
8.01	Surface contamination Alpha	None Observed
8.02	Surface contamination B/G	None Observed
8.03	Airborne Contamination	None Observed
8.04	PPE (Mask, Fresh Air etc)	None Observed
8.05	Boundary	RAD CON Eberline Hand & Foot Monitors setup at Doors to Office and Control Room
8.06	Postings	"Internal Contamination" Potential [Photos P1015335-5336, 5417-5420, 5440] Carbonate Off-Gas subsystem, Sodium Tanks & piping, Caustic Tanks and piping, Reactor Off-Gas subsystem
8.07	Mapping	Not Know a This Time - RAD CON Contacts to be made
8.08	Fixed Contamination	None Observed
8.09	Fixative Information	None Observed
8.1	Work Place Air Sampling	None Observed
8.11	High Radiation Area's	None Observed
8.12	Key Control	None Observed
8.13	Log Books	None Observed
8.14	Radon	None Observed
8.15	Decontamination Stations	None Observed / Hand & Foot Monitors at Certain RAD CON Boundary Areas [Photo P1015347] Eberline
8.16	Laundry (SWPs)	None Observed
	Outside Contamination Areas	
8.17	Boundary	None Observed
8.18	Postings	None Observed
8.19	Mapping	None Observed
8.2	Fixed Contamination	None Observed
8.21	Fixative Information	None Observed
8.22	Work Place Air Sampling	None Observed
	Radioactive Waste	
8.23	TRU Waste	None Observed
8.24	Mixed Waste	None Observed
8.25	Resins, Sludge or others	None Observed
8.26	Packaged	None Observed
8.27	Not Packaged	None Observed
8.28	Disposal Path Availability	None Observed
8.29	Excess Material	None Observed
8.3	90 Day Pad	None Observed
8.31	Satellite Area	None Observed
8.32	Containment	None Observed
8.33	Shipping Records	None Observed
8.34	Assay Requirements	None Observed

Appendix B

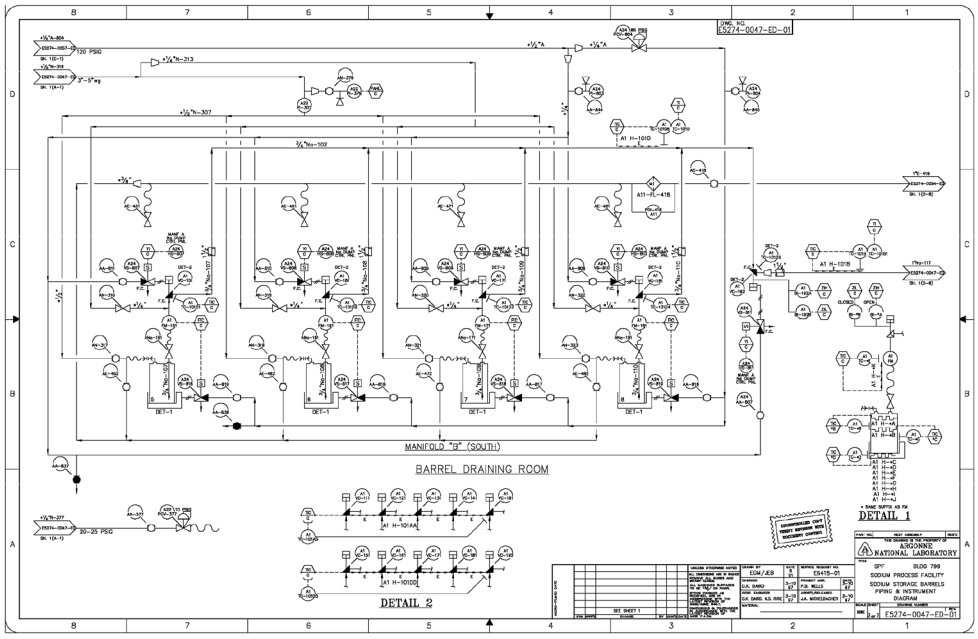
Drawings


DWG. NO. E5274-0006-ED-06
NOTES:
1. FOR STANDARD PIPING AND INSTRUMENT SYMBOLS SEE DWG. NO. E5274-0046-ED.
2. FLOW MAY BE TO EITHER NOZZLE.
VENT TO ATMOSPHERE
REACTION VESSEL (400 GAL) A23-T-201
No. 2
No. 1
HEAT EXCHANGER A23-HX-204
CONDENSER A13-C-601
SCRUBBER (60 GAL) A23-T-203
NITROGEN HEATER A22-H1-301
REFRIG UNIT A18-C-602
DRAIN DITCH
VACUUM PUMP A11-P1-401
CAUSTIC RECIRCULATION PUMP A23-P-206
CAUSTIC METERING PUMP A23-P-201
CAUSTIC COOLING TANK (1000 GAL) A23-T-202
CAUSTIC STORAGE TANK BLDG 799A
CAUSTIC STORAGE TANK (4000 GAL) A22-T-204
CAUSTIC TRANSFER PUMP A23-P-203
HEAT EXCHANGER A28-HX-801
GLYCOL RECEIVER
LOOP PUMP A18-P-1401
HEAT EXCHANGER A18-HX-1411
PROCESS AREA BLDG 799
WATER HEATER (400 GAL) A26-H1-501
PROCESS HEATER A26-H1-504
REACTION WATER PUMP A26-P-501
PRODUCT DRUM
SODIUM STORAGE TANK (8000 GAL) A1-T-101
DAY TANK "A" (750 GAL) A1-T-102
DAY TANK "B" (750 GAL) A1-T-103
REFERENCES: E5274-0013-ED SODIUM PROCESS PIPING & INSTRUMENT DIAGRAM.
REVISED AND REDRAWN FROM E5274-0006-ED
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
SODIUM PROCESS FLOW DIAGRAM
E5274-0006-ED-06

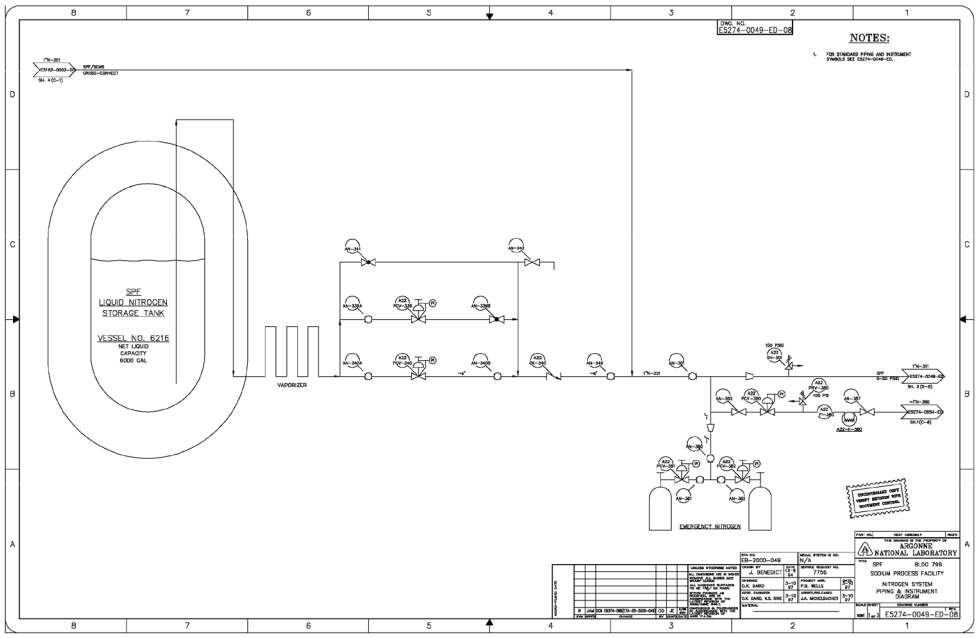
27


DWG. NO. E5274-0047-ED-01
120 PSIG
PROCESS AREA
MANIFOLD "A" (NORTH)
BARREL DRAINING ROOM
20-25 PSIG
TO SODIUM STORAGE TANK
NOTES:
1. FOR STANDARD PIPING AND INSTRUMENT SYMBOLS SEE DWG. NO. E5274-0046-ED.
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
SODIUM STORAGE BARRELS
PIPING & INSTRUMENT DIAGRAM
E5274-0047-ED-01

28


DWG. NO.
E5274-0047-ED-01
MANIFOLD "B" (SOUTH)
BARREL DRAINING ROOM
DETAIL 1
DETAIL 2
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
SODIUM STORAGE BARRELS
PIPING & INSTRUMENT
DIAGRAM
E5274-0047-ED-01

29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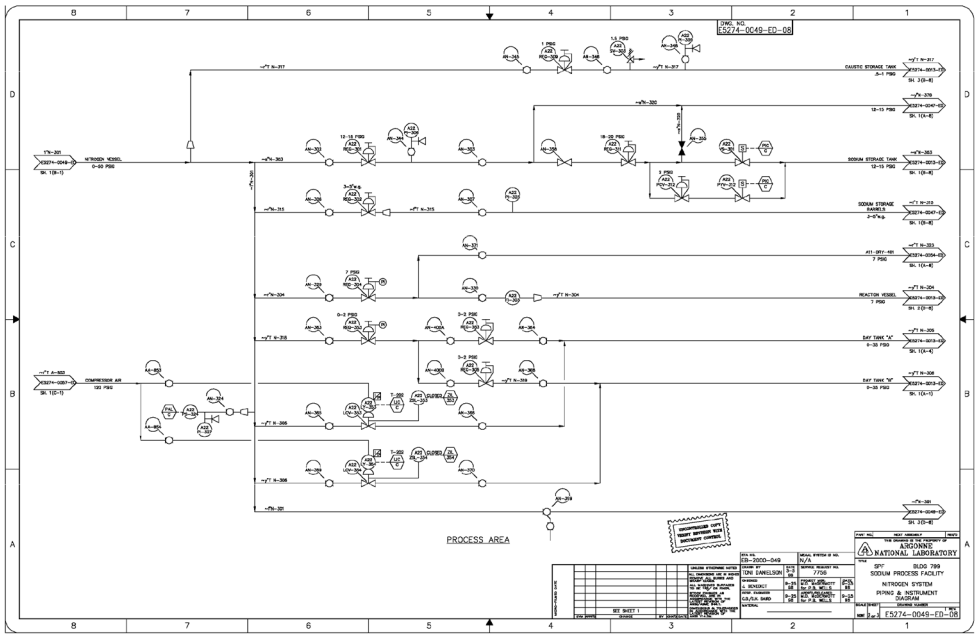
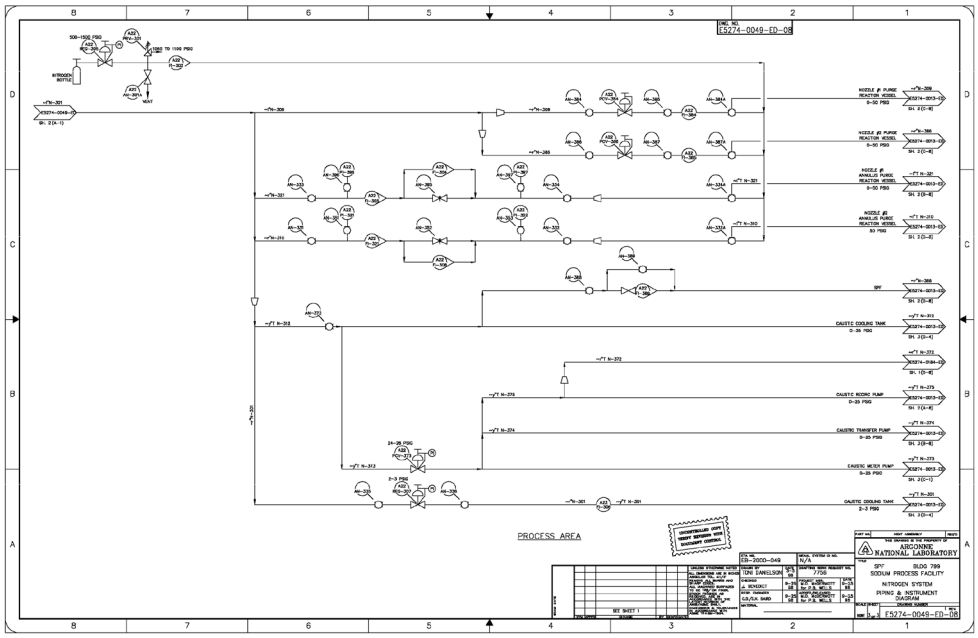
SPF
LIQUID NITROGEN
STORAGE TANK
VESSEL NO. 621E
NET LIQUID
CAPACITY
6000 GAL
VAPORIZER
EMERGENCY NITROGEN
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
NITROGEN SYSTEM
PIPING & INSTRUMENT
DIAGRAM
E5274-0049-ED-08

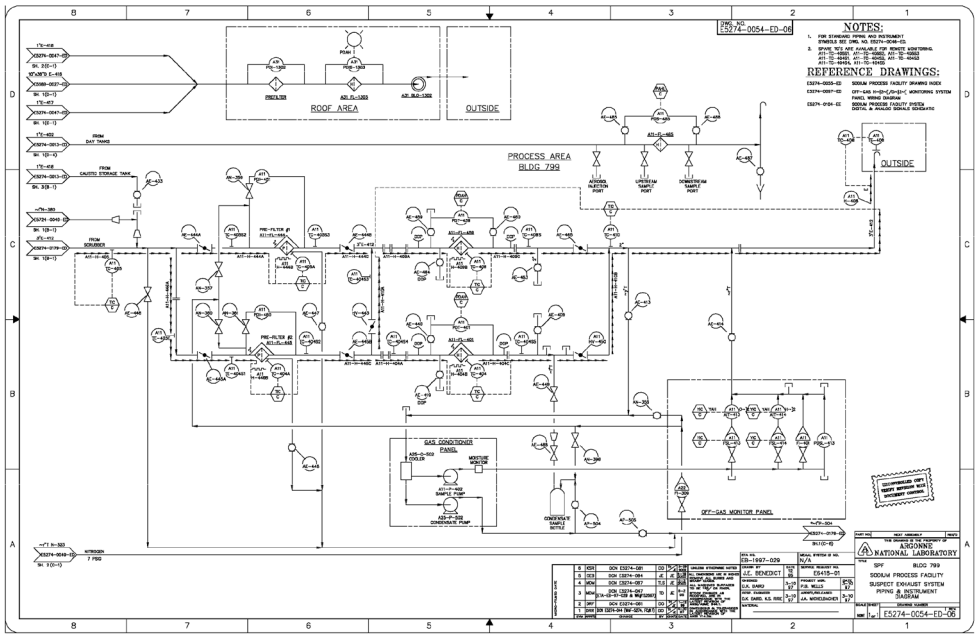
30


DWG. NO.
E5274-0049-ED-08
PROCESS AREA
SPV
BLDG 799
SODIUM PROCESS FACILITY
NITROGEN SYSTEM
PIPING & INSTRUMENT
DIAGRAM
ARGONNE
NATIONAL LABORATORY
E5274-0049-ED-08

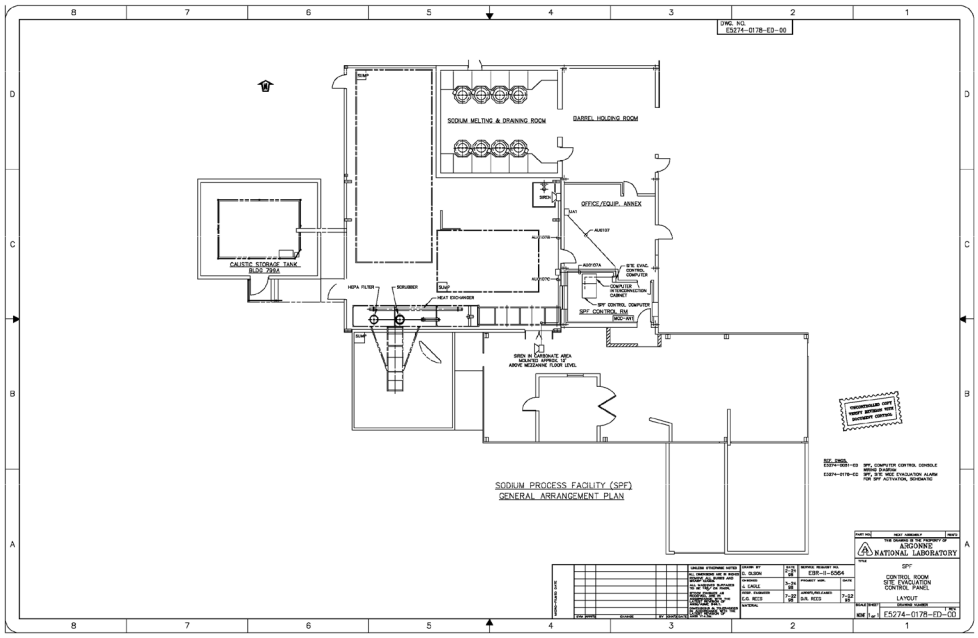
31


DWG. NO.
E5274-0049-ED-08
PROCESS AREA
SPV
BLDG 799
SODIUM PROCESS FACILITY
NITROGEN SYSTEM
PIPING & INSTRUMENT
DIAGRAM
ARGONNE
NATIONAL LABORATORY
E5274-0049-ED-08

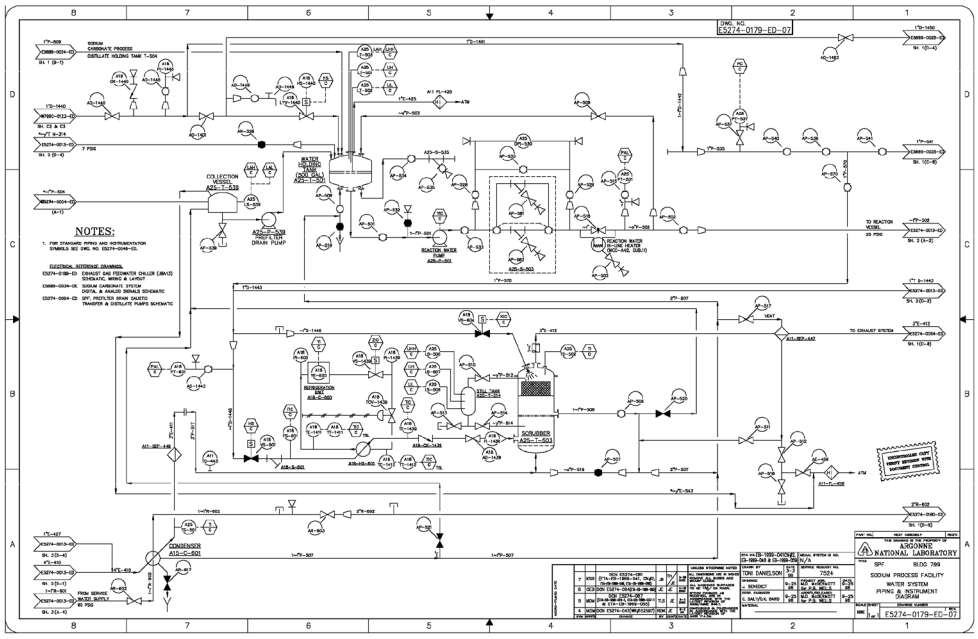
32


NOTES:
REFERENCE DRAWINGS:
ROOF AREA
OUTSIDE
PROCESS AREA
BLDG 799
GAS CONDITIONER PANEL
OFF-GAS MONITOR PANEL
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
SUSPECT EXHAUST SYSTEM
PIPING & INSTRUMENT DIAGRAM
E5274-0054-ED-06

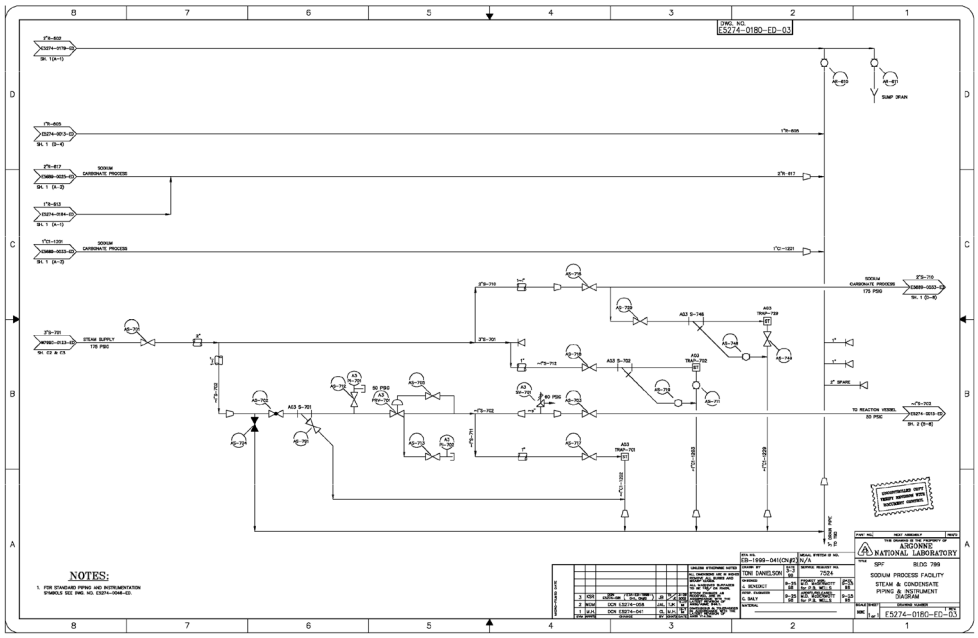
33


SODIUM MELTING & DRAINING ROOM
BARREL HOLDING ROOM
OFFICE/EQUIP. ANNEX
CAUSTIC STORAGE TANK BLDG 799A
SODIUM PROCESS FACILITY (SPF)
GENERAL ARRANGEMENT PLAN
ARGONNE NATIONAL LABORATORY
SPF
CONTROL ROOM S'E EVALUATION CONTROL PANEL LAYOUT
E5274-0178-ED-00

34


DWG. NO.
E5274-0179-ED-07
NOTES:
1. FOR STANDARD PIPING AND INSTRUMENTATION SYMBOLS SEE DWG. NO. E5274-0048-03.
ELECTRICAL SCHEMATIC DRAWINGS:
E5274-0186-ED EXHAUST GAS FEEDWATER CHILLER (BA10) SCHEMATIC, WIRING & LAYOUT
E3669-0024-06 SODIUM CARBONATE SYSTEM DIGITAL & ANALOG SIGNALS SCHEMATIC
E5274-0064-ED SPF, PRETILTER DRAIN DALETEC TRANSFER & DISTILLATE PUMPS SCHEMATIC
SODIUM CARBONATE PROCESS DISTILLATE HOLDING TANK T-504
COLLECTION VESSEL A25-T-530
DRAIN PUMP
REACTION WATER PUMP A25-P-501
SCRUBBER A25-T-503
CONDENSER A15-C-501
TO REACTION VESSEL 25 PSIG
TO EXHAUST SYSTEM
FROM SERVICE WATER SUPPLY 80 PSIG
UNCONTROLLED COPY
VERIFY BEFORE USE
DOCUMENT CONTROL
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
WATER SYSTEM
PIPING & INSTRUMENT DIAGRAM
E5274-0179-ED-07

35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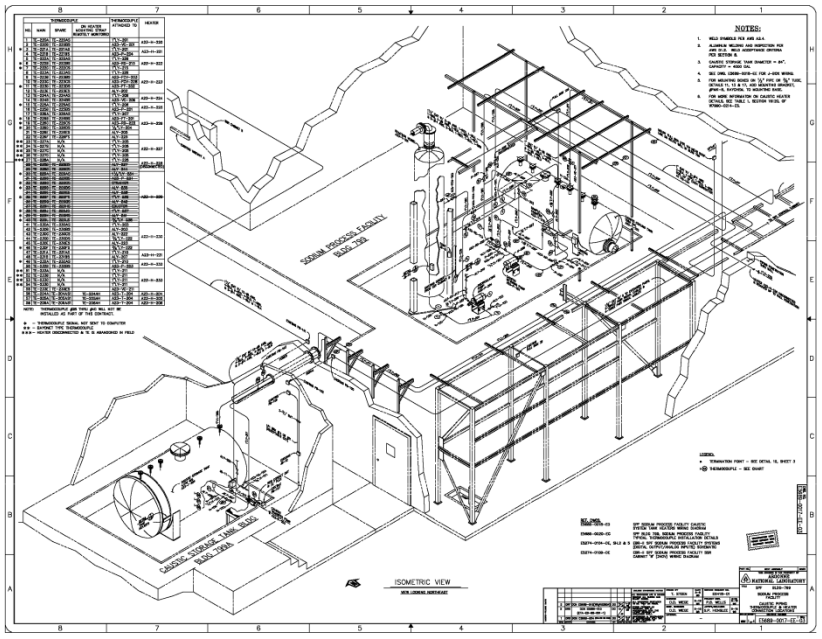
E5274-01B0-ED-03
SUMP DRAIN
SODIUM CARBONATE PROCESS
STEAM SUPPLY 175 PSIG
80 PSIG
TO REACTION VESSEL 50 PSIG
NOTES:
1. FOR STANDARD PIPING AND INSTRUMENTATION SYMBOLS SEE DWG. NO. E5274-0048-03.
UNCONTROLLED COPY
VERIFY BEFORE USE
DOCUMENT CONTROL
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
STEAM & CONDENSATE PIPING & INSTRUMENT DIAGRAM
E5274-01B0-ED-03

36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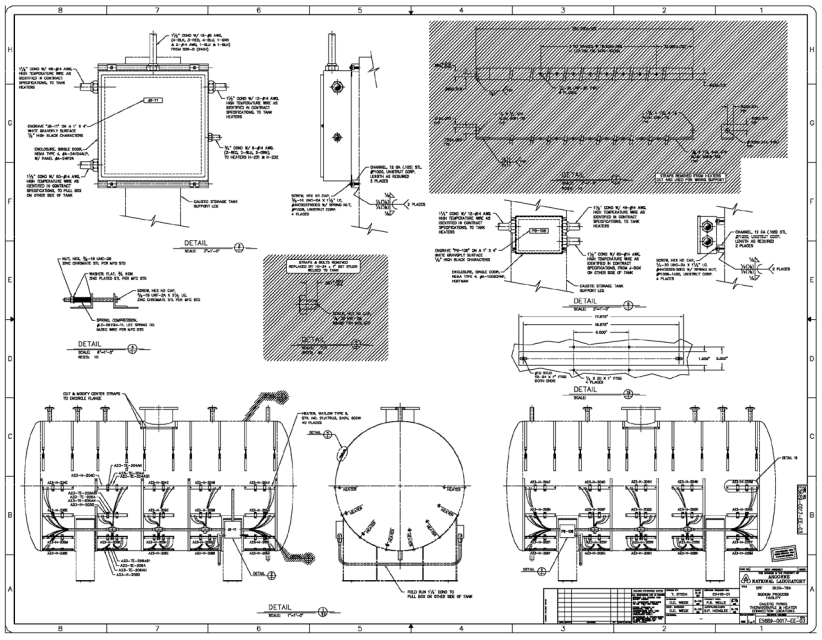
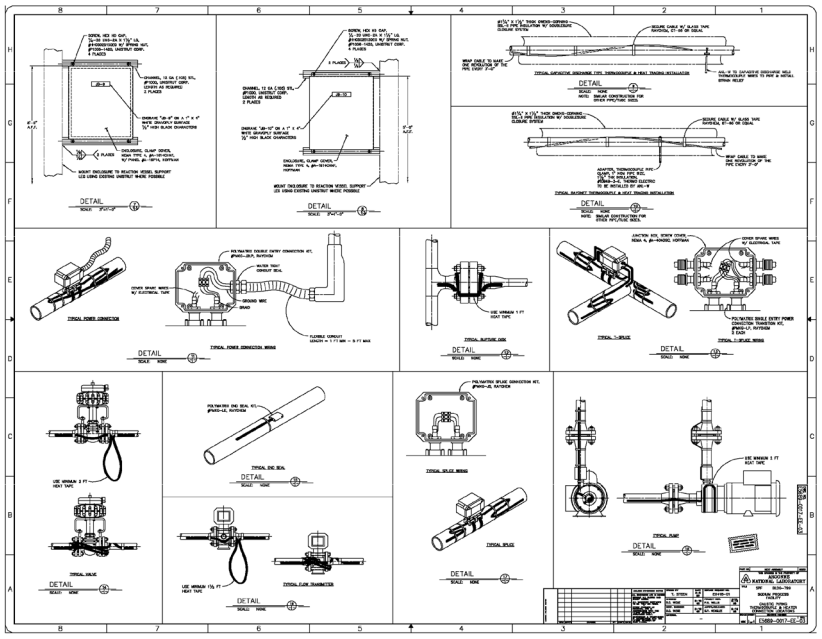
SODIUM PROCESS FACILITY
BLDG. 799
CAUSTIC STORAGE TANK SLAB
BLDG. 799A
ISOMETRIC VIEW

37


DETAIL
DETAIL
DETAIL
DETAIL
DETAIL

38



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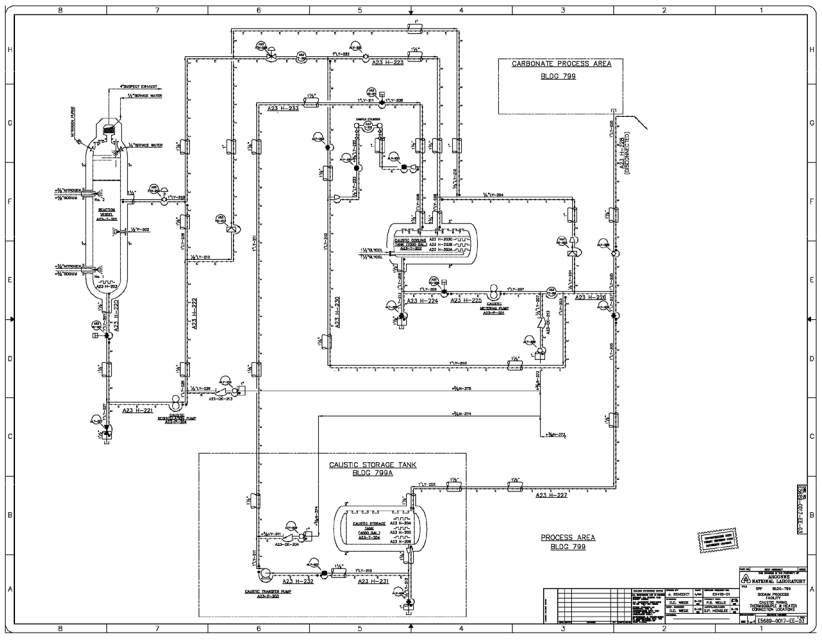
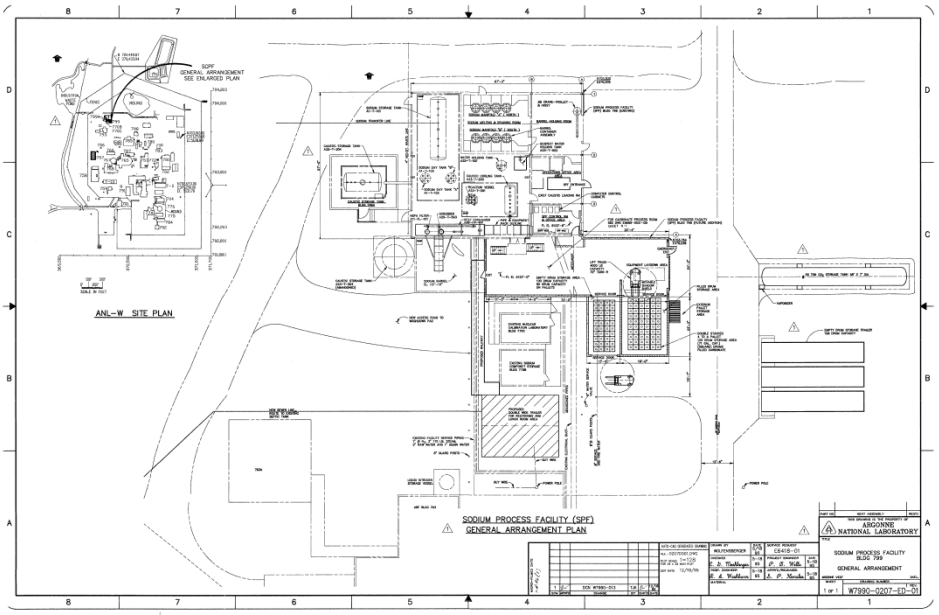
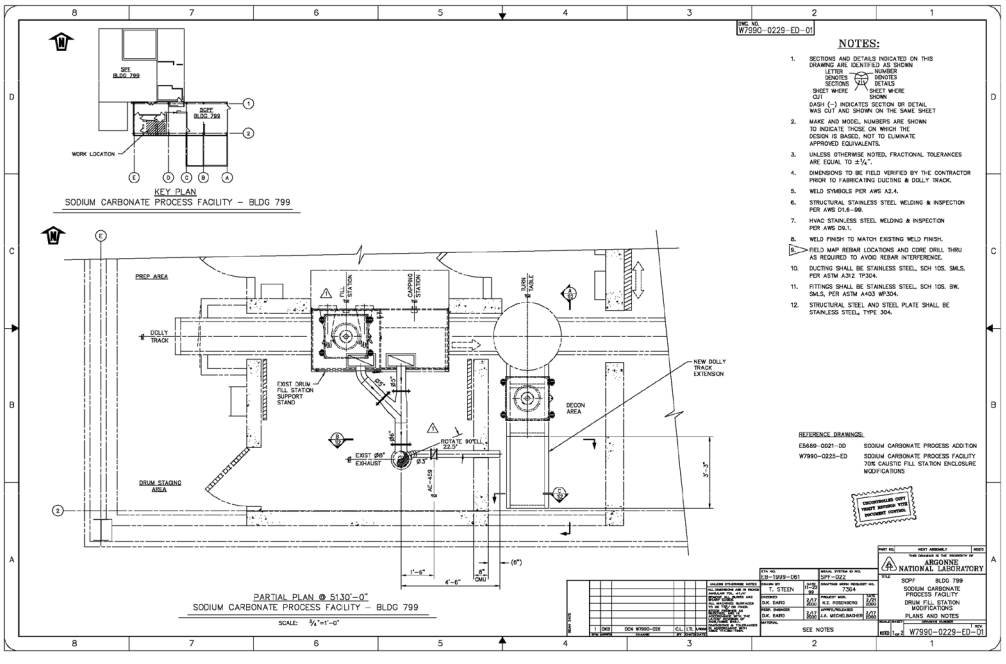

CARBONATE PROCESS AREA
BLDG 799
CAUSTIC STORAGE TANK
BLDG 799A
PROCESS AREA
BLDG 799

40


SPF
GENERAL ARRANGEMENT
SEE ENLARGED PLAN
ANL-W SITE PLAN
SODIUM PROCESS FACILITY (SPF)
GENERAL ARRANGEMENT PLAN
ARGONNE
NATIONAL LABORATORY
SODIUM PROCESS FACILITY
BLDG 799
GENERAL ARRANGEMENT
W7990-0207-ED-01

41


DWG NO.
W7990-0229-ED-01
NOTES:
1. SECTIONS AND DETAILS INDICATED ON THIS DRAWING ARE IDENTIFIED AS SHOWN
LETTER DENOTES SECTION
NUMBER DENOTES DETAILS
SHEET WHERE CUT
SHEET WHERE SHOWN
DASH (-) INDICATES SECTION OF DETAIL WAS CUT AND SHOWN ON THE SAME SHEET
2. MAKE AND MODEL NUMBERS ARE SHOWN TO INDICATE THOSE ON WHICH THE DESIGN IS BASED, NOT TO ELIMINATE APPROVED EQUIVALENTS.
3. UNLESS OTHERWISE NOTED, FRACTIONAL TOLERANCES ARE EQUAL TO ±1/4".
4. DIMENSIONS TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO FABRICATING DUCTING & DOLLY TRACK.
5. WELD SYMBOLS PER AWS A2.4.
6. STRUCTURAL STAINLESS STEEL WELDING & INSPECTION PER AWS D1.6-99.
7. HVAC STAINLESS STEEL WELDING & INSPECTION PER AWS D9.1.
8. WELD FINISH TO MATCH EXISTING WELD FINISH.
9. FIELD MAP REBAR LOCATIONS AND CORE DRILL THRU AS REQUIRED TO AVOID REBAR INTERFERENCE.
10. DUCTING SHALL BE STAINLESS STEEL, SCH 10S, SMLS, PER ASTM A312 TP304.
11. FITTINGS SHALL BE STAINLESS STEEL, SCH 10S, BW, SMLS, PER ASTM A403 WP304.
12. STRUCTURAL STEEL AND STEEL PLATE SHALL BE STAINLESS STEEL, TYPE 304.
SPF BLDG 799
SCPF BLDG 799
WORK LOCATION
KEY PLAN
SODIUM CARBONATE PROCESS FACILITY – BLDG 799
PREP AREA
DOLLY TRACK
FILL STATION
CAPPING STATION
TURN TABLE
NEW DOLLY TRACK EXTENSION
FIRST DRUM FILL STATION SUPPORT STAND
DECON AREA
ROTATE BOTTLE 22.5°
EXIST Ø40" EXHAUST
DRUM STAGING AREA
PARTIAL PLAN @ 5130'-0"
SODIUM CARBONATE PROCESS FACILITY – BLDG 799
SCALE: 3/4"=1'-0"
REFERENCE DRAWINGS:
E5689-0021-00 SODIUM CARBONATE PROCESS ADDITION
W7990-0225-ED SODIUM CARBONATE PROCESS FACILITY 709E CAUSTIC FILL STATION ENCLOSURE MODIFICATIONS
UNCONTROLLED COPY WHEN MARKED WITH DOCUMENT CONTROL
SEE NOTES
ARGONNE
NATIONAL LABORATORY
SCPF
BLDG 799
SODIUM CARBONATE
PROCESS FACILITY
DRUM FILL STATION
MODIFICATIONS
PLANS AND NOTES
W7990-0229-ED-01

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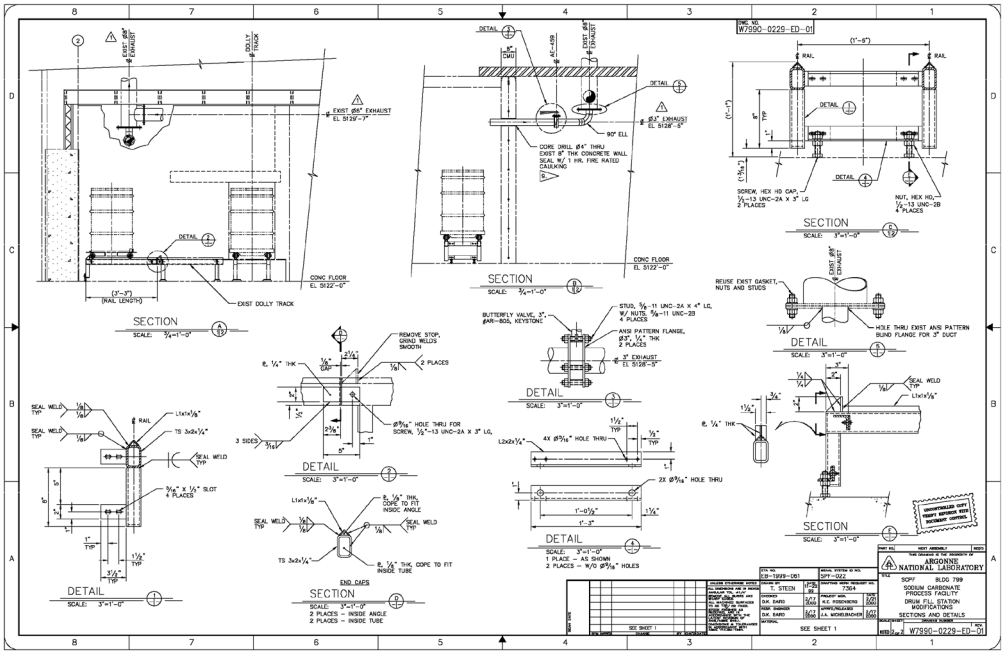
DWG NO. W7990-0229-ED-01
SECTION
DETAIL
SCALE: 3"=1'-0"
SCALE: 3/4"=1'-0"
EXIST DOLLY TRACK
CONC FLOOR EL. 5122'-0"
EXIST Ø8" EXHAUST
EL 5129'-7"
CORE DRILL Ø4" THRU EXIST 8" THK CONCRETE WALL SEAL W/ 1 HR. FIRE RATED CAULKING
90° ELL
Ø3.5" EXHAUST EL 5128'-5"
SCREW, HEX HD CAP, 1/2-13 UNC-2A X 3" LG 2 PLACES
NUT, HEX HD, 1/2-13 UNC-2B 4 PLACES
REUSE EXIST GASKET, NUTS AND STUDS
HOLE THRU EXIST ANSI PATTERN BLIND FLANGE FOR 3" DUCT
REMOVE STOP, GRIND WELDS SMOOTH
2 PLACES
Ø5/16" HOLE THRU FOR SCREW, 1/2"-13 UNC-2A X 3" LG,
3 SIDES
END CAPS
2 PLACES - INSIDE ANGLE
2 PLACES - INSIDE TUBE
BUTTERFLY VALVE, 3", #AR-803, KEYSTONE
STUD, 5/8-11 UNC-2A X 4" LG, W/ NUTS, 5/8-11 UNC-2B 4 PLACES
ANSI PATTERN FLANGE, Ø3", 1/4" THK 2 PLACES
3" EXHAUST EL 5128'-5"
4X Ø5/16" HOLE THRU
2X Ø5/16" HOLE THRU
1 PLACE - AS SHOWN
2 PLACES - W/O Ø5/16" HOLES
SEAL WELD TYP
RAIL
TS 3x2x1/4"
5/16" x 1/2" SLOT 4 PLACES
TS 3x2x1/4" THK, COPE TO FIT INSIDE TUBE
L3x2x1/4" THK, COPE TO FIT INSIDE ANGLE
SEE SHEET 1
UNCONTROLLED COPY VERIFY REVISION LEVEL BEFORE USE
ARGONNE NATIONAL LABORATORY
SCPF BLDG 799
SODIUM CARBONATE PROCESS FACILITY
DRUM FILL STATION MODIFICATIONS
SECTIONS AND DETAILS
W7990-0229-ED-01

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Appendix C

Photographs

MFC-799, 799A, 770B, and 770C Photo Description Log

Sodium Processing Facility MFC-799 - Equipment Laydown Area

P1015258 Filled Drum Room (looking south)

P1015259 Equipment Laydown Area (looking east)

P1015260 Equipment Laydown Area (looking east)

P1015261 Eyewash Station/Potable Water Lines/Portable Unit

P1015262 Filled Drum Room/Excess Storage

P1015263 14-port Glovebox (Storage)

P1015264 Daewoo BC30S Electric Forklift

P1015265 Empty Drum Storage (looking south)

P1015266 Outside Empty Drum Storage Room/Spill Cabinet

P1015267 Portable HEPA (Outside Drum Filling Room)

P1015268 Drum Filling Room (looking west)

P1015269 MCC-AE1 (north wall, Equipment Laydown Area)

P1015270 Junction Box JB-200/Forklift Battery Disconnect (north wall, Equipment Laydown Area)

P1015271 Transformer TF-AE1 (north wall, Equipment Laydown Area)

P1015272 Equipment Laydown Area (looking west)

P1015273 Equipment Laydown Area (looking southwest)

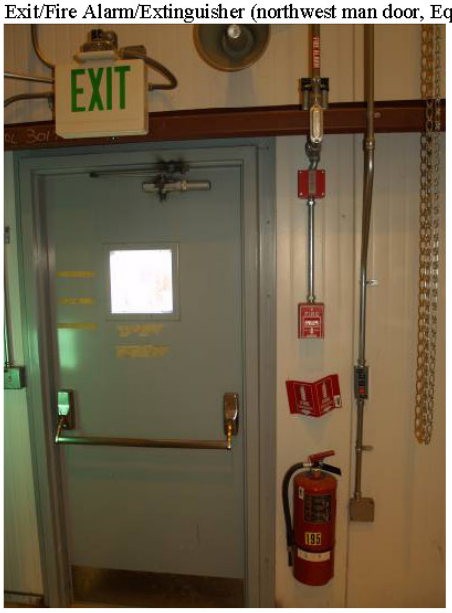
P1015274 Empty Drum Room (south view)

P1015275 Stored Glovebox Instrument Panel

P1015276 Forklift Battery Charger (Trojan II)

P1015277 Eyewash Station (northwest man door, Equipment Laydown Area)

P1015278 Exit/Fire Alarm/Extinguisher (northwest man door, Equipment Laydown Area)



P1015324 Mezzanine View - Equipment Laydown Area

P1015325 Mezzanine View - Equipment Laydown Area

P1015326 Mezzanine View – Equipment Laydown Area (west wall)

P1015327 Mezzanine View - Equipment Laydown Area (south wall)

P1015328 Mezzanine View - Equipment Laydown Area (south wall)

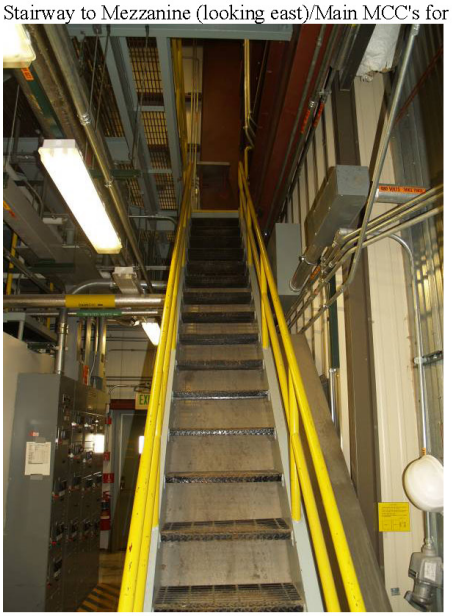
Sodium Processing Facility MFC-799 - Carbonate Sodium Processing Facility

P1015279 Mezzanine/TRANE Unit/2 to 5-Ton Rail Crane (looking south)

P1015280 Overhead Door #1 (west side Drum Filling Room)

P1015281 Leaded Window looking into Drum Filling Area/Palletizer Control Station

P1015282 Stairway to Mezzanine (looking east)/Main MCC's for Drum Filling Area



P1015283 North wall of Drum Filling Area (looking east)

P1015284 MCC AN2 Drum Filling Area

P1015285 NDA1 Power Panel (north wall Drum Filling Area)

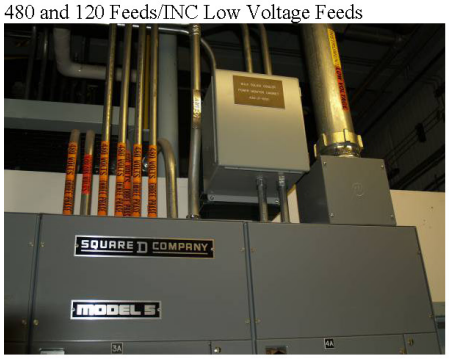
P1015286 Transformer TF 324 - Drum Filling Area

P1015287 NA2 Control Panel/Normal Power Voltage Monitor #2 (north wall Drum Filling Area)

P1015288 Bulk Solids Cooler Power Monitor Cabinet A30-JT-1002 - Drum Filling Area

P1015289 480 and 120 Volt Leads into MCC AN2

P1015290 480 and 120 Feeds/INC Low Voltage Feeds



P1015291 Drum Staging Area (looking south)

P1015292 Control Panel Control Box for Drum Filling Room (looking west)

P1015293 Drum Fill Control Cabinet

P1015294 Glovebox - Drum Fill Room

P1015295 Controls for Drum Filling Station

P1015296 Through Glovebox into Drum Fill Room (looking south)

P1015297 Control Panels for Drum Transfer Trolley

P1015298 Drum Transfer Trolley Weigh Station

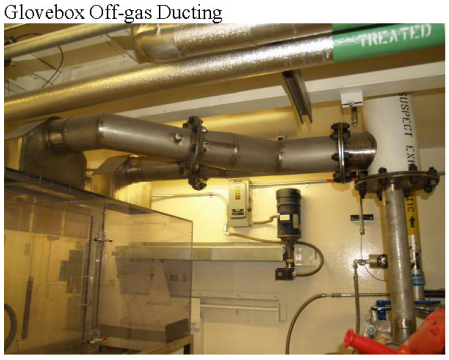
P1015299 Through Man Door into Drum Fill Room (looking west)

P1015300 Drum Fill Room (looking northwest)

P1015301 Drum Fill Room, Miscellaneous Materials, Waste (looking east)

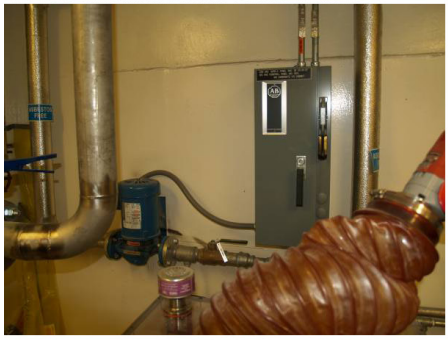
P1015302 Portable Drum Glovebox

P1015303 Glovebox Off-gas Ducting

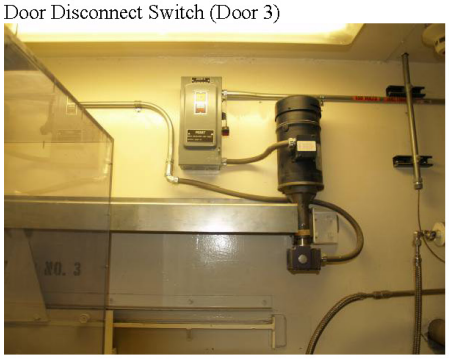


P1015304 Door Disconnect Switch (Door 4)

P1015305 Vacuum Control Panel for Drum Fill Room



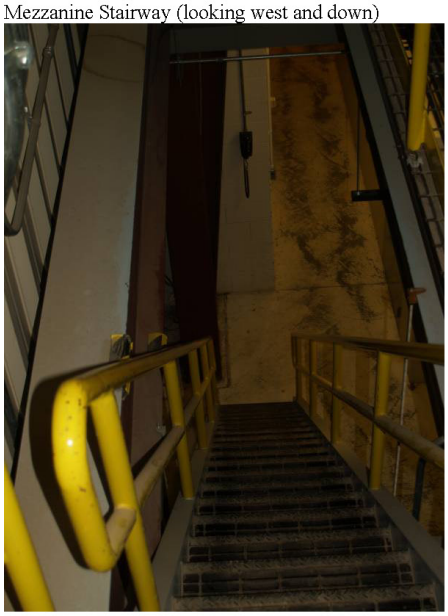
P1015306 Door Disconnect Switch (Door 3)



P1015307 Caustic Line Feeds into Drum Fill Room

P1015308 Portable Constant Air Monitor (on Mezzanine)

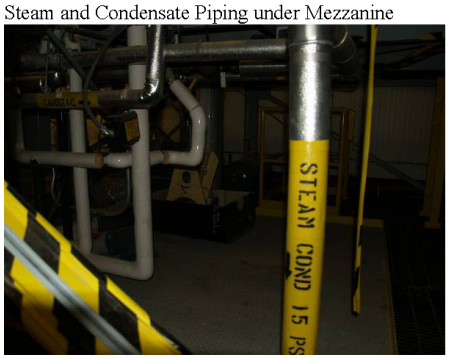
P1015309 Mezzanine Stairway (looking west and down)



P1015310 CO2 Piping on Mezzanine (associated with drum fill)

P1015311 Caustic and other Piping under Mezzanine

P1015312 Steam and Condensate Piping under Mezzanine



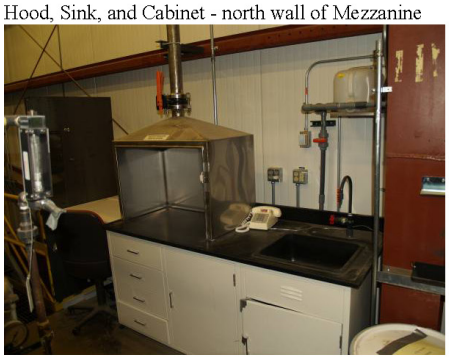
P1015313 Thin Film Evaporator Subsystem (never functioned properly - abandoned in place)

P1015314 RMA Storage Cabinet on Mezzanine

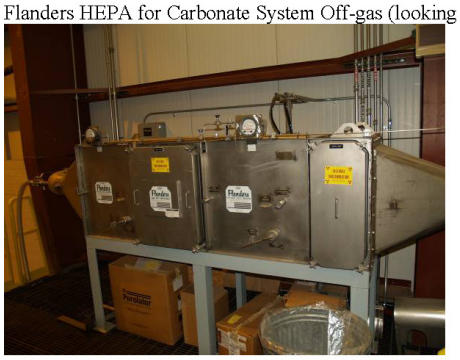
P1015315 TRANE HVAC - Mezzanine (looking west)

P1015316 HVAC Control Panel A31-AHU-1301 - north wall of Mezzanine

P1015317 Hood, Sink, and Cabinet - north wall of Mezzanine

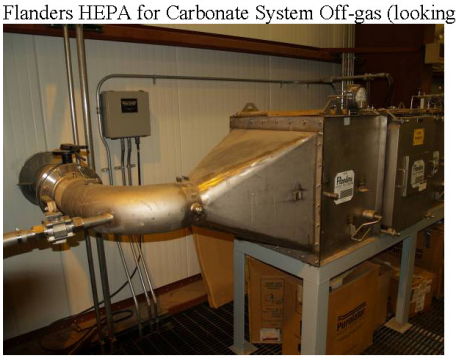


P1015318 Flanders HEPA for Carbonate System Off-gas (looking south)



P1015319 Suspect Exhaust Ducting into HEPAs

P1015320 Flanders HEPA for Carbonate System Off-gas (looking southeast)

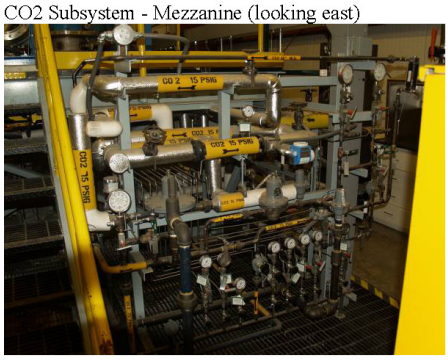


P1015321 HEPA and Ducting (looking east)

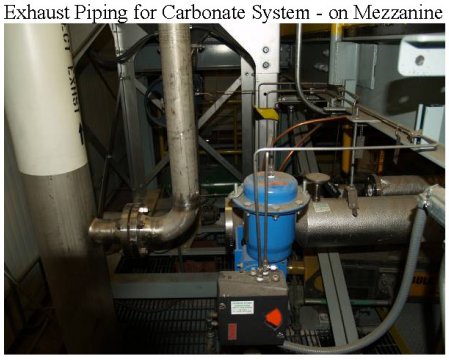
P1015322 Steam and Condensate Return on TRANE Unit (looking north)

P1015323 Steam and Condensate Return on TRANE Unit (looking north)

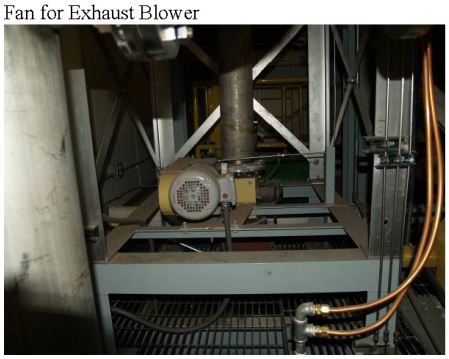
P1015329 CO2 Subsystem - Mezzanine (looking east)



P1015330 Exhaust Piping for Carbonate System - on Mezzanine



P1015331 Fan for Exhaust Blower

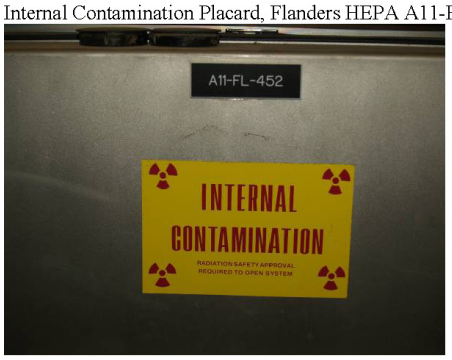


P1015332 Bulk Solids Cooler A30-HX-1001

P1015333 Bulk Solids Cooler A30-HX-1001/Suspect Exhaust

P1015334 Thin Film Evaporator Subsystem (never functioned properly - abandoned in place)

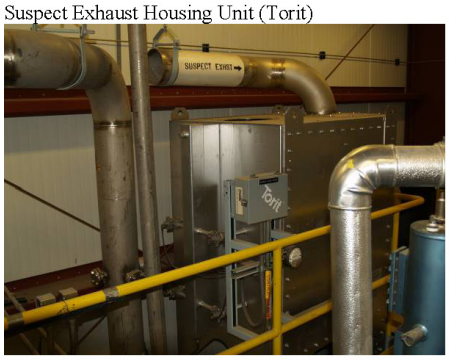
P1015335 Internal Contamination Placard, Flanders HEPA A11-FL-452



P1015336 Internal Contamination Placard, Flanders HEPA A11-FL-451

P1015337 Control Panel CST-4 for Carbonate Process

P1015338 Suspect Exhaust Housing Unit (Torit)



P1015339 Thin Film Evaporator Subsystem (never functioned properly - abandoned in place)

P1015340 Thin Film Evaporator Subsystem (never functioned properly - abandoned in place) (looking north)

P1015341 Thin Film Evaporator Subsystem -Additional Instrumentation (never functioned properly - abandoned in place) (looking north)

P1015342 Thin Film Evaporator Subsystem A30-EV-1001 (never functioned properly - abandoned in place)

P1015343 Suspect Exhaust Housing Unit (Torit) (looking west)

P1015344 HVAC Ducting (looking northeast)

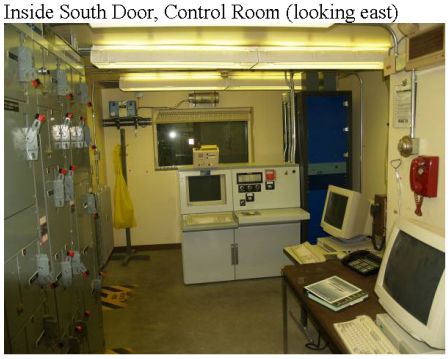
P1015345 TRANE/SpaceMaster II 5-ton Electric Hoist (looking northeast)

P1015346 Closeup of SpaceMaster II 5-ton Electric Hoist (two units)

Sodium Processing Facility MFC-799 - Sodium Processing Facility Control Room

P1015347 Eberline Hand and Foot Monitor - south door, Control Room

P1015348 Inside South Door, Control Room (looking east)



P1015349 South View - MCC AN1 (looking south)

P1015350 3B Circuit for RSWF Facility 771 (MUST BE MAINTAINED!)

P1015351 MCC AN1 Fed From PP 110 CKT #13-15-17

P1015352 Fire Alarm Terminal Box and Communication Boxes (looking north)

P1015353 RAM Station 1 - Southeast Wall

P1015354 RAM Intake

P1015355 Sun Station

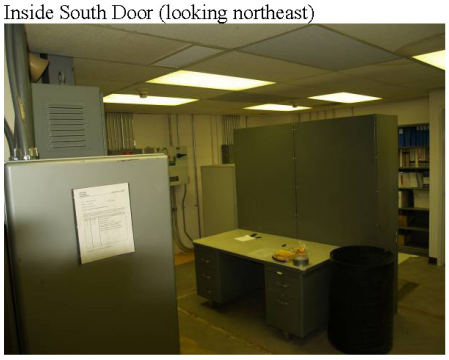
P1015356 HP Station

P1015357 Sodium Reactor Control Panel

P1015358 Instrumentation Cabinet

Sodium Processing Facility MFC-799 - Sodium Processing Facility Operations Office

P1015359 Inside South Door (looking northeast)

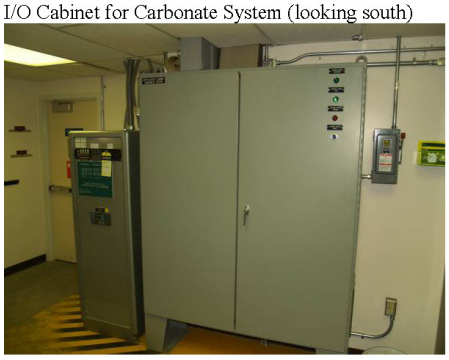


P1015360 Inside South Door (looking north)

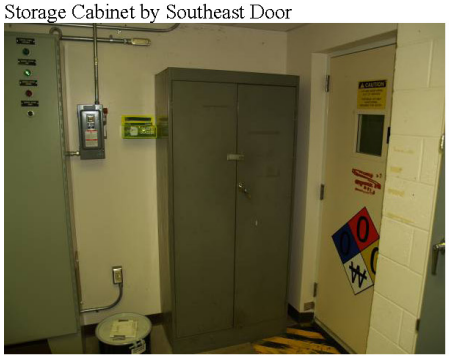
P1015361 Sodium Processing Facility Operating Record File Cabinet

P1015362 Sodium Process Facility Hydrogen - Oxygen Area Monitors

P1015363 I/O Cabinet for Carbonate System (looking south)

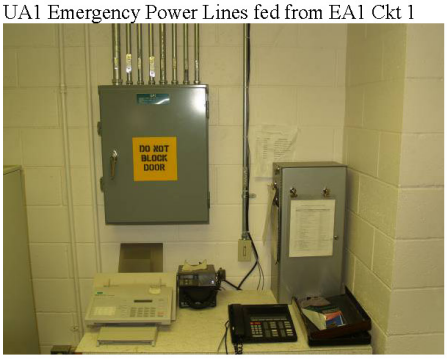


P1015364 Storage Cabinet by Southeast Door



P1015365 EA1 Emergency Power fed from MCC-AE1 Cabinet/UPS Maintenance Bypass Cabinet

P1015366 UA1 Emergency Power Lines fed from EA1 Ckt 1



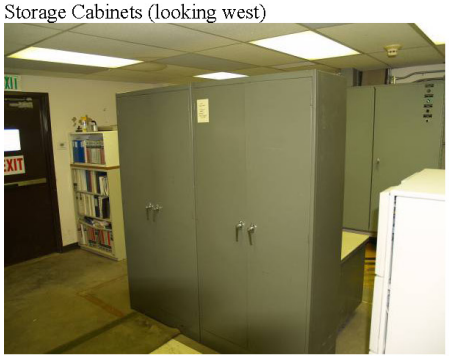
P1015367 UPS A1 Cabinet

P1015368 MET-L-X Control Station - north wall

P1015369 Blow-up of P1015368

P1015370 Reference Materials/Control Units (looking west)

P1015371 Storage Cabinets (looking west)



P1015372 North Door - Spill Control Station/Reference Materials/Fire Blanket, Extinguisher

P1015373 Control Cabinets P051256

P1015374 Control Cabinets P051256

P1015375 Magnetic Caution Signage

Sodium Processing Facility MFC-799 - Sodium Processing Facility Barrel Holding Room

P1015376 P&H Spectrum 1,000-lb Pedestral Crane

P1015377 6 x 6 Sliding Door/Misc Storage (looking northeast)

P1015378 Eberline Hand and Foot Monitor (looking south at north door of Operations Office

P1015379 Transformers/Control Panels for Sodium Melting Draining Room - South Wall

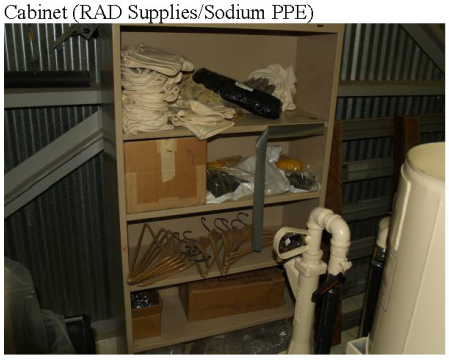
P1015380 PD080 Heater Transformer Disconnect

P1015381 Palletized Equipment -- North Side of Room

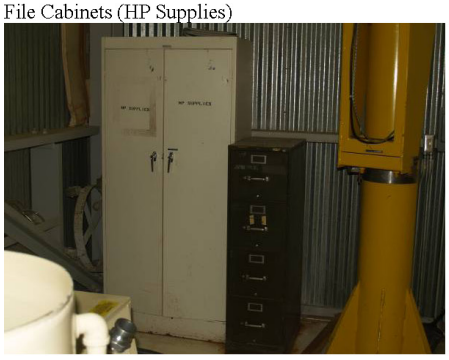
P1015382 RAM Equipment (on wheeled cart)

P1015383 Rolling Storage Cabinet (RAD Supplies)

P1015384 Cabinet (RAD Supplies/Sodium PPE)



P1015385 File Cabinets (HP Supplies)



P1015386 Pedestal Crane (looking west)

P1015387 Larger View Transformers/Control Panels for Sodium Melting Draining Room - South Wall

P1015388 Main Sliding Door - west side

P1015445 Portable Instrumentation Board

P1015446 Barrel Holding Room (looking northwest) (NOTE PALLET MARKINGS ON FLOOR)

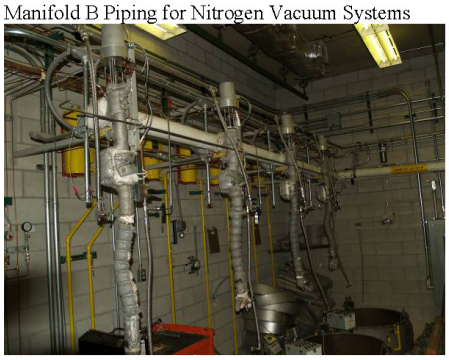
Sodium Processing Facility MFC-799 - Sodium Melting Draining Room

P1015389 Inside Personnel Door, Manifold B (Looking East)

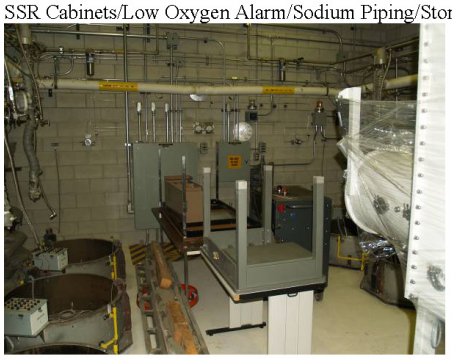
P1015390 MET-L-X Fire Suppression Bottles

P1015391 Closeup of Inductive Heating System/Fire Suppression Nozzles (4 per station), Manifold B

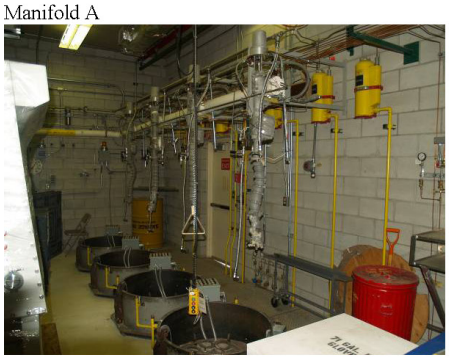
P1015392 Manifold B Piping for Nitrogen Vacuum Systems



P1015393 SSR Cabinets/Low Oxygen Alarm/Sodium Piping/Storage Miscellaneous Items



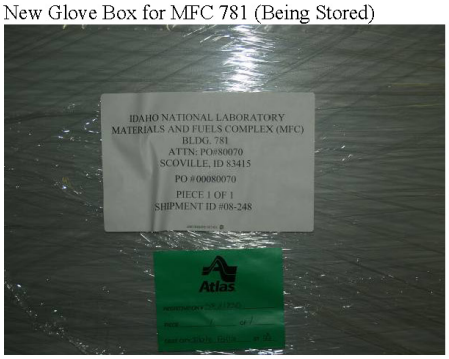
P1015394 Manifold A



P1015395 MET-l-X Fire Suppression Controls - Manifold A (north wall)

P1015396 MET-l-X Fire Suppression Controls - Manifold B (south wall)

P1015397 New Glove Box for MFC 781 (Being Stored)



P1015398 Portable Instrumentation - Counting Ratemeter Model CRM-51M (Manufactured by NMC)

P1015399 Barrel Heating Belts/Blankets - Southeast Corner

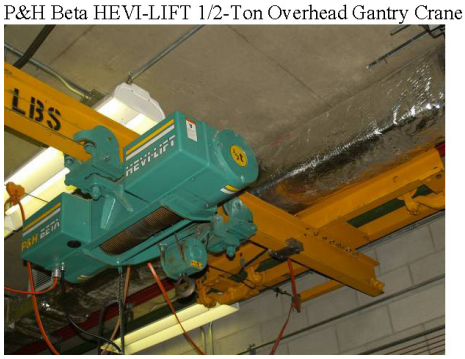
P1015400 Portable Instrumentation - Counting Ratemeter Model CRM-51M (Manufactured by NMC) - on west wall

P1015401 Upper View of Nitrogen Feed and Sodium Drain System

P1015402 Lower View of Nitrogen Feed and Sodium Drain System/Barrel Heater Assembly – Manifold A

P1015403 New Glovebox for MFC-781 (Being Stored)

P1015447 P&H Beta HEVI-LIFT 1/2-Ton Overhead Gantry Crane System



P1015448 P&H Beta HEVI-LIFT 1/2-Ton Overhead Gantry Crane System

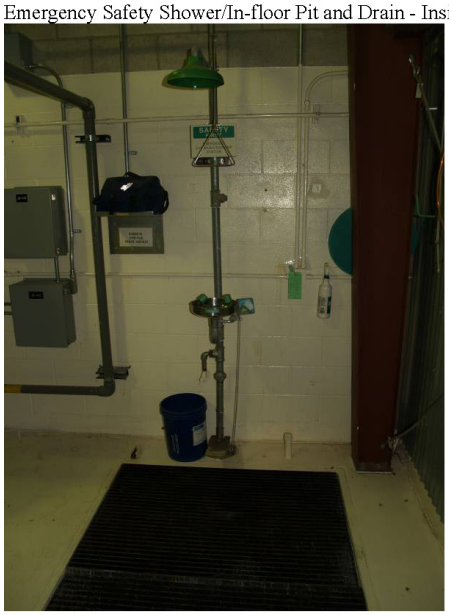
P1015449 P&H Beta HEVI-LIFT 1/2-Ton Overhead Gantry Crane System

P1015450 Larger View P&H Beta HEVI-LIFT 1/2-Ton Overhead Gantry Crane System/HVAC Ducting

P1015451 Larger View P&H Beta HEVI-LIFT 1/2-Ton Overhead Gantry Crane System/HVAC Ducting

Sodium Processing Facility MFC-799 - Sodium Reaction Area

P1015404 Emergency Safety Shower/In-floor Pit and Drain - Inside West Door, North Wall



P1015405 500-gal Water Holding Tank

P1015406 Inside West Door, Next to Bioshielding (looking east)

P1015407 Sodium Reactor Vessel (looking southeast)

P1015408 Instruments and Controls for Sodium Reactor Vessel

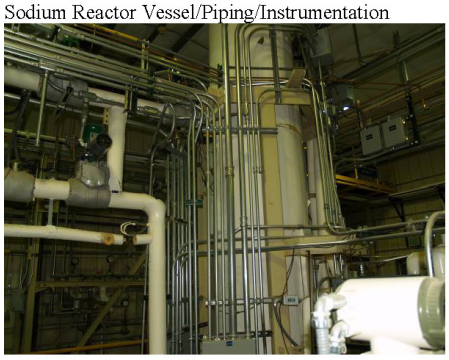
P1015409 Larger View Instruments and Controls for Sodium Reactor Vessel

P1015410 Caustic Cooling Tank with Pumps and Pit

P1015411 Caustic Cooling Tank with Overhead Piping

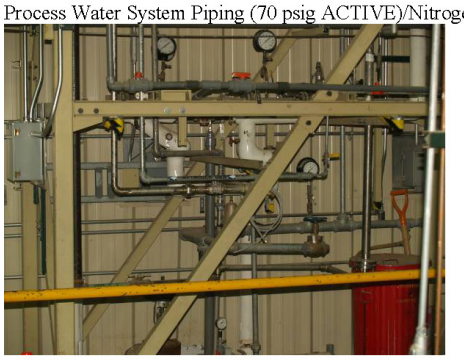
P1015412 Overhead Caustic Piping

P1015413 Sodium Reactor Vessel/Piping/Instrumentation

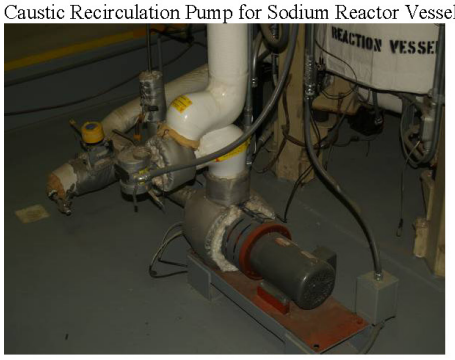


P1015414 Nitrogen Bottles/Control System

P1015415 Process Water System Piping (70 psig ACTIVE)/Nitrogen Gas Piping



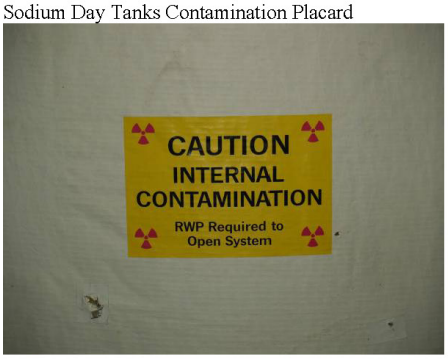
P1015416 Caustic Recirculation Pump for Sodium Reactor Vessel



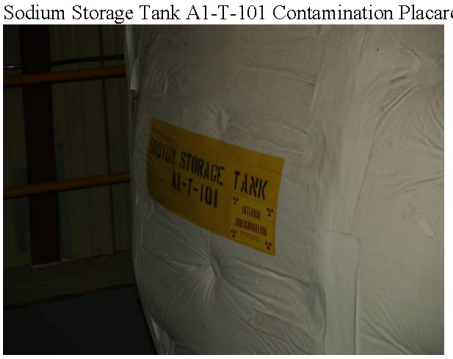
P1015417 Sodium Day Tanks B and A

P1015418 Sodium Storage Tank A1-T-101

P1015419 Sodium Day Tanks Contamination Placard



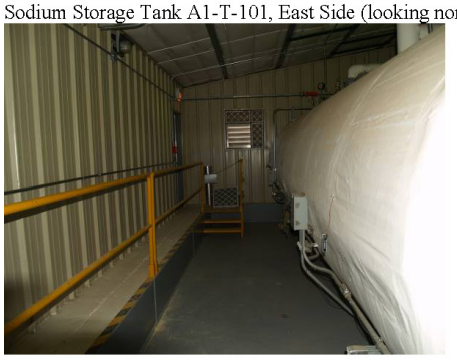
P1015420 Sodium Storage Tank A1-T-101 Contamination Placard



P1015421 Heater Control for Sodium Day Tank B

P1015422 Heater Control for Sodium Day Tank A

P1015423 Sodium Storage Tank A1-T-101, East Side (looking north)



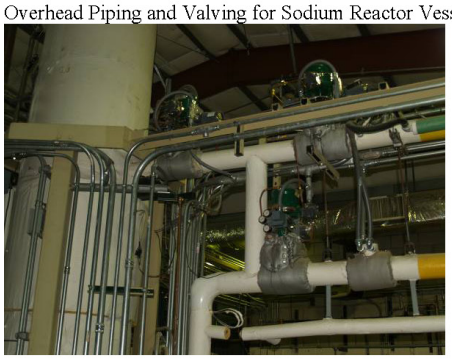
P1015424 Sodium Storage Tank A1-T-101, West Side (looking north)

P1015425 South Side of Room (looking east)

P1015426 Overhead Utility Piping - south wall

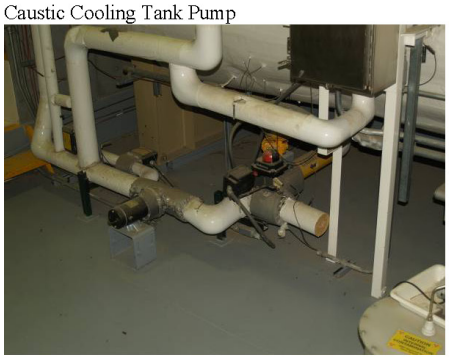
P1015427 Sodium Reactor Vessel (looking northeast)

P1015428 Overhead Piping and Valving for Sodium Reactor Vessel

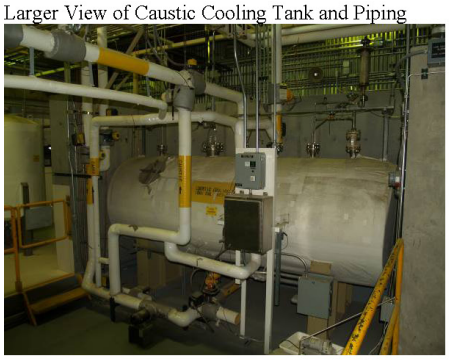


P1015429 Caustic Recirculation Pump for Sodium Reactor Vessel

P1015430 Caustic Cooling Tank Pump



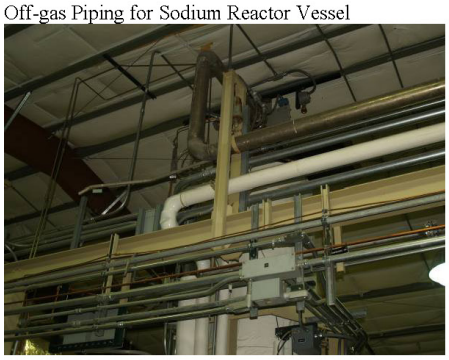
P1015431 Larger View of Caustic Cooling Tank and Piping



P1015432 Low Oxygen Alarm (Local Alarm 1307)

P1015433 Portable Sodium Treatment Instrument and Control Cabinet

P1015434 Off-gas Piping for Sodium Reactor Vessel



P1015435 Overhead Instrumentation/Power Conduits for Day Tanks

P1015436 Overhead Instrumentation/Power Conduits for Day Tank B

P1015437 Overhead Instrumentation/Power Conduits for Day Tank A

P1015438 Expanded View of Day Tanks A and B and Sodium Storage Tank

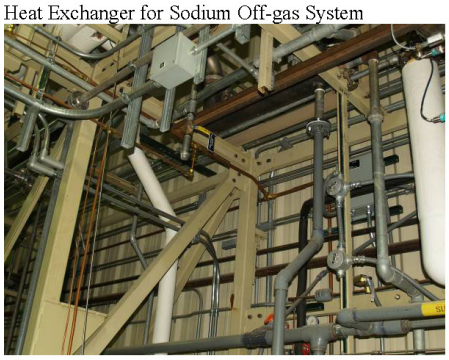
P1015439 Oxygen Transmitter A31-LT-1311

P1015440 Flanders Pre-Filters for Sodium Reactor Off-gas System (looking south) (Flanders HEPA Filters Directly Above)

P1015441 Expanded View of South Wall

P1015442 Scrubber and Condenser for Sodium Reactor Off-gas System

P1015443 Heat Exchanger for Sodium Off-gas System



P1015444 Steam and Condensate Return

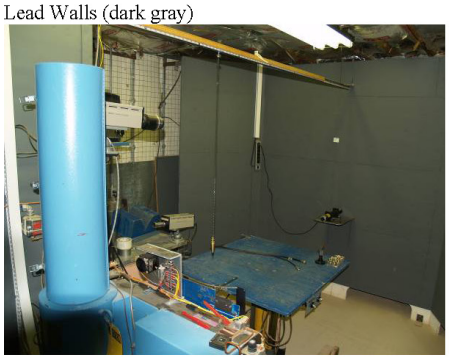
MFC-770C

P1015452 Instrumentation in "Front Room"

P1015453 Source and Auto Attenuation Device

P1015454 Calibration Table/Equipment

P1015455 Lead Walls (dark gray)



P1015456 Inside Door of Calibration Room (looking east)

P1015457 Cabinet/Supplies in "Front Room"

P1015458 JL Sheperd Source and Auto Attenuation Device

MFC-770B

P1015459 Ingersol Rand Air Compressor Placard

P1015460 Interior Compressed Air Piping (looking northeast)

P1015461 Compressor/Pressure Tank/Ducting/Power/Controls (looking west)

P1015462 AFFF Tank (looking south)

P1015463 Fire Main and Valve Controls for AFFF System (looking south)

P1015464 AFFF Tank

P1015465 AFFF Piping (looking east)

P1015466 Pressure Tank (115 psig)

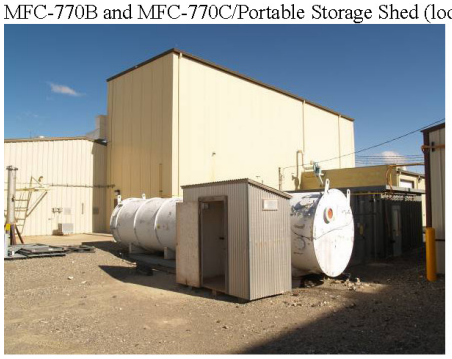
Site Photos

P1015467 East Side of MFC-770B and MFC-770C (looking north)

P1015468 Expanded View of East Side of MFC-770B and MFC-770C (looking north)

P1015469 Internal Contamination Placard on Vessel Stored on East Side of MFC-770B and MFC-770C

P1015470 Expanded View of Internal Contamination Placard on Vessel Stored on East Side of MFC-770B and MFC-770C/Portable Storage Shed (looking northwest)



P1015471 Cargo Container/Abandoned Caustic Storage Tank (looking north)

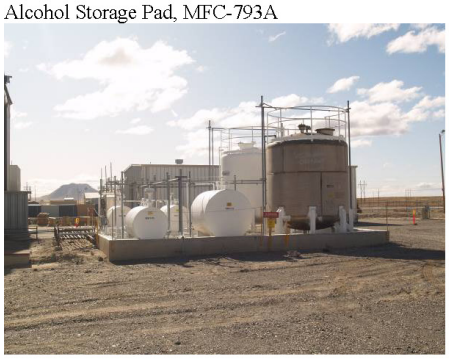
P1015472 MFC-799A (Caustic Storage Tank Building) and Abandoned Caustic Storage Tank (looking northwest)

P1015473 Abandoned Caustic Storage Tank (looking west)

P1015474 Barrel Washing Pad with Vessel with Internal Rad Contamination (looking west)

P1015475 Building 793 (looking south)

P1015476 Alcohol Storage Pad, MFC-793A



P1015477 Barrel Washing Pad with Vessel with Internal Rad Contamination (looking west)

P1015478 From Barrel Washing Pad (looking south) (NOTE: Includes Bioshield Wall Around MFC-770C

P1015479 Expanded View of Internal Contamination Placard on Vessel Stored on East Side of MFC-770B and MFC-770C/Portable Storage Shed (looking south from Barrel Washing Pad)

P1015480 Barrel Washing Pad Drain - located in northeast corner

P1015481 Confined Space Placard on Abandoned Caustic Storage Tank

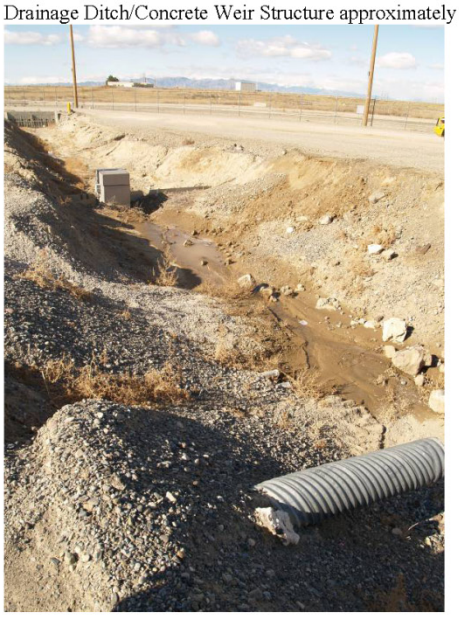
P1015488 MFC-799 (looking southwest)

P1015489 MFC-799A (looking southwest)

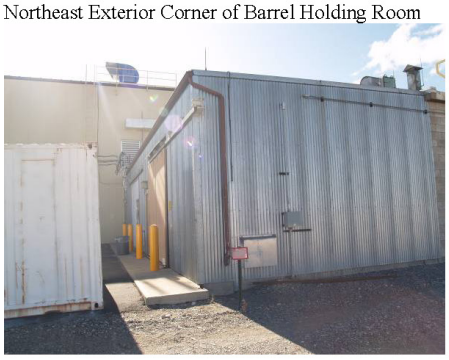
P1015490 Two 4-in Diameter Drain Pipes from MFC-799 and Barrel Washing Pad (Drains to North Area Drainage Ditch)

P1015491 12-in Diameter Culvert (Stormwater, located west of 4-in drain pipes)

P1015492 Drainage Ditch/Concrete Weir Structure approximately 20 yards downstream (looking east)



P1015493 Northeast Exterior Corner of Barrel Holding Room

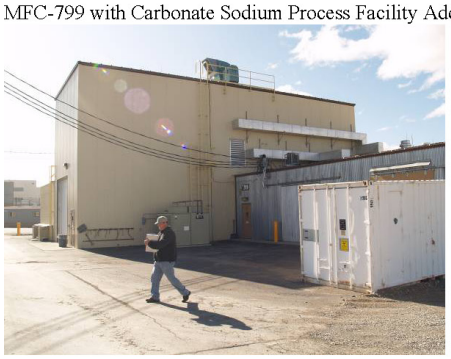


P1015494 North Side of MFC-799

P1015495 20-ft Cargo Storage Container RSU-1765

P1015496 Expanded View of 20-ft Cargo Storage Container RSU-1765 (looking southeast)

P1015497 MFC-799 with Carbonate Sodium Process Facility Addition (looking southeast)



P1015498 20-ft Cargo Storage Container RSU-1733 (looking west - located across street from RSU 1765)

P1015499 20-ft Cargo Storage Container RSU-1765 (looking east)

P1015500 Power Pole for Main Power Feed to MFC-799 (looking southwest)

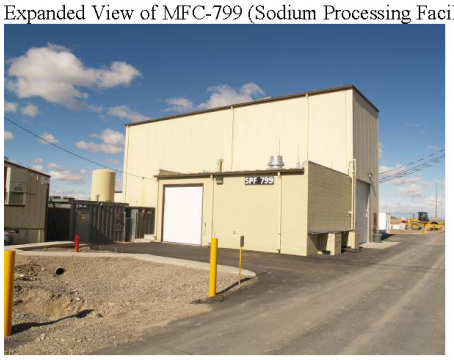
P1015501 Power Transmission Lines and Pole/CO_2 Storage Tank Pad

P1015502 Main Power Weatherhead Feed into MFC-799

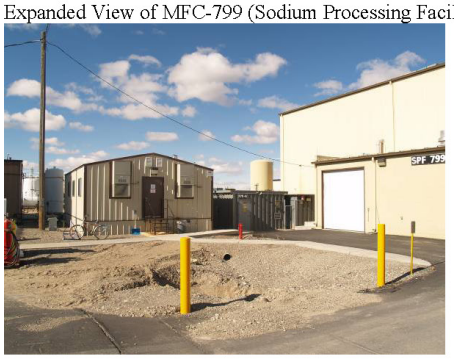
P1015503 TRANE Unit for Carbonate Sodium Process Facility

P1015504 External View of MFC-770B (looking northeast)

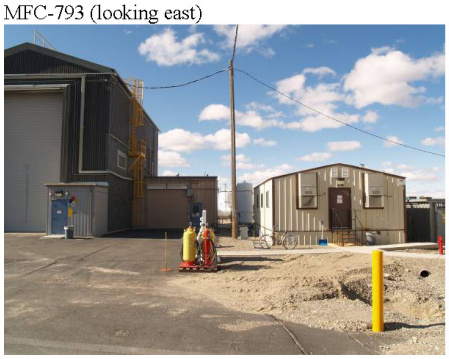
P1015505 Expanded View of MFC-799 (Sodium Processing Facility) (looking east by northeast)



P1015506 Expanded View of MFC-799 (Sodium Processing Facility) (looking northeast)



P1015507 MFC-793 (looking east)



P1015508 MFC-793 (looking east)

P1015509 Main Power Distribution Pole PP110, Input is PP111 Ckt #1 480 Volt

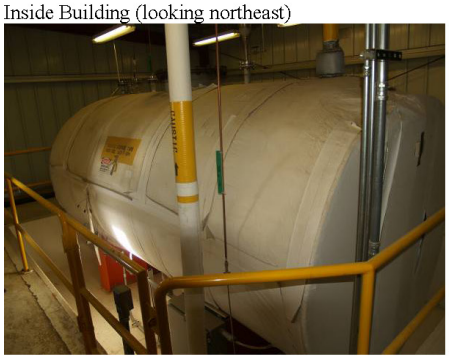
P1015510 Power Pole Weatherhead (PP110)

P1015511 Northeast View of MFC-770B and MFC-770C (NOTE: Emergency Diesel Generator Pad [generator removed])

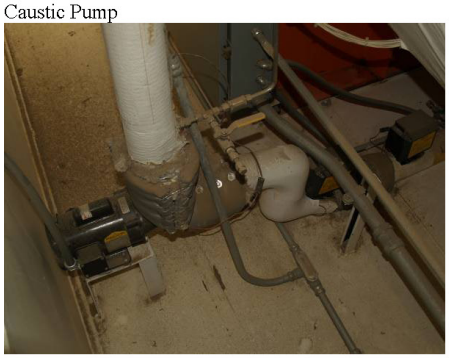
P1015512 Detail of Northeast View of MFC-770B and MFC-770C (NOTE: Emergency Diesel Generator Pad [generator removed])

MFC-799A

P1015482 Inside Building (looking northeast)



P1015483 Caustic Pump



P1015484 Caustic Storage Tank and Pit (looking southwest)

P1015485 Caustic Storage Tank and Pit (looking southeast)

P1015486 Caustic Storage Tank and Pit (looking northwest)

P1015487 Overhead Caustic Piping (looking northwest)

Appendix D

Radiological Control Survey Maps

VSDS Standard Map Survey Report

Survey M-20091014-30

General Information

Title: MFC799 SPF CARBONATE MEZZANINE
Survey Date/Time: 10/14/2009 13:18
Survey Type: Quarterly
Counted By:
RWP #: 31009658
Requestor Org: Rad Con
Status: Approved by: Maxine Rubick, 10/15/2009
Lead Surveyor: John Caudle
Work Order/Task #: 29002617 01 08
KCN: 53342
Ready For Review by: John Caudle, 10/14/2009

Dose Rate (DR) Object Prefixes/Suffixes

Dose Rates with Prefixes:	Dose Rates with No Prefixes:	Default Prefixes:	Default Suffixes:
* = Contact + = 30cm	Gen Area	HS = Hot Spot	"n" = Neutron "b" = Beta "c" = Corrected

Postings Legend

There are no postings in this survey.

Instruments Used

#	Instrument Model	Instrument Serial #	Inst Type	Efficiency β/γ	Efficiency β	Efficiency α
1	RO20	801838	D			
2	Electra	801753	C	.10		
3	Ludlum 3030	851825	C	.316		.280

Instruments Used - Notes

#	Notes
1	N/A
2	N/A
3	N/A

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Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-30 - Printed On: 11/10/2009 10:17

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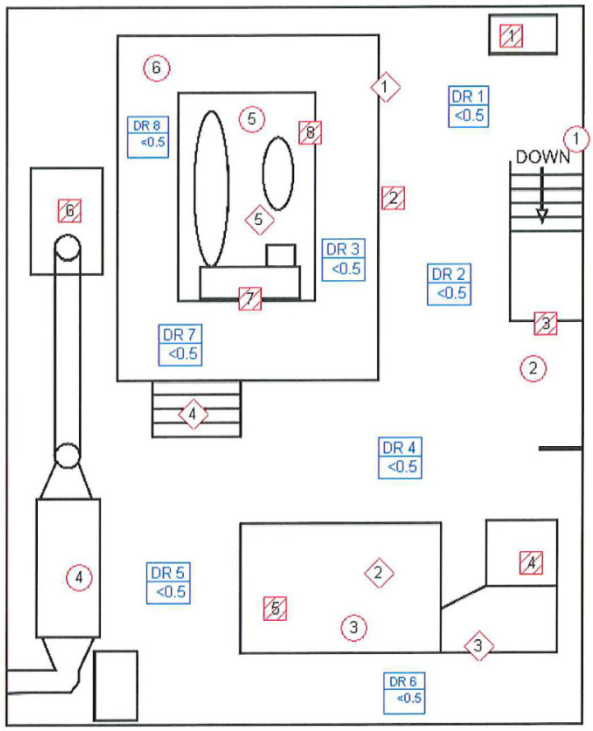
VSDS Standard Map Survey Report

SPF CARBONATE MEZZANINE	Survey #: M-20091014-30	Date/Time: 10/14/2009 13:18



Postings	B/Y Contamination Results
	1) <1000 dpm/100cm2
	2) <1000 dpm/100cm2
	3) <1000 dpm/100cm2
	4) <1000 dpm/100cm2
	5) <1000 dpm/100cm2
	6) <1000 dpm/100cm2

Lead Surveyor: John Caudle

Instrument Serial #'s: 801838, 801753, 851825

Date	Survey #	Surveyed By

Document #: N/A

Reference: MCP-139 - 0 pages

Survey #: M-20091014-30 - Printed On: 11/10/2009 10:33

Image File: MFC\SPF 799\SPF 799 CARBONATE MEZZANINE

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VSDS Standard Map Survey Report

Data Point Details

Survey #: M-20091014-30

Map: SPF CARBONATE MEZZANINE

#	Type	Inst.	Value	Units	Position	Notes
1	DR γ	1	<0.5	mrem/hr		
2	DR γ	1	<0.5	mrem/hr		
3	DR γ	1	<0.5	mrem/hr		
4	DR γ	1	<0.5	mrem/hr		
5	DR γ	1	<0.5	mrem/hr		
6	DR γ	1	<0.5	mrem/hr		
7	DR γ	1	<0.5	mrem/hr		
8	DR γ	1	<0.5	mrem/hr		
1	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
2	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
3	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
4	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
5	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
6	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
1	Wipe		β/γ <1000	dpm		
2	Wipe		β/γ <1000	dpm		
3	Wipe		β/γ <1000	dpm		
4	Wipe		β/γ <1000	dpm		
5	Wipe		β/γ <1000	dpm		
6	Wipe		β/γ <1000	dpm		
7	Wipe		β/γ <1000	dpm		
8	Wipe		β/γ <1000	dpm		
1	Direct	2	β/γ <5000	dpm/100cm2		
2	Direct	2	β/γ <5000	dpm/100cm2		
3	Direct	2	β/γ <5000	dpm/100cm2		
4	Direct	2	β/γ <5000	dpm/100cm2		
5	Direct	2	β/γ <5000	dpm/100cm2		

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-30 - Printed On: 11/10/2009 10:17

Image File: MFC\SPF 799\SPF 799 CARBONATE MEZZANINE

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VSDS Standard Map Survey Report

Survey M-20091014-29

General Information

Title: MFC799 SPF CARBONATE MAIN FLOOR AREA

Survey Date/Time: 10/14/2009 13:07
Survey Type: Quarterly
Counted By:
RWP #: 31009658
Requestor Org: Rad Con
Status: Approved by: Maxine Rubick, 10/15/2009

Lead Surveyor: John Caudle
Work Order/Task #: 29002617 01 08
KCN: 53342

Ready For Review by: John Caudle, 10/14/2009

Dose Rate (DR) Object Prefixes/Suffixes

Dose Rates with Prefixes:	Dose Rates with No Prefixes:	Default Prefixes:	Default Suffixes:
* = Contact + = 30cm	Gen Area	HS = Hot Spot	"n" = Neutron "b" = Beta "c" = Corrected

Postings Legend

RMA=Radioactive Material Area RMSA=Rad Material Storage Area

Instruments Used

#	Instrument Model	Instrument Serial #	Inst Type	Efficiency β/γ	Efficiency β	Efficiency α
1	RO20	801838	D			
2	Electra	801753	C	.10		
3	Ludlum 3030	851825	C	.316		.290

Instruments Used - Notes

#	Notes
1	N/A
2	N/A
3	N/A

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Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-29 - Printed On: 11/10/2009 10:18

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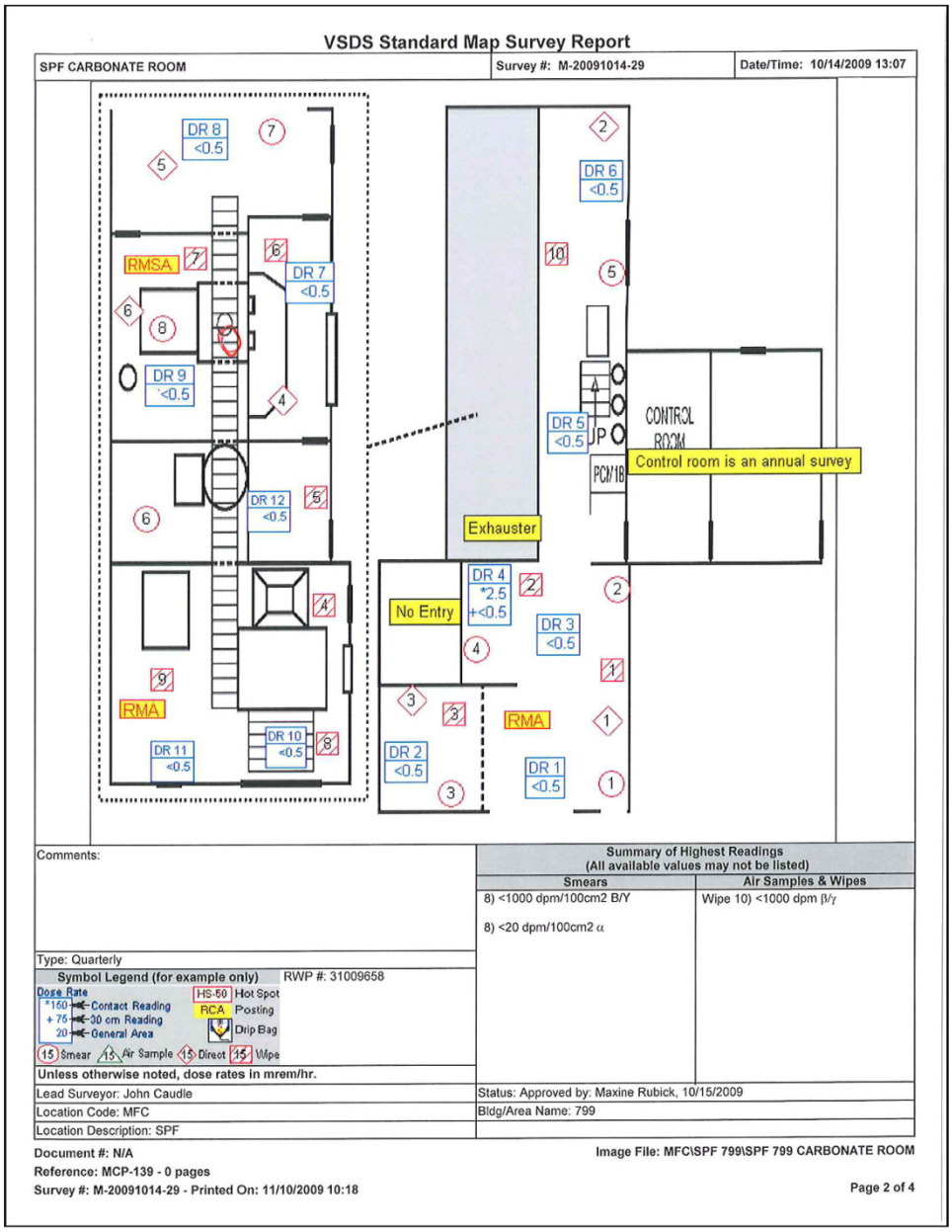
VSDS Standard Map Survey Report
SPF CARBONATE ROOM
Survey #: M-20091014-29
Date/Time: 10/14/2009 13:07
DR 8 <0.5
DR 7 <0.5
DR 9 <0.5
DR 12 <0.5
DR 11 <0.5
DR 10 <0.5
RMSA
RMA
DR 6 <0.5
DR 5 <0.5
CONTROL ROOM
PCM 1B
Control room is an annual survey
Exhauster
No Entry
DR 4 *2.5 +<0.5
DR 3 <0.5
DR 2 <0.5
DR 1 <0.5
RMA
Comments:
Summary of Highest Readings
(All available values may not be listed)
Smears
Air Samples & Wipes
8) <1000 dpm/100cm2 B/Y
8) <20 dpm/100cm2 α
Wipe 10) <1000 dpm β/γ
Type: Quarterly
Symbol Legend (for example only)
RWP #: 31009658
Dose Rate
*160 Contact Reading
+ 75 30 cm Reading
20 General Area
HS-50 Hot Spot
RCA Posting
Drip Bag
15 Smear
15 Air Sample
15 Direct
15 Wipe
Unless otherwise noted, dose rates in mrem/hr.
Lead Surveyor: John Caudle
Status: Approved by: Maxine Rubick, 10/15/2009
Location Code: MFC
Bldg/Area Name: 799
Location Description: SPF
Document #: N/A
Image File: MFC\SPF 799\SPF 799 CARBONATE ROOM
Reference: MCP-139 - 0 pages
Survey #: M-20091014-29 - Printed On: 11/10/2009 10:18
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VSDS Standard Map Survey Report

Data Point Details
Survey #: M-20091014-29
Map: SPF CARBONATE ROOM

#	Type	Inst.	Value	Units	Position	Notes
1	DR γ	1	<0.5	mrem/hr		
2	DR γ	1	<0.5	mrem/hr		
3	DR γ	1	<0.5	mrem/hr		
4	DR γ	1	* 2.5	mrem/hr		
		1	+ <0.5	mrem/hr		
5	DR γ	1	<0.5	mrem/hr		
6	DR γ	1	<0.5	mrem/hr		
7	DR γ	1	<0.5	mrem/hr		
8	DR γ	1	<0.5	mrem/hr		
9	DR γ	1	<0.5	mrem/hr		
10	DR γ	1	<0.5	mrem/hr		
11	DR γ	1	<0.5	mrem/hr		
12	DR γ	1	<0.5	mrem/hr		
1	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
2	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
3	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
4	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
5	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
6	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
7	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
8	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
1	Wipe		β/γ <1000	dpm		
2	Wipe		β/γ <1000	dpm		
3	Wipe		β/γ <1000	dpm		
4	Wipe		β/γ <1000	dpm		
5	Wipe		β/γ <1000	dpm		
6	Wipe		β/γ <1000	dpm		
7	Wipe		β/γ <1000	dpm		
8	Wipe		β/γ <1000	dpm		
9	Wipe		β/γ <1000	dpm		
10	Wipe		β/γ <1000	dpm		
1	Direct	2	β/γ <5000	dpm/100cm2		
2	Direct	2	β/γ <5000	dpm/100cm2		
3	Direct	2	β/γ <5000	dpm/100cm2		
4	Direct	2	β/γ <5000	dpm/100cm2		
5	Direct	2	β/γ <5000	dpm/100cm2		
6	Direct	2	β/γ <5000	dpm/100cm2		
	Text		Control room is an annual survey			
	Text		Exhauster			
	Text		No Entry			
	Posting		RMA			

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-29 - Printed On: 11/10/2009 10:18

Image File: MFC\SPF 799\SPF 799 CARBONATE ROOM

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VSDS Standard Map Survey Report

Data Point Details
Survey #: M-20091014-29
Map: SPF CARBONATE ROOM

#	Type	Inst.	Value	Units	Position	Notes
	Posting		RMA			
	Posting		RMSA			

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-29 - Printed On: 11/10/2009 10:18

Image File: MFC\SPF 799\SPF 799 CARBONATE ROOM

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VSDS Standard Map Survey Report

Survey M-20091014-24

General Information

Title: MFC799 SPF BARREL MELT ROOM
Survey Date/Time: 10/14/2009 12:51
Survey Type: Quarterly
Counted By:
RWP #: 31009658
Requestor Org: Rad Con
Status: Approved by: Maxine Rubick, 10/15/2009
Lead Surveyor: John Caudle
Work Order/Task #: 29002617 01 08
KCN: 53342
Ready For Review by: John Caudle, 10/14/2009

Dose Rate (DR) Object Prefixes/Suffixes

Dose Rates with Prefixes:	Dose Rates with No Prefixes:	Default Prefixes:	Default Suffixes:
* = Contact + = 30cm	Gen Area	HS = Hot Spot	"n" = Neutron "b" = Beta "c" = Corrected

Postings Legend

RMA=Radioactive Material Area

Instruments Used

#	Instrument Model	Instrument Serial #	Inst Type	Efficiency β/γ	Efficiency β	Efficiency α
1	RO20	801838	D			
2	Electra	801753	C	.10		
3	Ludlum 3030	851825	C	.317		.290

Instruments Used - Notes

#	Notes
1	N/A
2	N/A
3	N/A

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Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-24 - Printed On: 11/10/2009 10:20

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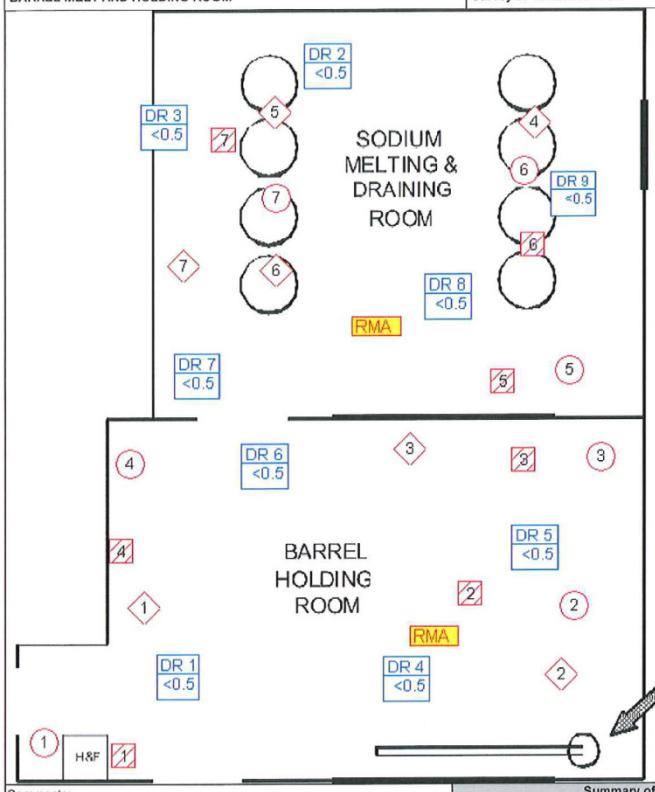
VSDS Standard Map Survey Report

BARREL MELT AND HOLDING ROOM	Survey #: M-20091014-24	Date/Time: 10/14/2009 12:51



Comments:

Type: Quarterly

Symbol Legend (for example only) RWP #: 31009658

Dose Rate
*160 Contact Reading
+ 75 30 cm Reading
20 General Area
HS-50 Hot Spot
RCA Posting
Drip Bag
15 Smear 15 Air Sample 15 Direct 15 Wipe

Unless otherwise noted, dose rates in mrem/hr.

Lead Surveyor: John Caudle

Location Code: MFC

Location Description: SPF

Summary of Highest Readings (All available values may not be listed)	
Smears	Air Samples & Wipes
7) <1000 dpm/100cm2 B/Y 7) <20 dpm/100cm2 α	Wipe 7) <1000 dpm β/γ

Status: Approved by: Maxine Rubick, 10/15/2009

Bldg/Area Name: 799

Document #: N/A

Reference: MCP-139 - 0 pages

Survey #: M-20091014-24 - Printed On: 11/10/2009 10:20

Image File: MFC\SPF 799\SPF barrel melt and holding room

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VSDS Standard Map Survey Report

Data Point Details
Survey #: M-20091014-24
Map: BARREL MELT AND HOLDING ROOM

#	Type	Inst.	Value	Units	Position	Notes
1	DR γ	1	<0.5	mrem/hr		
2	DR γ	1	<0.5	mrem/hr		
3	DR γ	1	<0.5	mrem/hr		
4	DR γ	1	<0.5	mrem/hr		
5	DR γ	1	<0.5	mrem/hr		
6	DR γ	1	<0.5	mrem/hr		
7	DR γ	1	<0.5	mrem/hr		
8	DR γ	1	<0.5	mrem/hr		
9	DR γ	1	<0.5	mrem/hr		
1	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
2	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
3	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
4	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
5	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
6	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
7	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
1	Wipe		β/γ <1000	dpm		
2	Wipe		β/γ <1000	dpm		
3	Wipe		β/γ <1000	dpm		
4	Wipe		β/γ <1000	dpm		
5	Wipe		β/γ <1000	dpm		
6	Wipe		β/γ <1000	dpm		
7	Wipe		β/γ <1000	dpm		
1	Direct	2	β/γ <5000	dpm/100cm2		
2	Direct	2	β/γ <5000	dpm/100cm2		
3	Direct	2	β/γ <5000	dpm/100cm2		
4	Direct	2	β/γ <5000	dpm/100cm2		
5	Direct	2	β/γ <5000	dpm/100cm2		
6	Direct	2	β/γ <5000	dpm/100cm2		
7	Direct	2	β/γ <5000	dpm/100cm2		
	Posting		RMA			
	Posting		RMA			

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-24 - Printed On: 11/10/2009 10:20

Image File: MFC\SPF 799\SPF barrel melt and holding room

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VSDS Standard Map Survey Report

Survey M-20091014-20

General Information

Title: MFC799 SPF PROCESS AREA
Survey Date/Time: 10/14/2009 12:44
Survey Type: Quarterly
Counted By:
RWP #: 31009658
Requestor Org: RAD CON
Status: Approved by: Maxine Rubick, 10/15/2009
Lead Surveyor: John Caudle
Work Order/Task #: N/A
KCN: 53342
Ready For Review by: John Caudle, 10/14/2009

Dose Rate (DR) Object Prefixes/Suffixes

Dose Rates with Prefixes:	Dose Rates with No Prefixes:	Default Prefixes:	Default Suffixes:
* = Contact + = 30cm	Gen Area	HS = Hot Spot	"n" = Neutron "b" = Beta "c" = Corrected

Postings Legend

RMA=Radioactive Material Area

Instruments Used

#	Instrument Model	Instrument Serial #	Inst Type	Efficiency β/γ	Efficiency β	Efficiency α
1	RO20	801838	D			
2	Electra	801753	C	.10		
3	Ludlum 3030	851825	C	.317		.290

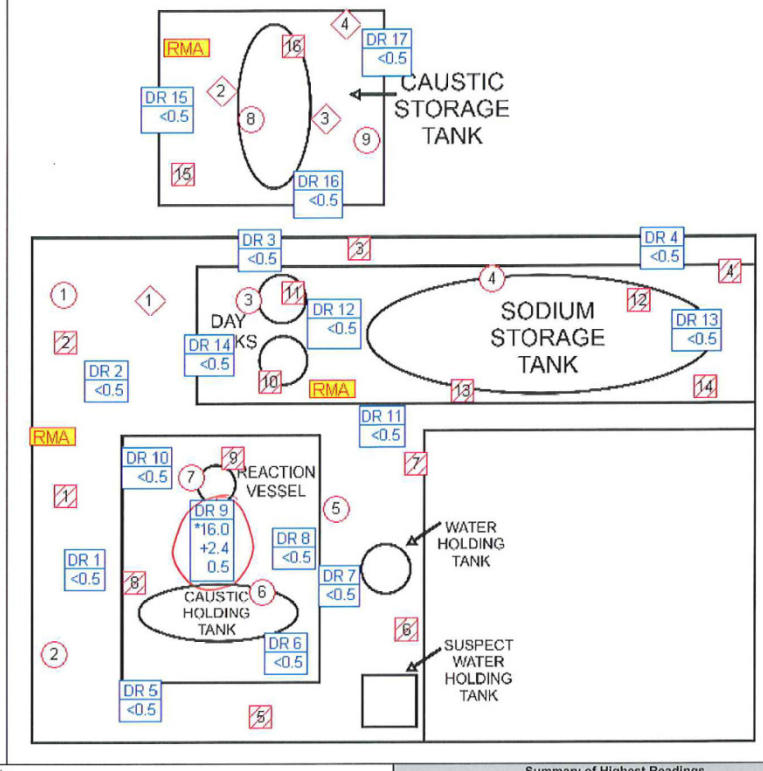
Instruments Used - Notes

#	Notes
1	N/A
2	N/A
3	N/A

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-20 - Printed On: 11/10/2009 10:16

VSDS Standard Map Survey Report

SPF PROCESSING AREA	Survey #: M-20091014-20	Date/Time: 10/14/2009 12:44



Comments:

Type: Quarterly

Symbol Legend (for example only) RWP #: 31009658

Dose Rate
*160 Contact Reading
+ 75 30 cm Reading
20 General Area
HS-50 Hot Spot
RCA Posting
Drip Bag
15 Smear 15 Air Sample 15 Direct 15 Wipe

Unless otherwise noted, dose rates in mrem/hr.

Summary of Highest Readings (All available values may not be listed)	
Smears	**Air Samples & Wipes**
9) <1000 dpm/100cm2 B/Y 9) <20 dpm/100cm2 α	Wipe 16) <1000 dpm β/γ

Lead Surveyor: John Caudle	Status: Approved by: Maxine Rubick, 10/15/2009
Location Code: MFC	Bldg/Area Name: 799
Location Description: SPF	

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-20 - Printed On: 11/10/2009 10:16

Image File: MFC\SPF 799\SPF 799 PROCESSING AREA

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VSDS Standard Map Survey Report

Data Point Details

Survey #: M-20091014-20

Map: SPF PROCESSING AREA

#	Type	Inst.	Value	Units	Position	Notes
1	DR γ	1	<0.5	mrem/hr		
2	DR γ	1	<0.5	mrem/hr		
3	DR γ	1	<0.5	mrem/hr		
4	DR γ	1	<0.5	mrem/hr		
5	DR γ	1	<0.5	mrem/hr		
6	DR γ	1	<0.5	mrem/hr		
7	DR γ	1	<0.5	mrem/hr		
8	DR γ	1	<0.5	mrem/hr		
9	DR γ	1	* 16.0	mrem/hr		
		1	+ 2.4	mrem/hr		
		1	0.5	mrem/hr		
10	DR γ	1	<0.5	mrem/hr		
11	DR γ	1	<0.5	mrem/hr		
12	DR γ	1	<0.5	mrem/hr		
13	DR γ	1	<0.5	mrem/hr		
14	DR γ	1	<0.5	mrem/hr		
15	DR γ	1	<0.5	mrem/hr		
16	DR γ	1	<0.5	mrem/hr		
17	DR γ	1	<0.5	mrem/hr		
1	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
2	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
3	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
4	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
5	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
6	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
7	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
8	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
9	Smear	3	B/Y <1000	dpm/100cm2		
		3	α <20	dpm/100cm2		
1	Wipe		β/γ <1000	dpm		
2	Wipe		β/γ <1000	dpm		
3	Wipe		β/γ <1000	dpm		
4	Wipe		β/γ <1000	dpm		
5	Wipe		β/γ <1000	dpm		
6	Wipe		β/γ <1000	dpm		
7	Wipe		β/γ <1000	dpm		
8	Wipe		β/γ <1000	dpm		
9	Wipe		β/γ <1000	dpm		
10	Wipe		β/γ <1000	dpm		
11	Wipe		β/γ <1000	dpm		
12	Wipe		β/γ <1000	dpm		
13	Wipe		β/γ <1000	dpm		

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-20 - Printed On: 11/10/2009 10:16

Image File: MFC\SPF 799\SPF 799 PROCESSING AREA

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VSDS Standard Map Survey Report

Data Point Details

Survey #: M-20091014-20

Map: SPF PROCESSING AREA

#	Type	Inst.	Value	Units	Position	Notes
14	Wipe		β/γ <1000	dpm		
15	Wipe		β/γ <1000	dpm		
16	Wipe		β/γ <1000	dpm		
1	Direct	2	β/γ <5000	dpm/100cm2		
2	Direct	2	β/γ <5000	dpm/100cm2		
3	Direct	2	β/γ <5000	dpm/100cm2		
4	Direct	2	β/γ <5000	dpm/100cm2		
	Posting		RMA			
	Posting		RMA			
	Posting		RMA			

Document #: N/A
Reference: MCP-139 - 0 pages
Survey #: M-20091014-20 - Printed On: 11/10/2009 10:16

Image File: MFC\SPF 799\SPF 799 PROCESSING AREA

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Appendix E

Cost Estimate Information

Rev. 03-04-10
Battelle Energy Alliance, LLC

COST ESTIMATE SUPPORT DATA RECAPITULATION

Project Title:	Facility Transition – INL/EXT-09-17292 – MFC-799, 799A, 770C
Estimator:	R. R. Honsinger
Date:	May 14, 2010
Estimate Type:	Class 3
File:	9A70
Approved By:	Page 1 of 6

I. **PURPOSE:** *Brief description of the intent of how the estimate is to be used, i.e., for engineering study, comparative analysis, request for funding, proposal, etc.*

The purpose of this estimate is to provide a cost estimate to support project planning and budget development. This estimate will be used to support execution of facility transition pre-requisite work scope as stated below.

II. **SCOPE OF WORK:** *Brief statement of the project's objective. Thorough overview and description of the proposed project. Identify work to be accomplished, as well as any specific work to be excluded.*

A. **Objective:**
The objective is to complete the actions that are required prior to facility transfer from the Office of Nuclear Energy (NE) to the Office of Environmental Management (EM). The project includes buildings MFC-799, 799A, and 770C, at the Materials and Fuels Complex (MFC) located at Idaho National Laboratory (INL).

B. **Included:**
The scope of work required to achieve this objective includes the following:

1. Providing Project Management oversight.
2. Providing Construction Management for oversight of subcontractor construction activities.
3. Providing subsurface investigations in support of subcontractor construction activities.
4. Developing the work planning documents.
5. Actions required to be completed prior to transfer include the following:
   a. Remove the serviceable equipment and materials at MFC-799 and 799A.
   b. Remove and dispose of the Cs137 source at MFC-770C.
   c. Perform a hazardous materials and waste characterization at MFC-799 and 799A. Limited characterization sampling and laboratory analysis will be performed for the caustic and sodium tanks.
   d. Prepare a final End State Transition Report.
   e. Perform modifications to the electrical power feed to building MFC-771, which currently receives electrical power from MFC-799. The modifications will require isolating the electrical service feed from MFC-799 and construction of 247 linear feet of new underground electrical duct bank from an existing power pole to MFC-771.

C. **Excluded:**
This scope of work specifically excludes the following:
1. Surveillance and maintenance (S&M) costs prior to facility transfer.
2. Isolating building utilities or modifications to building structural components prior to facility transfer, with the exception of the electrical modifications stated above.

III. **ESTIMATE METHODOLOGY:** *Overall methodology and rationale of how the estimate was developed, i.e., parametric, forced detail, bottoms up, etc. Total dollars/hours and rough order magnitude (ROM) allocations of the methodologies used to develop the cost estimate.*

A "*forced detail*" method was used to develop this estimate. The activities and resources were developed by the cost estimators and the project manager.

Estimate Methodology	ROM Percentage (%)
Project Team	50
Recorded Actuals	0
Parametric	0
Vendor Quotes	0
Other (rough order of magnitude planning estimates)	50
TOTAL	100

IV. **BASIS OF THE ESTIMATE:** *Overall explanation of sources for resource pricing and schedules.*

A. **Quantification Basis:** *The source for the measurable quantities in the estimate that can be used in support of earned value management. Source documents may include drawings, design reports, engineers' notes, and other documentation upon which the estimate is originated.*

The requester provided a report, *"Facilities Condition and Hazards Assessment for Materials and Fuel Complex Facilities MFC-799, 799A, and 770C, November 2009, (INL/EXT-09-17292),"* that was used to establish the activities and quantities for this estimate.

B. **Planning Basis:** *The source for the execution and strategies of the work that can be used to support the project execution plan, acquisition strategy, schedules, and market conditions and other documentation upon which the estimate is originated.*

1. Battelle Energy Alliance, LLC (BEA) will provide all engineering and project planning resources, with the exception of the engineering required for the electrical utility modifications stated above.
2. Engineering for the electrical utility modifications will be provided by a subcontractor.
3. BEA crafts and operations personnel will perform the property removal activities.
4. BEA personnel will perform characterization sampling.
5. Laboratory analysis of the characterization samples will be performed by a subcontractor.
6. Subcontractor construction forces will perform the electrical utility modifications.
7. The estimate costs are presented as FY 2010 dollars. The time of execution is undetermined at the time of estimate preparation. Escalation adjustments will be made at a later time when the execution period is determined.
8. This work will be performed during standard working hours and no premium time will be required for off-shift or weekend work.
9. Work will be able to progress consecutively and will not require delays between work segments.
10. The cost estimate does not consider or address funding or labor resource restrictions. Sufficient funding and labor resources will be available in a manner allowing optimum usage of that funding and resources as estimated and scheduled.

C. **Cost Basis:** *The source for the costing on the estimate that can be used in support of earned value management, funding profiles, and schedule of values. Sources may include published costing references, judgment, actual costs, preliminary quotes and/or other documentation upon which the estimate is originated.*

1. INL labor rates, fees, and burdens are based on the current published rates as provided by BEA Planning and Financial Controls.
2. Resources and costs to perform the transition activities are per the original rough order of magnitude activity based estimate for the *"Facilities Condition and Hazards Assessment for Materials and Fuel Complex Facilities MFC-799, 799A, and 770C, November 2009, (INL/EXT-09-17292)."*
3. Resources and costs for construction of the electrical utility modifications are per a Class 2 estimate prepared by Walsh Engineering Services, File #WES-EST-10-014, May 7, 2010 (BEA Estimate File 1C32).
4. Sales tax on materials is based on the current 6% rate charged by the State of Idaho.

5. Project management, construction management, work planning, and closeout costs are based upon input from the requester and this estimator's judgment.

V. **ESTIMATE QUALITY ASSURANCE:** *A listing of all estimate reviews that have taken place and the actions taken from those reviews.*

A. A review of the cost estimate was held on May 13, 2010, with the requester and the cost estimators. This review allowed for the requester to review and comment, in detail, on the perceived scope, basis of estimates, assumptions, project risks, and the resources that make up this cost estimate. Comments from this review have been incorporated into this estimate to reflect a project team consensus of this document.
B. An internal organizational check has been performed on this estimate with the purpose of checking the methodology approach used, discussing the document with the estimator, and ensuring the document has been reviewed and discussed with the requester, reflects a team consensus, has adequately documented the basis, assumptions, and risks to the project, and has mitigated those risks.

VI. **ASSUMPTIONS:** *Condition statements accepted or supposed true without proof of demonstration; statements adding clarification to scope. An assumption has a direct impact on total estimated cost.*

A. The only actions that are required prior to building transfer are those actions listed in the report *"Facilities Condition and Hazards Assessment for Materials and Fuel Complex Facilities MFC-799, 799A, and 770C, November 2009, (INL/EXT-09-17292)."*
B. Radiological surveys and characterization sampling will not disclose any conditions that increase the work scope previously identified for this project.
C. Formal engineering drawings and specifications, produced by Facility and Site Services, will not be required for the work scope included in this estimate.
D. Assumptions related to the electrical utility modifications are noted in the estimate recapitulation report per Walsh Engineering Services, File #WES-EST-10-014, May 7, 2010 - BEA Estimate File 1C32.

VII. **MANAGEMENT RESERVE (MR) GUIDELINE IMPLEMENTATION:**

Management Reserve Methodologies: *Explanation of methodology used in determining overall management reserve. Identify any specific drivers or items of concern.*

MR has been applied to this estimate for work that will be performed by BEA personnel and the subcontract cost for laboratory analysis of the characterization samples. The MR rates were developed by the estimator and the requester based upon an evaluation of the threats and opportunities stated below. A formal risk analysis was not performed for this estimate. MR rates of 15% were applied to the various BEA activities.

MR has also been applied to the subcontracted construction activities. The subcontractor construction only estimate is based upon preliminary approved for construction drawings

and specifications, which represent a good level of project definition. The project also has inherent risk associated with construction of underground duct banks and excavation within the MFC facility. Based upon these considerations and the judgment of the cost estimator, an MR rate of 20% was applied to the construction activities.

A. **Threats:** *Uncertain events that are potentially negative or reduce the probability that the desired outcome will happen.*

1. Average labor rates were used to estimate the rough order of magnitude costs for performing the actions required for facility transfer. There is uncertainty associated with the labor rates and the specific personnel performing the required work activities.
2. The lab analysis rates may be variable, depending on lab workloads, timing, and types of analysis required.
3. Work planning may require more rigor and resources than estimated.
4. Preciseness in the forced detail take-offs leaves little room if crews are unable to meet the estimated production rates. Factors could include, but are not limited to, changes to Integrated Safety Management requirements, equipment breakdowns, resource impacts, and/or availability.
5. Excavation and construction of the underground electrical duct bank may disclose unforeseen obstructions which could result in work stoppages and increased costs to remove or work around the obstructions.
6. Final construction drawings may include features which were not noted in the preliminary construction drawings, and cost of construction could increase.

B. **Opportunities:** *Uncertain events that could improve the results or improve the probability that the desired outcome will happen.*

1. Well-planned-out work activities and scheduling could result in increased production, thus producing lower costs for the required actions and lower operating contractor oversight costs than what have been estimated.
2. Removal of all serviceable equipment and materials residing in these facilities could be removed by other programs.
3. Deleting the requirement for characterization sampling and analysis would result in lower project costs. Characterization sampling and analysis may have to be performed by the EM contractor after facility transfer is completed.

Note: Management reserve does not increase the overall accuracy of the estimate; it does, however, reduce the level of risk associated with the estimate. Management reserve is intended to cover the inadequacies in the complete project scope definition, estimating methods, and estimating data. Management reserve specifically excludes changes in project scope, unexpected work stoppages (e.g., strikes, disasters, and earthquakes) and excessive and/or unexpected inflation or currency fluctuations. This estimate does not contain any contingencies and has not been evaluated to include any of the risks that pertain to Department of Energy.

COST ESTIMATE SUPPORT DATA RECAPITULATION

– Continued –

Project Title: Facility Transition – INL/EXT-09-17292 – MFC-799, 799A, 770C

File: 9A70

VIII. **OTHER COMMENTS/CONCERNS SPECIFIC TO THE ESTIMATE:**

None.

TEC Summary Report

Project Name: *Facility Transition - INL/EXT-09-17292*
MFC-799, 799A, 770C
Project Location: *MFC*
Project Number: *9A70*

ESTIMATE ELEMENT	Estimate Subtotal	Escalation & Inflation *0.00%*	Management Reserve *15.83%*	TOTAL
Total Estimated Cost (TEC)	$533,122	$0	$84,368	$617,490
Total Estimated Cost (TEC)	$533,122	*0.00%* $0	*15.83%* $84,368	$617,490
Rounded TEC (Rounded to the nearest $ 1000)				$617,000

	Remarks
Type of Estimate: Class 3 Planning	**BEA Approved Cost/Schedule Dat.**
Estimator: R. P. Honsinger, 6-3984	R.O. Cook for Dwayne Coburn
Checked By:	6-25-10
Approved By:	

BEA
06/24/2010 09:06:25
Idaho National Laboratory
Cost Estimating
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Project Summary Report

Project Name: *Facility Transition - INL/EXT-09-17292*
MFC-799, 799A, 770C
Project Location: *MFC*
Estimate Number: *9A70*

Client: *L. A. Harvego*
Prepared By: *R. R. Honsinger, 6-3984*
Estimate Type: *Class 3 Planning*

Level	Description	Estimate Subtotal	Escalation & Inflation	Management Reserve MR	MR %	TOTAL
5	Execution Phase	$522,305	$0	$82,746	15.84%	$605,051
5.10	. . . . Project Management (PM) Support during Execution	$98,799	$0	$14,820	15.00%	$113,619
5.10.10	. . . . . Provide PM Oversight - Level of Effort (LOE) during Execution	$77,039	$0	$11,556	15.00%	$88,595
5.10.20	. . . . . Maintain Project Files - LOE during Execution	$4,858	$0	$729	15.00%	$5,586
5.10.30	. . . . . Provide Cost and Schedule Support during Execution	$7,864	$0	$1,180	15.00%	$9,044
5.10.40	. . . . . Prepare Annual Work Plan at the Execution	$5,299	$0	$795	15.00%	$6,093
4.05.50	. . . . . Provide Procurement Support -	$3,740	$0	$561	15.00%	$4,301
5.20	. . . . Quality Assurance and Quality Control Support	$2,534	$0	$380	15.00%	$2,914
5.20.20	. . . . . Quality Assurance Oversight	$2,534	$0	$380	15.00%	$2,914
5.30	. . . . Construction Management (CM) during Execution	$68,441	$0	$10,266	15.00%	$78,707
5.30.10	. . . . . Provide CM Oversight/Support during Execution - Level of Effort (LOE)	$25,283	$0	$3,792	15.00%	$29,075
5.30.15	. . . . . BEA - Provide CM Supervision - OPC	$5,714	$0	$857	15.00%	$6,571
5.30.20	. . . . . Provide Safety Oversight/Support during Execution - LOE	$5,529	$0	$829	15.00%	$6,358
5.30.25	. . . . . Provide Industrial Hygiene Oversight/Support during Execution - LOE	$3,895	$0	$584	15.00%	$4,479
5.30.30	. . . . . Perform Subsurface Investigations Prior to Excav'ns, Floor and Wall Penetrations	$28,021	$0	$4,203	15.00%	$32,224
5.40	. . . . Program Execution	$350,351	$0	$56,953	16.26%	$407,304
5.40.05	. . . . . Perform Facility Transition Activities	$242,757	$0	$36,414	15.00%	$279,171
5.40.05.1	. . . . . MFC-799, 799A -EM Transition - Property Removal	$66,287	$0	$9,943	15.00%	$76,230
5.40.05.2	. . . . . MFC-799, 799A EM Transition - Characterization and Verification	$42,041	$0	$6,306	15.00%	$48,347
5.40.05.3	. . . . . MFC-770C EM Transition - Final Disposition and Source Removal	$82,235	$0	$12,335	15.00%	$94,570
5.40.05.4	. . . . . MFC-799, 799A EM Transition - Engineering for Electrical Modifications	$26,000	$0	$3,900	15.00%	$29,900
5.40.05.5	. . . . . MFC-799, 799A, 770C EM Transition - Final End State Report	$17,810	$0	$2,672	15.00%	$20,482

BEA

Project Summary Report

Project Name: ***Facility Transition - INL/EXT-09-17292 MFC-799, 799A, 770C***
Project Location: ***MFC***
Estimate Number: ***9A70***

Client: ***L. A. Harvego***
Prepared By: ***R. R. Honsinger, 6-3984***
Estimate Type: ***Class 3 Planning***

Level	Description	Estimate Subtotal	Escalation & Inflation	Management Reserve MR	MR %	TOTAL
5.40.05.6	..... MFC-799, 799A, 770C EM Transition - Transfer Out of PER 116 MFC RCRA Permit	$8,385	$0	$1,258	15.00%	$9,642
5.40.10	**..... Provide Subcontracted Construction Services**	**$88,000**	**$0**	**$17,600**	**20.00%**	**$105,600**
5.40.10.10	..... Modify Electrical Power to Building MFC-771 - Subcontractor	$88,000	$0	$17,600	20.00%	$105,600
5.40.40	**..... Provide Construction Support**	**$8,993**	**$0**	**$1,349**	**15.00%**	**$10,341**
5.40.40.10	..... Provide Radiation Control (Technical) Direct Work	$7,290	$0	$1,094	15.00%	$8,384
5.40.40.20	..... Provide Radiation Control (Technical) Oversight	$1,702	$0	$255	15.00%	$1,957
5.40.55	**..... Work Orders (WOs)**	**$10,601**	**$0**	**$1,590**	**15.00%**	**$12,191**
5.40.55.10	..... Prepare WO	$10,601	$0	$1,590	15.00%	$12,191
5.70	**.... BEA Material Handling Fee and G&A Costs - Execution Phase**	**$2,180**	**$0**	**$327**	**15.00%**	**$2,507**
6	**Project Transition/Closeout Phase**	**$10,817**	**$0**	**$1,622**	**15.00%**	**$12,439**
6.10	**.... Project Management (PM) Support during Transition/Closeout Phase**	**$3,855**	**$0**	**$578**	**15.00%**	**$4,433**
6.10.10	**..... Provide PM Oversight - Level of Effort (LOE) during Transition/Closeout Phase**	**$3,369**	**$0**	**$505**	**15.00%**	**$3,875**
6.10.20	**..... Closeout Project Files**	**$486**	**$0**	**$73**	**15.00%**	**$559**
6.20	**.... Closure Engineering and Design Documents**	**$6,962**	**$0**	**$1,044**	**15.00%**	**$8,006**
6.20.10	**..... Prepare Master Facility As-Built Drawings and Incorporate into EDMS**	**$3,481**	**$0**	**$522**	**15.00%**	**$4,003**
6.20.20	**..... Prepare Project As-Built Drawings and Incorporate into EDMS**	**$3,481**	**$0**	**$522**	**15.00%**	**$4,003**
Total	Facility Transition - MFC-799, 799A, 770C - INL-EXT-09-17292	$533,122	$0	$84,368	15.83%	$617,490

Appendix B

Limited Characterization Report

INL/EXT-10-19590

Hazardous Materials Verification and Limited Characterization Report on Sodium and Caustic Residuals in Materials and Fuel Complex Facilities MFC-799/799A

August 2010

The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

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INL/EXT-10-19590

Hazardous Materials Verification and Limited Characterization Report on Sodium and Caustic Residuals in Materials and Fuel Complex Facilities MFC-799/799A

August 2010

Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

Prepared for the
U.S. Department of Energy
Office of Nuclear Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517

ABSTRACT

This report is a companion to the *Facilities Condition and Hazard Assessment for Materials and Fuel Complex Sodium Processing Facilities MFC-799/799A and Nuclear Calibration Laboratory MFC-770C* (referred to as the Facilities Condition and Hazards Assessment). This report specifically responds to the requirement of Section 9.2, Item 6, of the Facilities Condition and Hazards Assessment to provide an updated assessment and verification of the residual hazardous materials remaining in the Sodium Processing Facilities processing system. The hazardous materials of concern are sodium and sodium hydroxide (caustic).

The information supplied in this report supports the end-point objectives identified in the *Transition Plan for Multiple Facilities at the Materials and Fuels Complex, Advanced Test Reactor, Central Facilities Area, and Power Burst Facility*, as well as the deactivation and decommissioning critical decision milestone 1, as specified in U.S. Department of Energy Guide 413.3-8, "Environmental Management Cleanup Projects."

Using a tailored approach and based on information obtained through a combination of process knowledge, emergency management hazardous assessment documentation, and visual inspection, this report provides sufficient detail regarding the quantity of hazardous materials for the purposes of facility transfer; it also provides that further characterization/verification of these materials is unnecessary.

CONTENTS

FIGURES

Hazardous Materials Verification and Limited Characterization Report on Sodium and Caustic Residuals in Materials and Fuel Complex Facilities MFC-799/799A

1. INTRODUCTION

This report is a companion to the *Facilities Condition and Hazard Assessment for Materials and Fuel Complex Sodium Processing Facilities MFC-799/799A and Nuclear Calibration Laboratory MFC-770C* (INL 2009; referred to as the Facilities Condition and Hazards Assessment). This report specifically responds to the requirement of Section 9.2, Item 6, of the Facilities Condition and Hazards Assessment to provide an updated assessment and verification of the residual hazardous materials remaining in the Sodium Processing Facilities processing system. The hazardous materials of concern are sodium and sodium hydroxide (caustic).

The information supplied in this report supports the end-point objectives identified in the *Transition Plan for Multiple Facilities at the Materials and Fuels Complex, Advanced Test Reactor, Central Facilities Area, and Power Burst Facility* (INL 2010), as well as the deactivation and decommissioning critical decision milestone 1, as specified in U.S. Department of Energy (DOE) Guide 413.3-8, "Environmental Management Cleanup Projects."

2. APPROACH

DOE Guide 450.3-3, "Tailoring for Integrated Safety Management Applications," demonstrates that tailoring is integral to the Integrated Safety Management System. Application of tailoring is appropriate for all phases of facility transitioning.

In keeping with tailoring principles, reliance on information compiled from the following sources, as opposed to intrusive sampling, is an adequate and prudent approach to meet the objectives of this report:

- Process knowledge relative to tank and pumping configurations and the procedures followed when the facilities were placed into operational standby
- Information contained in EHA-70, Appendix R, "Emergency Management Hazards Assessment for MFC-799, Sodium Process Facility, and MFC-799A, Caustic Storage Tank Building"
- Information contained in the Integrated Waste Tracking System for container profile CH-ANL-180 and Argonne Laboratory Memo FE-AL-(SAB)-97-003 summarizing chemical analysis of sodium feedstock for the Sodium Process Facility
- Confirmation measurements of materials, where practical.

3. SYSTEM DESCRIPTION

Residual hazardous materials are confined to the system process components depicted in the simplified process flow diagram in Figure 1. The Facilities Condition and Hazards Assessment (INL 2009) provides a detailed description of the MFC-799/799A equipment and process from which the following summary is extracted.

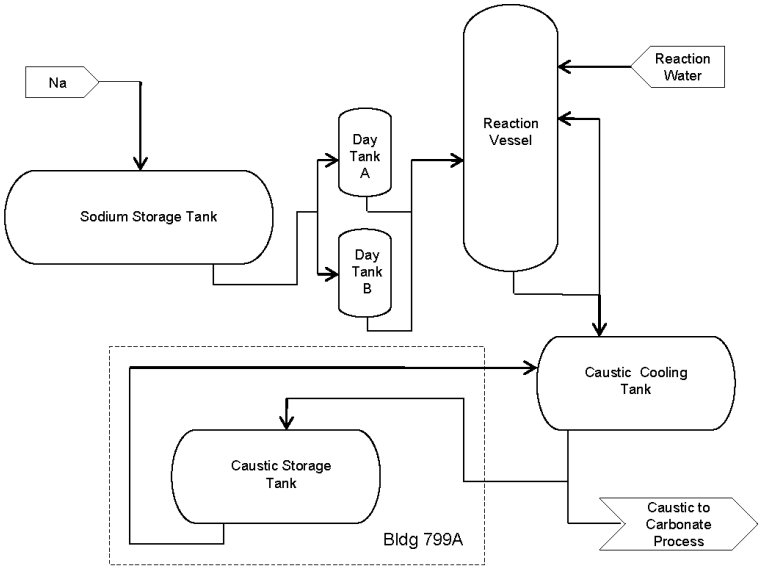


Figure 1. Simplified process flow diagram.

The Sodium Process Equipment Area was used to store and treat alkali metal hazardous waste/mixed waste. There are several major components in the sodium process area, including a 5,000-gal sodium storage tank, two 730-gal sodium day tanks (Tank A on the west side and Tank B on the east), sodium reaction vessel, 1,000-gal caustic cooling tank, and a 4,000-gal caustic storage tank.

The sodium storage tank received alkali metal from the barrel drain stations (supply lines are all drained). The storage tank filled the day tanks, which fed the alkali metal to the reaction vessel. The reaction vessel converted the alkali metal to a liquid hydroxide waste form, which was then loaded into drums and allowed to cool to solidify. The caustic cooling tank and the caustic storage tank allowed for storage of caustic during reaction vessel shutdowns. The caustic storage tank was included to provide for backup storage only. The caustic storage tank is located in a separate building (MFC-799A) just west of the Sodium Process Equipment Area.

Pressurized nitrogen gas was the motive force for transfer of sodium to the reaction vessel, whereas pumps were used to transfer and recirculate caustic within the system.

In the reaction vessel, the sodium/sodium potassium reacted with water to produce sodium hydroxide/potassium hydroxide and hydrogen. The hydroxide in the reaction vessel was recirculated with approximately 1 to 2 gallons per minute (gpm) of the 8 to 10 gpm recirculated solution continuously diverted to either the drum fill station (during operation) or to the 1,000-gal caustic cooling tank (during shutdown operations).

The caustic metering pump transferred the 50 wt% hydroxide solution from the 1,000-gal caustic cooling tank directly to the reaction vessel upon startup or if backup hydroxide storage was needed. The 4,000-gal caustic storage tank was intended to be used, in an emergency only, to transfer hydroxide solution to or from the caustic storage tank to the reaction vessel. The caustic recirculation pump, metering pump, and caustic cooling tank are located in the sodium process area; the caustic storage tank and caustic transfer pump are housed in MFC-799A.

Drawing W7990-0207-ED-01, Sodium Process Facility Building 799 General Arrangement (see Appendix A), depicts the layout of these system components. Each of the tanks and the reaction vessel are installed in below-grade, lined containment wells with associated recirculation and pumping equipment mounted below the vessel bottoms, all of which allows for gravity draining of the systems.

3.1 Sodium Storage Tanks

Figures 2 and 3 show the 5,000-gal sodium storage tank (A1-T-101) and the two 750-gal sodium day tanks (A1-T-102 and A1-T-103), respectively.

As depicted in drawing E5274-0013-ED-19, Sheet 1 of 4, Sodium Process Facility, Sodium Process Piping and Instrumentation Diagram (see Appendix B), all three tanks have rounded bottoms and the sodium storage tank has a dip tube well on the end closest to the day tanks. All three tanks have low point drain ports.

3.2 Sodium Reaction Vessel (A23-T-201)

Figure 4 shows the sodium reaction vessel and Figure 5 depicts the associated recirculation pumps.

The sodium reaction vessel also has a rounded bottom and drains to the recirculation pump from the low point (see drawing E5274-0013-ED-19, Sheet 2 of 4, Sodium Process Facility, Sodium Process Piping and Instrumentation Diagram [see Appendix B]).

3.3 Caustic Cooling Tank (A23-T-202)

Figure 6 shows the 1,000-gal caustic cooling tank. This tank also has a round bottom and drains at the tank low point (see drawing E4-5274-0013-ED-19, Sheet 3 of 4, Sodium Process Facility, Sodium Process Piping and Instrumentation Diagram [see Appendix B]).

3.4 Caustic Storage Tank (A23-T-204)

Figure 7 shows the 4,000-gal caustic storage tank located in MFC-799A and is depicted in drawing E4-5274-0013-ED-19, Sheet 3 of 4, Sodium Process Facility, Sodium Process Piping and Instrumentation Diagram (see Appendix B). It also has a round bottom and drains from the tank low point.

Figure 2. Sodium storage tank.

Figure 3. Sodium day tanks.

Figure 4. Sodium reaction vessel.

Figure 5. Sodium reaction vessel recirculation pumps and piping.

Figure 6. Caustic cooling tank.

Figure 7. Caustic storage tank.

4. SYSTEM SHUTDOWN PROCEDURES

According to the entries in *A Summary of the Operational and Maintenance Activities at the Sodium Processing Facility for the Period Covering December 1995 through March 2001* (Sandifer 2001), all processing of Experimental Breeder Reactor II primary sodium was completed on February 16, 2001. Once Experimental Breeder Reactor II processing was finished, the remainder of the FERMI sodium transferred to the Idaho National Laboratory (INL) was processed as a system flush[a]. Processing of FERMI sodium was completed on March 5, 2001, at which time, a non-routine procedure was performed to minimize the residual amounts of sodium and caustic left in all tanks/containers at the Sodium Processing Facility. The Sodium Processing Facility was then shutdown to a facility standby status.

The non-routine procedure consisted of pressurizing the nitrogen system and forcing out and collecting as much residual material within the sodium transfer piping and storage tanks as possible. The process continued until the system pressure could not be maintained, indicating there was an insufficient quantity of sodium remaining to create a backpressure seal against the nitrogen purge.

Residual caustic in the reaction vessel was pumped from the bottom of the vessel and into the caustic cooling tank until pump vacuum could no longer be contained, indicating the reaction vessel had been evacuated to as low a level as possible. The residual caustic pumped into the caustic cooling tank during this process remains, and the tank level is monitored via an active bubbler measurement system.

Contaminated caustic was never stored in the caustic storage tank in MFC-799A. A clean, 50% solution was pumped into the tank for initial system testing but was later pumped back out via the tank bottom drain. Pumping continued until suction was lost, indicating the tank is empty and any residual is limited to what is contained within the associated recirculation pump and lower piping connection.

[a] Conversation with Darrell Pfannenstiel on June 29, 2010, confirmed that the reason FERMI sodium was considered a system flush is because the FERMI sodium was less radioactively contaminated than Experimental Breeder Reactor II sodium. Actual activity readings are not available nor are they considered significant for purposes of this report.

It is reasonable to assume that further draining of the system would require opening the tanks, pumps, and drains, which would be neither prudent nor cost effective. Residuals are considered minimal and isolated to readily identifiable locations.

The facilities have been well maintained since shutdown, with regular inspections. No evidence of leakage has been observed and regular checks of the caustic cooling tank bubbler measurements indicate that the tank level has not changed since system shutdown.

5. RESIDUAL HAZARDOUS MATERIAL QUANTITIES

Two documents provide information relative to residual hazardous materials remaining in the system in the Sodium Processing Facility. The first is the Materials and Fuels Complex Emergency Management Hazards Assessment (EHA-70), Appendix R (prepared in 2006). The second is the Sodium Processing Facility Systems Log, which is maintained in accordance with the requirements of the Materials and Fuels Complex Hazardous Waste Management Act Resource Conservation and Recovery Act (RCRA) Storage and Treatment Permit.

5.1 EHA-70 Quantities

5.1.1 Sodium

The MFC-799 sodium tanks are drained as low as practical and the remaining heels are estimated to be so low a quantity that sodium, while still likely present, is minimal and exempted from further evaluation as a hazard. Components that held sodium were identified in the Integrated Waste Tracking System in Material Profile ANL-180-CH.

5.1.2 Sodium Hydroxide

EHA-70 estimates that there are approximately 200 to 240 gallons of 50% by weight solution of radioactively contaminated sodium hydroxide resident in the caustic cooling tank in MFC-799 and approximately 50 gallons of residual non-radioactive 50% by weight solution sodium hydroxide associated with the caustic storage tank in MFC-799A. This calculates to roughly 1,520 lb and 315 lb of dry caustic residual, respectively.

5.2 Resource Conservation and Recovery Act Permit Quantities

5.2.1 Sodium

Sodium quantities are minimal (because the sodium systems essentially were drained completely). Minimal sodium quantities were tracked for radiological inventory purposes as follows:

- Day Tank A (Container Profile, DTA) lists 0.25 gallons
- Day Tank B (Container Profile, DTB) lists 0.25 gallons
- Sodium storage tank (container profile, SST) lists 1 gallon.

5.2.2 Sodium Hydroxide

- **MFC-799A Caustic Storage Tank.** This tank is not monitored in the permit because the material is non-radioactive and the volume is well below reportable quantities.

- **MFC-799 Caustic Cooling Tank.** The 50% caustic solution in this tank is radiologically contaminated and subject to daily RCRA monitoring. Fluid-level monitoring is done using a calibrated bubbler measurement system in which the logs indicate a constant liquid volume of 450 gallons. This correlates to approximately 2,852 lb of dry weight sodium hydroxide. This quantity does not agree with the EHA-70 number.

5.3 Material Confirmation Measurements

There is a disagreement between the EHA-70 and RCRA reported volume of contaminated residual caustic solution. Upon further investigation, it was determined that the volume recorded in EHA-70 was an approximate volume based on verbal information provided to the preparer(s) of the EHA rather than an onsite physical verification. The RCRA volume, on the other hand, is monitored daily via calibrated, real-time instrumentation. The RCRA volume is considered accurate and takes precedence over the EHA quantity.

Only the caustic cooling tank is instrumented for direct readings. The other tanks are sealed systems and would have to be opened and physically dipped or visually inspected to verify any residual levels. The risks and costs associated with such individual entries are not commensurate with the value of any additional information gained given what is already known and discussed above.

The caustic cooling tank bubbler measurement system was physically checked on an inspection visit made to the facility on June 29, 2010. The measurement system was operational and the calibration was current. The observed reading was 23 in., which correlates to a 450-gal liquid volume. According to facility management, this reading has remained constant since system shutdown in March 2001.

6. SUMMARY AND CONCLUSION

The processing system at the Sodium Processing Facility is well defined and the orderly process followed at shutdown gives assurance that the hazardous sodium and caustic materials internal to the system were drained to the lowest levels achievable.

Any sodium residual is limited to heels in the tanks, associated lower transfer piping sections, and is considered as such a minimal quantity as to be exempted from further consideration.

There is an estimated 450 gallons of residual radioactively[b] contaminated 50% weight solution sodium hydroxide (caustic) contained in the caustic cooling tank in MFC-799. An additional estimated 50 gallons of non-radioactive 50% weight solution caustic is trapped in the lower pump and piping sections of the caustic storage tank in MFC-799A. In terms of dry weight of chemical, these liquid volumes translate to roughly 2,850 lb and 315 lb of sodium hydroxide, respectively.

The above estimates reflect maximum quantities and are less than 20% of the reportable quantity of the screening threshold in 40 CFR 302.4, Table 302.4. However, the quantities do exceed laboratory quantities (approximately 5 gal or 40 lb), and merit a National Fire Protection Association Health Hazard Rating of 3.

Based on the information, sufficient detail is known for the purposes of facility transfer and further characterization/verification is unnecessary.

7. REFERENCES

40 CFR 302.4, 2002, Title 40, "Protection of Environment," Part 302, "Designation, Reportable Quantities, and Notification," Section 302.4, "Designation of hazardous substances," *Code of Federal Regulations*, Office of the Federal Register.

[b] Per EHA-70, MFC-799/799A are less than Hazard Category 3 facilities.

DOE Guide 413.3-8, *Environmental Management Cleanup Project*, September 24, 2008, MFC Hazardous Waste Management Act) RCRA Storage and Treatment Permit, No. ID4890008952, dated August 16, 2004, and modified on October 2, 2008, U.S. Department of Energy.

DOE Guide 450.3-3, *Tailoring For Integrated Safety Management Applications*, U.S. Department of Energy, February 1997.

EHA-70, Appendix R, "Emergency Management Hazards Assessment for MFC-799, Sodium Process Facility, and MFC-799A, Caustic Storage Tank Building," Revision 0, Effective Date July 5, 2006, eCR Number 506092.

INL, 2009, *Facilities Condition and Hazard Assessment for Materials and Fuel Complex Sodium Processing Facilities (SPF) MFC-799/799A and Nuclear Calibration Laboratory MFC-770C*, INL/EXT-09-17292, Idaho National Laboratory, November 2009.

INL, 2010, *Transition Plan for Multiple Facilities at the Materials and Fuels Complex, Advanced Test Reactor, Central Facilities Area, and Power Burst Facility*, PLN-3352, Idaho National Laboratory, January 2010.

MFC Hazardous Waste Management Act (HWMA), RCRA Storage and Treatment Permit, No. ID4890008952, dated August 16, 2004, and modified on October 2, 2008.

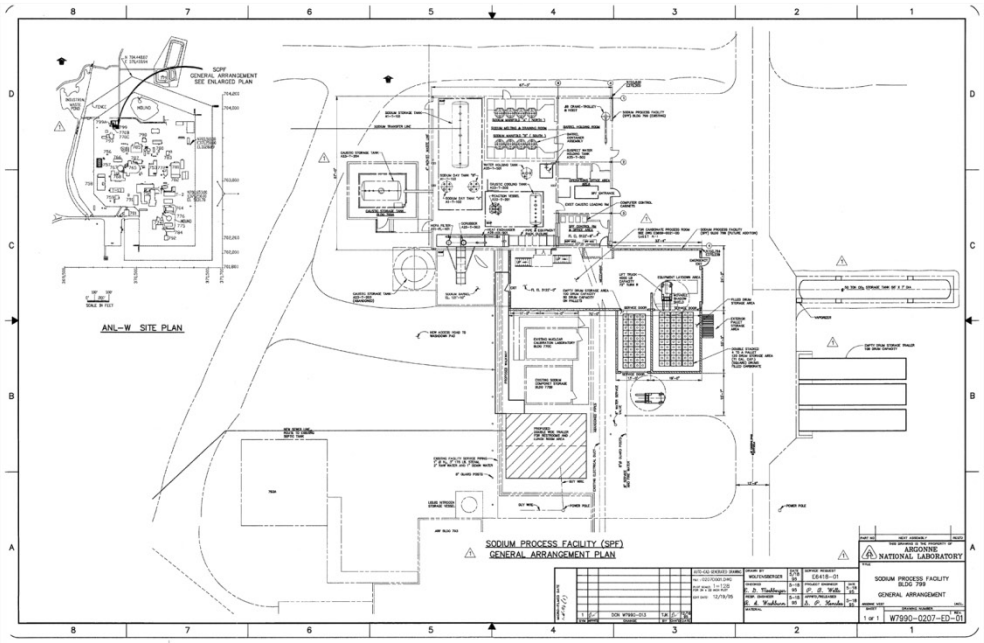
Sandifer, V., 2001, "A Summary of the Operational and Maintenance Activities at the Sodium Processing Facility for the Period Covering December 1995 through March 2001," prepared by Van Sandifer, EBR-II/SPF Operations Manager.

8. APPENDIXES

Appendix A, Sodium Process Facility General Arrangement Drawing

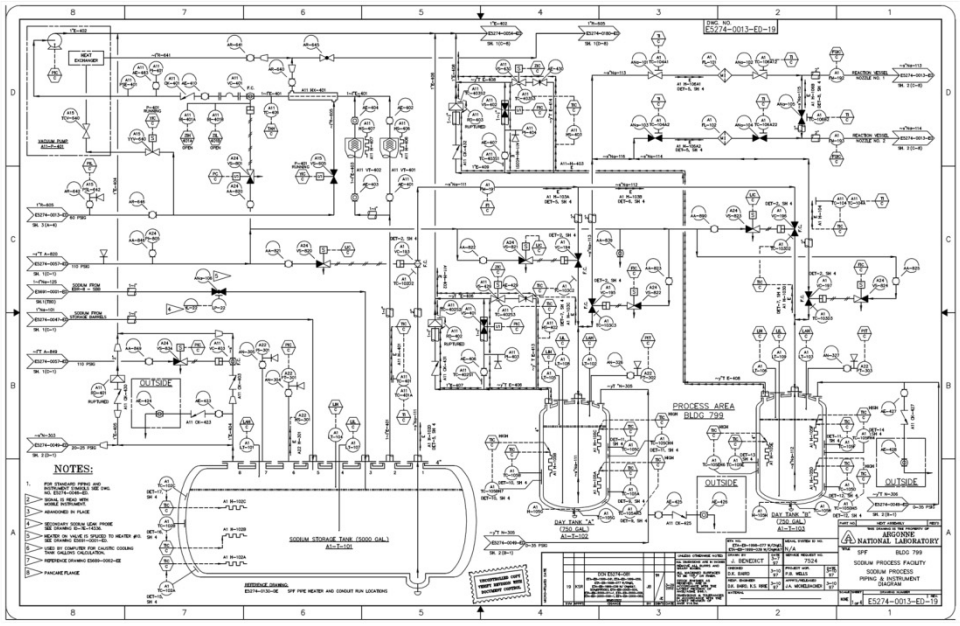
Appendix B, Sodium Process Facility Sodium Process Piping and Instrumentation Drawings

Appendix A
Sodium Process Facility General Arrangement Drawing



10

Appendix B
Sodium Process Facility
Sodium Process Piping and Instrumentation Drawings



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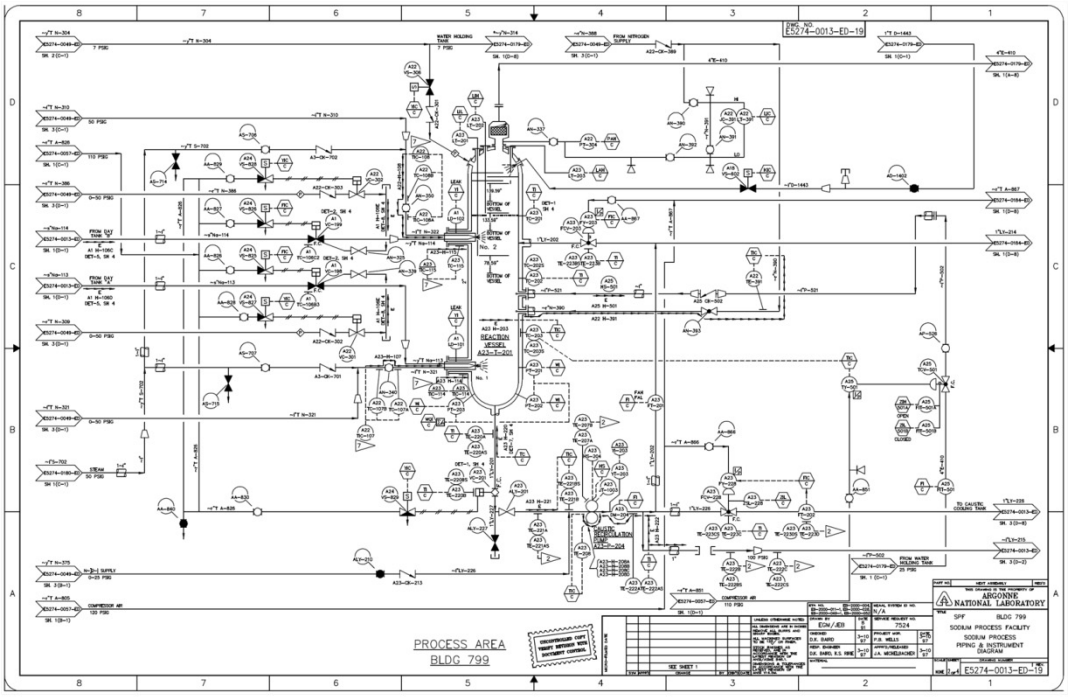
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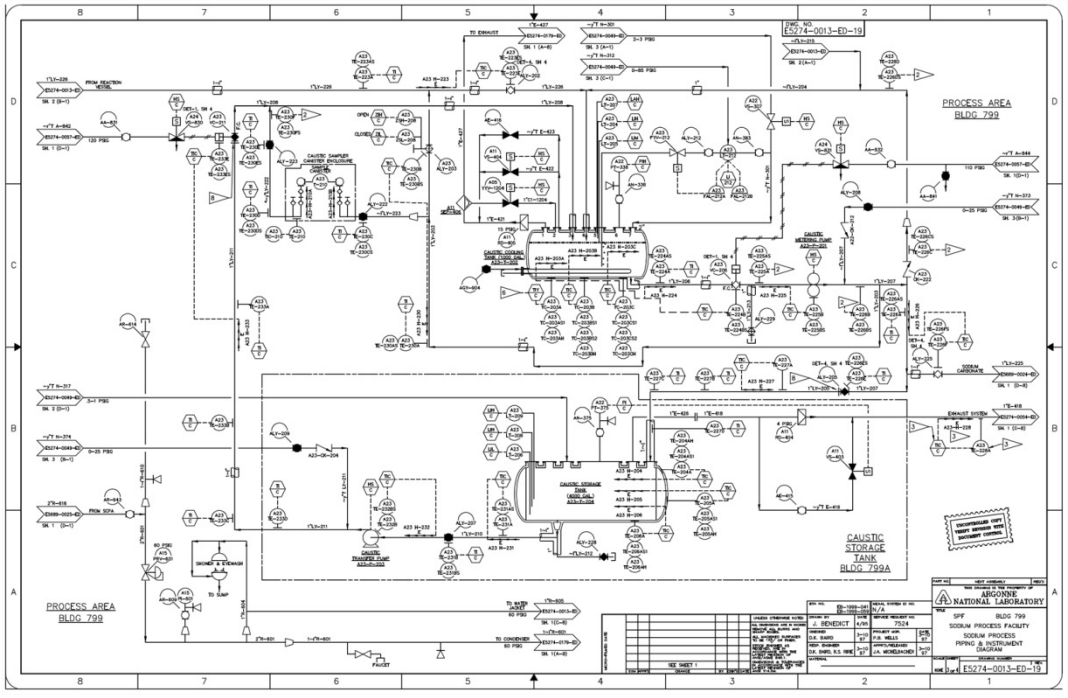
BLDG 799
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
SODIUM PROCESS PIPING & INSTRUMENT DIAGRAM
E5274-0013-ED-19

12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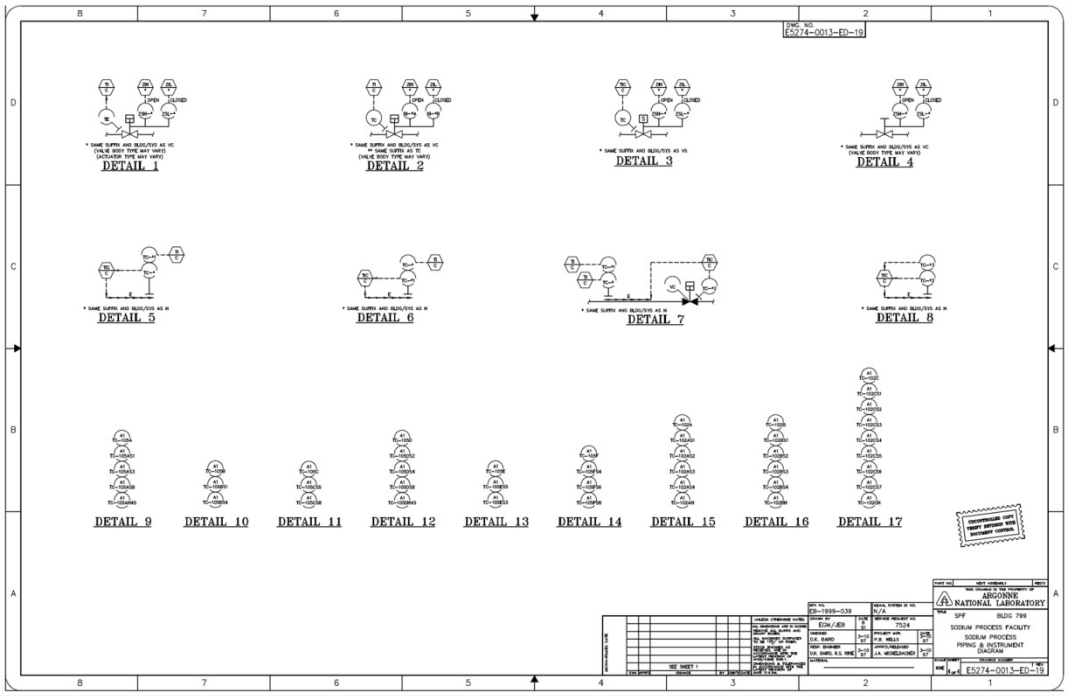
BLDG 799
CAUSTIC STORAGE TANK BLDG 799A
ARGONNE NATIONAL LABORATORY
SPF BLDG 799
SODIUM PROCESS FACILITY
SODIUM PROCESS PIPING & INSTRUMENT DIAGRAM
E5274-0013-ED-19

13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E5274-0013-ED-19
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DETAIL 5
DETAIL 6
DETAIL 7
DETAIL 8
DETAIL 9
DETAIL 10
DETAIL 11
DETAIL 12
DETAIL 13
DETAIL 14
DETAIL 15
DETAIL 16
DETAIL 17
ARGONNE
NATIONAL LABORATORY
SPF
BLDG 799
SODIUM PROCESS FACILITY
SODIUM PROCESS
PIPING & INSTRUMENT
DIAGRAM
E5274-0013-ED-19

Appendix C

Cs-137 Source Disposition Documents

Department of Energy
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

AUG 20 2010

Julie E. Conner, DOE Idaho Operations Office, Idaho Falls, ID

APPROVAL TO SHIP BATTELLE ENERGY ALLIANCE (BEA) LOW-LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE (NTS)

BEA has completed the waste profile approval process described in the Nevada Test Site Waste Acceptance Criteria (NTSWAC), Revision 7-01. The National Nuclear Security Administration Nevada Site Office (NNSA/NSO) reviewed and commented on the following waste profile:

Waste Profile	Revision and Date	Description
NEID-CHCS137SS	Rev. 0, 08/13/2010	CH Cs-137 Sealed Source

NNSA/NSO approves the shipment and disposal of the subject waste stream under the requirements of the NTSWAC, Revision 7-01, and the BEA Waste Certification Program. The enclosure lists the current BEA approvals and supersedes all previous approval memoranda.

Prior to initiating shipment of this waste stream, please notify National Security Technologies, LLC (NSTec) Disposal Operations personnel at (702) 295-6811 with a planned shipping date. NSTec will ensure sufficient disposal capacity is available and provide the necessary equipment and personnel for disposal activities.

If you have any questions or comments, please contact James J. Cebe, Waste Management Project, at (702) 295-0957.

E. Frank Di Sanza
Federal Project Director
Waste Management Project

WMP:6722.JJC

Enclosure:
As stated

cc w/encl. via e-mail:
J. J. MacDougall, NDEP, Las Vegas, NV
T. H. Murphy, NDEP, Las Vegas, NV
L. A. Harvego, BEA, Idaho Falls, ID
R. M. Guertal, EnergySolutions, Idaho Falls, ID
J. D. Freter, NSTec, Mercury, NV
R. G. Geisinger, NSTec, Las Vegas, NV
K. C. Tanaka, NSTec, Las Vegas, NV
NSTec Correspondence Control, MS NLV008
J. J. Cebe, WMP, NNSA/NSO, Las Vegas, NV
K. K. Snyder, PSG, NNSA/NSO, Las Vegas, NV
S. A. Hejazi, SC, NNSA/NSO, Las Vegas, NV
D. J. Morgan, OPA, NNSA/NSO, Las Vegas, NV
NNSA/NSO Read File

Nevada Test Site Approval Status - 08/18/2010

Battelle Energy Alliance (BEA), Idaho Falls, Idaho

WASTE STREAM(s)

Waste Profile Number	Revision #	and Date	Current Approval Date	Waste Profile Name
NEID-04SMC0001	0	10/09/2009	10/29/2009	DU Material
NEID-04SMC0002	1	06/29/2010	08/12/2010	DU Contaminated Material, Classified
NEID-04ATR2328	0	11/18/2009	12/10/2009	Routinely Generated CH LLW at ATR Complex*
NEID-05SMC3056	0	10/09/2009	10/29/2009	DU Contaminated Material
NEID-06SMC0001	0	10/09/2009	10/29/2009	DU Waste Material
NEID-0900RALLW	0	11/04/2009	12/09/2009	INL Regulated Asbestos LLW*
NEID-0900RESIN	0	11/17/2009	01/06/2010	Ion Exchange Resins from ATR Complex*
NEID-09INLCLLW	0	02/02/2010	03/04/2010	INL Routinely Generated Contact Handled Low-Level Waste*
NEID-09MFCCLLW	0	02/01/2010	02/11/2010	MFC Routinely Generated Contact Handled Low-Level Waste*
NEID-09MFCRLLW	1	08/05/2010	08/12/2010	MFC Routinely Generated Remote Handled Low-Level Waste*
NEID-CHCS137SS	0	08/13/2010	Cvr Ltr Date	CH Cs-137 Sealed Source

* Shipments containing tritium (H-3) should arrive at the Nevada Test Site no later than 1200 hours to allow ample time for off loading, survey, and swipe analysis.

WASTE CERTIFICATION PROGRAM

WCPP - QAP Designation	Revision	and Date	WCPP - QAP Title
PLN-522	8	04/20/10	Quality Assurance Program Plan for the Waste Management/Waste Certification Program

NIC Rev Date: 10/22/2009 **NIC Revision Due:** 10/22/2010

ASSESSMENT STATUS

Last RWAP Facility Evaluation:

RWAP-S-10-15, 05/2010

NEL10067

MFC100171, Cs-137 Source from MFC to NTS

U.S. DOE Nevada Test Site

Information Only

Task Definition

Originating Facility

MFC : LLW_1610N

Battelle Energy Alliance
Materials and Fuels Complex
MFC-770C-West
Idaho Falls,, ID

☑ **System Controlled as of:** 09-Aug-2010 12:00 AM

15-Sep-2010
09:00:00 AM
Shipment

Destination Unit

NTS : NTS

National Security Technologies, LLC (NSTec)
U.S. DOE Nevada Test Site
U.S. DOE Nevada Test Site
Mercury, NV
Phone: (702) 295-9306
☑ **System Controlled as of:** 01-Jan-2001 12:00 AM

Load or Campaign ID: _____

Charge No: _____

Execution

✓	**Name:** Rodney B Allen **Phone:** (208) 533-7577 **FAX:** (208) 533-7689 **E-Mail:** Rodney.Allen2@inl.gov

Limit check only.

✓	**Name:** Rodney B Allen **Phone:** (208) 533-7577 **FAX:** (208) 533-7689 **E-Mail:** Rodney.Allen2@inl.gov

RECEIVE SHIPMENT
I certify that this shipment meets the WAC of the receiving unit and that it has been received at that unit.

Status

Record Status
☑ **Active**
☐ **Pending**
☐ **Cancelled**

Record Status
☑ **Locked (user and date):** allenrb 31-Aug-2010
☐ **Unlocked**

Record Status
User: AllenRB
Date: 24-Aug-2010 08:05:04 AM

Containers

Barcode	Unit From	Approved Mat. Profile	Approved Container	Reject	Container	Common Name of Material
MFC100171	LLW_1610N	☑	☑	☐	33-FT3 DW	Cs-137 Sealed Sources to be disposed of at Nevada Test Site

Grid Locations

Barcode	Rej.	Previous Task ID	Previous Grid Location			New Grid Location		
			Grid X	Grid Y	Grid Z	Grid X	Grid Y	Grid Z
MFC100171	☐							

Container Count (excluding rejects): 1

NEL10067 Disposal
Cs137 Source, MFC100171

Nevada Test Site LLW Disposal

Information Only

Task Definition

Disposal Facility

NTS : NTS

National Security Technologies, LLC (NSTec)
U.S. DOE Nevada Test Site
U.S. DOE Nevada Test Site
Mercury, NV
Phone: (702) 295-9306
☑ **System Controlled as of:** 01-Jan-2001 12:00 AM

15-Sep-2010
09:30:00 AM
Disposal

Disposal Unit

NTS : NTS_DSPSL

National Security Technologies, LLC (NSTec)
U.S. DOE Nevada Test Site
Nevada Test Site LLW Disposal
Mercury, NV
Phone: (702) 295-9306
☑ **System Controlled as of:** 01-Jan-2001 12:00 AM

Load or Campaign ID: _____

Charge No: _____

DISPOSAL COMPLETE
I certify that this task has been completed as indicated and that all associated containers are properly characterized.

Execution

Name: Rodney B Allen
Phone: (208) 533-7577
FAX: (208) 533-7689
E-Mail: Rodney.Allen2@inl.gov

DISPOSAL COMPLETE
I certify that this task has been completed as indicated and that all associated containers are properly characterized.

Status

Record Status	Record Status		Record Status
☑ Active	☑ Locked (user and date):	allenrb 15-Sep-2010	User: AllenRB
☐ Pending	☐ Unlocked		Date: 15-Sep-2010 11:03:40 AM
☐ Cancelled			

Containers

Barcode	Unit From	Approved Mat. Profile	Approved Container	Reject	Container	Common Name of Material
MFC100171	NTS	☑	☑	☐	33-FT3 DW	Cs-137 Sealed Sources to be disposed of at Nevada Test Site

Grid Locations

Barcode	Rej.	Previous Task ID	Previous Grid Location			New Grid Location		
			Grid X	Grid Y	Grid Z	Grid X	Grid Y	Grid Z
MFC100171	☐	NEL10067						

Container Count (excluding rejects): 1