



Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF) Project Closure Report

September 23, 2021

**U.S. Department of Energy (DOE)
National Nuclear Security Administration (NNSA)
Savannah River Site
Aiken, South Carolina**

Revision Summary

Rev. No	Date	Summary of Change
A	9/23/2021	Initial Draft

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ACRONYMS

AEC	Area Emergency Coordinator
AMIS	Asset Management Information System
BCP	Baseline Change Proposal
CD-1	Critical Decision 1
CDC	Centers for Disease Control
CO	Contracting Officer
COR	Contracting Officer Representative
CR	Condition Reports
DAA	Declaration of Available Asset
DOE	Department of Energy
EPC	Engineering, Procurement, and Construction
EPCRA	Emergency Planning and Community Right-to-Know Act
EPFM	Engineering Plant & Facilities Management
ERTG	Emergency Response Training and Evaluation Group
ETC	Estimate to Completion
FEC	Facility Emergency Coordinator
FFA	Federal Facility Agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GSA	General Service Administration
HPI	Human Performance Improvement
IDRT	Infectious Disease Response Team
IPMS	Integrated Procedures Management System
ISMS	Integrated Safety Management System
ISSP	Information System Security Plan
IT	Information Technology

MOX MFFF Closure Report

LOE	Level of Effort
LSDD	Lost, Stolen, Damaged, or Destroyed
MCA	MOX Complex Area
MFFF	Mixed Oxide (MOX) Fuel Fabrication Facility
MOX-T	MOX Termination
MPQAP	MOX Project Quality Assurance Plan
MS	MOX Services
NCR	Nonconformance Reports
NPDES	National Pollutant Discharge Elimination System
NNSA	National Nuclear Security Administration
NRC	Nuclear Regulatory Commission
ODC	Other Direct Cost
ODS	Ozone Depleting Substances
OPC	Other Project Cost
OPMO	Organizational Property Management Officer
OSHA	Occupational Safety and Health Administration
PMO	Project Management Office
PSWG	Property Screening Work Group
PTC	Project Termination Closed
QA	Quality Assurance
QAIS	Quality Assurance Information System
RCRA	Resource Conservation and Recovery Act
RICE	Reciprocating Internal Combustion Engines
SCM	Supply Chain Management
SME	Subject Matter Expert
SPCC	Spill Prevention Control and Countermeasure

SRFO	Savannah River Field Office
SRID	Standards/Requirements Identification Document
SRNS	Savannah River Nuclear Solutions, LLC
SRPPF	Savannah River Plutonium Processing Facility
SRS	Savannah River Site
S&S	Safeguards and Security
SSC	Structures, Systems, and Components
TB	Technical Baseline
TEC	Total Estimated Cost
TCO	Terminating Contracting Officer
UCNI	Unclassified Controlled Nuclear Information

1.0 EXECUTIVE SUMMARY

The Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF) Project Closure Report was developed using a tailored approach incorporating appropriate elements identified in DOE G 413.3-16A, Project Completion/Closeout Guide. This report will address the key elements of: project records closeout; MOXNet Closure; Design Documentation; Safety Design Basis Documentation; Environmental Safety&Health; Quality Assurance; Safeguards, Security,& Emergency Services; Safety; Lessons Learned; Procurement; Surveillance & Maintenance of Facilities; and Physical Closeout. Other information deemed appropriate is included.

2.0 PROJECT BACKGROUND

On October 10, 2018, DOE NNSA Office of Acquisition and Project Management, Procuring Contracting Officer, Albuquerque, New Mexico issued to CB&I AREVA MOX Services, LLC (MS) a notice of termination for construction of the MOX MFFF. On October 11, 2018, the National Nuclear Security Administration (NNSA) Office of Acquisition and Project Management, Head of the Contracting Activity, Washington, DC delegated authority to administer MOX project termination activities to the Termination Contracting Officer (TCO). Included in this termination notice was a requirement for MS to prepare and submit within 30 days a detailed Termination Plan addressing the process of winding down construction operations and preserving the construction site and existing structures in a safe and secure manner. As a follow-on action, NNSA MOX PMO issued Savannah River Nuclear Solutions,

LLC (SRNS) Work Authorization No. DN 234 19 410003-00; MOX Fuel Fabrication Facility Project Termination and Transition Planning under the existing SRNS M&O contract. Further details on the activities to be performed by SRNS relating to this work authorization were provided by NNSA MOX PMO in an accompanying statement of work document, DNN Construction FY 2019 Implementation Plan (Statement of Work), Rev 0.0, dated 11/08/18.

On November 21, 2018 NNSA MOX Project Management Office (PMO) issued to SRNS correspondence NA-APM-19-0022, providing the Mox Services (MS) Termination Plan along with NNSA MOX PMO's comments on that plan. Using those two documents, SRNS developed the SRNS Transition Plan outlining the strategy for transition, acceptance, and turnover to SRNS management of MOX facilities, equipment, materials, documents and records, systems, and other transitioned Government property. Consistent with the requirements of NNSA MOX PMO's above referenced correspondence, SRNS' Transition plan was submitted to NNSA MOX PMO within 30 days of the date of receipt of the MS Termination Plan on December 21, 2018.

Additionally, SRNS was issued Revision 1.0 to the initial Rev 0 work authorization on January 23, 2019, updating the document to reflect an increase in funding and changes to the milestone table. Performing as the M&O contractor under these work authorizations, SRNS assessed inventories and documentation, and worked with NNSA MOX PMO to transition for disposition the following buildings, equipment, and materials:

- MFFF + 11 support facilities:
 - MFFF is approximately 500,000 square feet
 - 7 permanent facilities with a total of approximately 285,000 square feet
 - 4 temporary facilities with a total of approximately 128,000 square feet
 - Numerous construction support buildings: pipe shop; carpenter shop; welding shop; Conex boxes; etc.
- Equipment and Materials:
 - Overall procurement spending for the 11 years = \$2.3 billion
 - 40 acres (1,742,400 square feet) of lay down yards
 - 315,000 square feet of indoor storage
- Information – technical and business systems, including paper and electronic records and drawings

As identified in the SRNS MOX Transition Plan, there are three distinct activity phases for the complete MOX Transition effort: Development Phase, Implementation Phase and Operations and Disposition Phase. These phases include the following:

- The Development Phase comprises the development, preparation and submittal of SRNS' MOX Transition Plan. This phase began November 8, 2018 and concluded on January 6, 2019.
- The Implementation Phase comprises the activities performed by SRNS to evaluate and assume responsibility for transition, acceptance, and turnover to SRNS management of MOX facilities, equipment, materials, documents and records, systems and other transitioned Government property. It includes the activities identified in the Transition Work Packages for each functional area and NNSA MOX PMO decision making activities to determine end-state disposition paths for the MOX facilities, equipment, materials, documents and records, systems, and other transitioned Government property. Activities described in the Transition Work Packages (TWPs) were accomplished during the Implementation Phase. This phase began on January 7, 2019 and ended on March 31, 2019 following the turnover of MOX facilities, equipment, materials, documents and records, systems and other transitioned Government property, and demobilization of MS.
- Operations and Disposition Phase comprises the activities SRNS will take to: continue safe operations and maintenance of the MOX facilities and systems, and manage received inventories of equipment, materials, documents and records, and other transitioned Government property consistent with NNSA MOX PMO's decision making strategies. This phase began on April 1, 2019 and continues until September 30, 2021.

The SRNS MOX Transition Implementation Phase Final Report recorded the activities SRNS performed during the Implementation Phase consistent with its Transition Plan and individual Functional Area Transition Work Packages. It also includes SRNS' follow-on plan to address and more fully define the Transition Operations and Disposition Phase activities following demobilization of MS on March 28, 2019, and transition turnover on March 29, 2019.

SRNS established a dedicated project team to manage the efforts for transition, acceptance, and turnover of MOX facilities, equipment, materials, documents, and records, and other transitioned property. During the Plan Development and Implementation Phases of the MOX Transition (November 2018 through March 2019), this SRNS team of management, staff and functional area subject matter experts (SMEs): performed initial reviews/assessments of the MS-provided documentation and inventories; performed due diligence through walkdowns, lines of inquiry and reviews with MS managers and SMEs; and developed and implemented plans to assume responsibility, care, custody, and control for the MOX facilities, equipment, materials, documents and records, systems, and other transitioned Government property.

From the initial work authorization, SRNS has continued to receive clarification on the scope, funding, and milestones through updates and a new FY21 Work Authorization (DN 234 21 410003-00) on September 30, 2020. There have been few changes to the scope over that period. All scope changes have been captured through change control along with the associated changes in budget. The Baseline Change Proposal (BCP) Log can be found in Table 2-1. All changes to milestones have been captured in the schedule.

Table 2-1: Baseline Change Proposal (BCP)

BCP #	Date Initiated	Title	OPC PMB Change	OPC MR Change	Contractor Project PMB	Contractor Project MR	PB TPC	Approval Date	Status
CR19M0047	1/23/2019	MOX Transition - Implementation Phase	\$11,180,276	\$0	\$11,180,276	\$0	\$11,180,276	1/23/2019	Approved
CR19M0111	3/21/2019	MOX-T Surveillance and Disposition Phase	\$177,654,768	\$0	\$188,835,044	\$0	\$188,835,044	3/27/2019	Approved
CR19M0142	5/28/2019	Change to the MOX T Baseline due to NNSA Comments	\$16,419,342	\$0	\$205,254,386	\$0	\$205,254,386	5/30/2019	Approved
CR19M0172	7/10/2019	MOX-T Equipment Reuse DeScope/IT Add	(\$2,146,067)	\$0	\$203,108,319	\$0	\$203,108,319	7/18/2019	Approved
CR20M33	11/6/2019	FY20 Sch Exec & FY20 SOH Outyear Rates & Legacy Calc	(\$16,272,386)	\$0	\$186,835,933	\$0	\$186,835,933	11/8/2019	Approved
CR20M46	11/21/2019	Alignment of the Budget for Maintaining MOXnet	(\$21,814,429)	\$0	\$165,021,504	\$0	\$165,021,504	12/2/2019	Approved
CR20M0072	1/6/2020	Removal of the Remaining Scope in the MFFF BASEline CA	(\$13,234,312)	\$0	\$151,787,192	\$0	\$151,787,192	1/22/2020	Approved
CR20M0171	6/30/2020	Update the Material Disposition Baseline Schedule	\$0	\$0	\$151,787,192	\$0	\$151,787,192	6/30/2020	Approved
CR21M0037	10/27/2020	MOX - Incorporation of FY21 Execution Rates	(\$4,591,202)		\$147,195,990	\$0	\$147,195,990	11/10/2020	Approved
		TOTAL	\$147,195,990	\$0	\$147,195,990	\$0	\$147,195,990		

3.0 M&O S/RID NON-COMPLIANCE

The NNSA directed SRNS to support their efforts to close out the MOX project through the transfer of certain MOX property, systems, facilities, and activities (the MOX Project assets) to SRNS. SRNS submitted letter SRNS-F2000-2019-00074 to NNSA requesting relief of specified contract requirements to receive the MOX Project Assets. NNSA granted SRNS contractual relief until April 15, 2019 via letter NA-APM-19-0094. After discussions with NNSA and receiving letter NA-APM-19-0094 SRNS provided supplemental information and developed Compliance Actions and Milestone Completion Dates. This information was transmitted to NNSA on April 8, 2019 via letter SRNS-F2000-2019-00091 and requested contractual relief until the milestone completion date. NNSA concurred with SRNS request in letter NA-APM-19-0100.

Table 3-1: Compliance Actions and Milestone Completion Dates

Milestone #	Milestone Action	Milestone Due Date	Completion Date
PROJECT MANAGEMENT			
PM-1	Develop an implementation schedule and associated performance metrics, as appropriate	30-Apr-19	15-Apr-19
ESH&Q/WM			
ESH-1	Complete the required postings in visible locations to the workforce pursuant to 10 CFR 851	01-Jul-19	30-May-19
ESH-2	Replace all barricades not meeting the requirements of SRNS 8Q-9 with compliant protective barricade materials and signs	1-Jul-19	30-May-19
ESH-3	Inspect all portable trailers (i.e. light plants, welders, pumps, etc.) and install wheel chocks per 8Q-16	01-Jul-19	27-Jun-19
ESH-4	Issue direction via standing order and brief MOX area staff to restrict use of scaffolds until the required inspections are completed per SRNS OSR 12-16 and OSR 20-228	08-Apr-19	08-Apr-19
ESH-5	Inspect all scaffolds and properly tag in accordance with 8 Q-16	01-Jun-19	30-May-19
ESH-6	Inspect all ladders and tag out/discard ladders not meeting requirements of 8Q-16. Tag: Danger Unsafe Condition Do Not Use	01-Jun-19	30-May-19
ESH-7	Validate inventory of confined spaces and transition listing to SRNS accessible database. Complete OSR 20-169 evaluation on each confined space and install postings consistent with 8Q-33	01-Oct-19	1-Oct-19
ESH-8	Complete Arc Flash calculations and post required labels on panels and battery banks consistent with NFPA-70E and 18Q-2	01-Apr-20	31-Mar-20
ESH-9	Establish the required PMs for Electrical Equipment per 18Q-2	01-Apr-20	31-Mar-20
ESH-10	Replace all Pressure Relief Valves on area water heaters, register the replacement valves and establish PMs for required inspection/replacement schedule per ASME Boiler Pressure Vessel Code and 10CFR 851	01-Apr-20	31-Mar-20
ESH-11	Relocate flammable non-compliantly stored liquids/gases in accordance with NFPA-241 and 10 CFR 851	01-Oct-19	30-Sep-19
ESH-12	Complete engineering evaluation of separation distances on temporary structures consistent with NFPA-241 and 10 CFR 851 and propose corrective actions to NNSA	01-Aug-19	22-Jul-19
ESH-13	Implement corrective actions consistent with the approved engineering options analysis addressing separation distances between temporary structures	15-Apr-21	8-Apr-21

Milestone #	Milestone Action	Milestone Due Date	Completion Date
ESH-14	Complete walkdown and engineering evaluation of GFCI protections on MFFF and other temporary structures. Complete installation of required GFCI to become code compliant	01-Jun-20	26-Dec-19
ENGINEERING			
ENG-1	Maintain out of service condition for piping system components in various utility systems until future use determined and compliance with ASME B31.3 table 326.1 is established (included in STAR, as 2019-CTS-003307)	Permanent until Future Project Resolution	TBD*
ENG-2	Maintain facility status as turned over with conditions as noted in MS-provided deviation log. Inform the future project team of the deviation log for review and evaluation as part of SRPPF design development (included in STAR, as 2019-CTS-003307)	Permanent until Future Project Resolution	TBD*
ENG-3	Maintain MFFF as construction site per 29 CFR 1926 until future use is established and compliance with DOE 420.1C for Occupied Facilities is established	Permanent until Future Project Resolution	TBD*
PROPERTY MANAGEMENT			
PR-1	Perform 100 % High Risk Property Screening prior to disposition.	31-Aug-20	15-Aug-19
PR-2	Establish interim control process to utilize MS provided paper copies of Chemical Safety Data Sheets (SDS) to authorize use of chemicals in work process.	15-Apr-19	28-Mar-19
PR-3	Establish accountability in the SRNS Property System for MS identified Sensitive, High Risk and Accountable Property	15-Jul-19	15-Jul-19
PR-4	Establish accountability for Sensitive, High Risk, and Accountable Property in accordance with SRNS requirements within fourteen (14) working days from discovery of property (newly identified following 07/15/19 from item 3 above)	As Discovered	16-Sep-19
PR-5	Establish plan outlining methodology for asset valuation that aligns with abandoned design of MOX facility	30-Sep-21	30-Sep-20
PR-6	Import SDS Images in the SRNS CHEMS system and establish chemical container inventory in accordance Manual 13B	30-Jun-19	26-Jun-19
PR-7	Establish Contract Termination Personal Property Inventory Methodology and Schedule in accordance with NNSA direction	31-May-19	30-May-19
PR-8	Perform Personal Property Inventory in accordance with NNSA direction	30-Sep-21	17-Sep-21
PR-9	Continue to maintain the Personal Property Inventory in its current configuration until the inventory is finally dispositioned.	Upon Final Disposition	24-Sep-21

Milestone #	Milestone Action	Milestone Due Date	Completion Date
PROCUREMENT AND CONTRACTS			
PC-1	For assigned subcontracts, document non-conformance to SRNS Approved Purchasing Process in each procurement file and include notes to the file.	30-Sep-19	24-Apr-19
PC-2	Incorporate existing general provisions into subcontracts - He3 storage and Security.	30-Sep-19	24-Apr-19
EMERGENCY PREPAREDNESS PROGRAM			
EP-1	Develop and implement an annex to SCD-7 covering all requirements specific to the MOX Complex Area.	30-Sep-19	30-Sep-19
EP-2	Identify and develop EP performance indicators for the MOX facility.	30-Sep-19	11-Jul-19
EP-3	Incorporate facility information into the ERAP and submit to the DOE field element by 11/30.	30-Nov-19	22-Nov-19
EP-4	Perform an All-Hazards Survey to describe the applicable potential health, safety, or environmental impacts in accordance with SCD-7, Section 1. NOTE: Results from the All-Hazards Survey will determine implementation actions necessary in Phase II.	30-Sep-19	16-Sep-19
EP-5	Revise the Implementation Plan to incorporate all actions required in Phase II as a result of the All-Hazards Survey	30-Apr-20	29-Apr-20
INFORMATION TECHNOLOGY			
IT-1	Complete migration of data files from MOXnet identified during the due diligence process associated with MOX transition as being required to support ongoing SRNS transition activities to Compliant SRNS Platforms	08-Aug-20	29-Jul-20
IT-2	Complete Migration of any additional data from MOXnet required to support SRNS activities	30-Sep-20	30-Sep-20

Milestone #	Milestone Action	Milestone Due Date	Completion Date
IT-3	<p>Maintain MOXnet in its present configuration to support MOX project close out and other related NNSA activities. Please note that this configuration does not conform to SRNS prime contract requirements for which we request permanent relief for items as noted below:</p> <ul style="list-style-type: none"> -DOE O 205.1B -NNSA SD 205.1 -DOE O 200.1A -DOE O 206.2, and HSPD-12 -NNSA PEMP/PEG -from 10Q/12B/12B1 in regards to MOXnet where they conflict with MOXnet procedures until such MOXnet procedures are converted. -for POAM-schedule relief for AssetSuite upgrade as long as MOX Services is using that application. -from changes to MOXnet that would have normally been required to remain on vendor supported software. -maintain Asset Suite and Documentum at current versions as long as those applications are needed for contract termination activities or data is under litigation hold, whichever is longer, regardless of vendor support. 	30-Jun-22	On Schedule
RECORDS MANAGEMENT			
RM-1	Complete duplication and transfer of records required to support SRNS areas of assigned scope from MOXnet to SRNS system maintaining current configuration of the records	TBD**	TBD
RM-2	Complete the proper markings of records transferred to SRNS system on an as needed basis consistent with the required need/ use of the discrete document	TBD**	TBD
RM-3	<p>Maintain the current configuration of records until otherwise directed by NNSA or until the records are transferred into compliant storage. Please note the current configuration of records are not in compliance with the following SRNS prime contract requirements for which we request permanent relief for items as noted below:</p> <ul style="list-style-type: none"> • DOE O 243.1b Vital Records • DOE EM Mandate Off Site Electronic Backup • DOE O 243.1b Markings – for those records remaining within the MOX Documentum and for all boxed documents 	TBD**	TBD
RM-4	DOE O 243.1b Records Retention – Relief until NNSA concurrence/direction on Authority ADM17.30.c.03- "Destroy 10 years after project termination" – or Litigation Hold lifted, whichever is later for paper and electronic	TBD**	TBD

Milestone #	Milestone Action	Milestone Due Date	Completion Date
RM-5	DOE O 243.1b NARA Compliant Indexing and Storage Relief until 8000 boxes shipped offsite (Indexing accomplished by 3rd party Storage)	TBD**	TBD

* Engineering: Informed NNSA via CO letter that SRPPF will evaluate milestones and determine if they are still applicable.

** Records Management: TBD pending resolution of the transition Stay/Protection order and associated contract direction with no dates.

4.0 COSTS

A summary of the cost baseline for the MOX project is provided in the table below:

Table 4.1: COSTS SUMMARY

Organization	OPC (\$K)	TEC (\$K)	Total (\$K)
NNSA ODCs	17,575*	0	17,575
MOX Services (Construction)	0	5,098,600	5,098,600
SRNS (MOX Termination)	107,453*	0	107,453
Total	125,028	5,098,600	5,223,628

* Actuals through July 2021. ETC is (\$K) 10,350 to complete current scope.

5.0 CLOSEOUT REPORT

5.1 RECORDS CLOSEOUT

SRNS submitted a letter (SRNS-P0000-2020-00047) to NNSA per their request in May 2020; this letter contained two options for MOX record disposition. Assumptions were listed that would need to be addressed before SRNS could manage these records. To date, and from SRNS understanding, litigation holds are still in place and we have not been given direction on a path forward. Once a letter of direction is received, SRNS will need exemptions as described in the submitted disposition plan.

5.2 MOX INFORMATION TECHNOLOGY

On June 20, 2019, SRNS assumed full control of MOXnet as directed by Email, Lance P. Nyman to Maria Gauthier-Love, *Work Authorization DN 234 19 41003-01 – MOXnet2*. In addition, administrative access privileges were transitioned to SRNS Information Technology (IT) personnel and a mirrored Gold Copy of the contents of MOXnet, as of June 20th, was established and placed under two party lock and key control. Consistent with NA-APM-19-0100, SRNS continues to operate MOXnet within transitioned configuration and within the limits of the contractual requirements' waiver granted by NNSA on April 11, 2019. Substantial changes to the existing configuration of MOXnet are discussed with NNSA prior to implementation to ensure maintenance from a cyber security and operational perspective. The operational support of MOXnet has continued as directed by the NNSA PMO and NNSA Savannah River Field Office (SRFO) to stay in compliance with Cyber Security requirements.

SRNS worked with MS and NNSA to complete the transfer of 76 active subcontracts to support MOXnet vendor license and system maintenance agreements. SRNS accepted the assignment of all IT subcontracts and purchase orders relating to MOXnet and the specific list of subcontracts accepted by SRNS was submitted to NNSA for concurrence prior to finalizing subcontract assignment. Subcontracts continue to be managed and reviewed annually with the NNSA PMO, resulting in cancellations or license count reductions.

5.2.1 Data Copies from MOXnet to SRSnet

The SRPPF Project required certain information about the Mixed Oxide Fuel Fabrication Facility (MFFF) to proceed with conceptual design efforts in support of Critical Decision-1 (CD-1). Because the Project must utilize SRSnet in accordance with Project requirement R.00.G, which states "SRPPF will operate in conjunction with the existing Savannah River Site (SRS) facilities and infrastructure in an integrated configuration to support pit production capabilities for the Nuclear Security Enterprise," data was migrated from MOXnet to the SRSnet system. Data migration scope was captured in the milestones below:

Table 5.2.1-1: IT Milestones 1 & 2

Milestone	Milestone Action	Status	Completion Date
IT Milestone 1	Complete migration of data files from MOXnet identified during the due diligence process associated with MOX transition as being required to support ongoing SRNS transition activities to SRSnet.	Complete	7/29/2020
IT Milestone 2	Complete migration of any additional data from MOXnet required to support SRNS activities including engineering related data extracts from MOXnet Information Systems to SRSnet.	Complete	9/30/2020

SRNS revalidated NNSA formal direction concerning any legal/litigation hold requirements or special access protocols to any information located on MOXnet, including the preservation, and accessing of the Gold Copy. As SRNS completed activities associated with the data migration from the MOXnet Information Systems, the objective was to reduce the MOXnet legacy footprint by the end of Fiscal Year 2020 (FY20). Upon completion of IT Milestones IT-1 and IT-2, SRNS resolved any residual dependencies on the legacy MOXnet Information Systems to satisfy NNSA request as of July 29, 2020.

Figure 5.2.1-1: SRPPF Design Reference System (SRSNet)

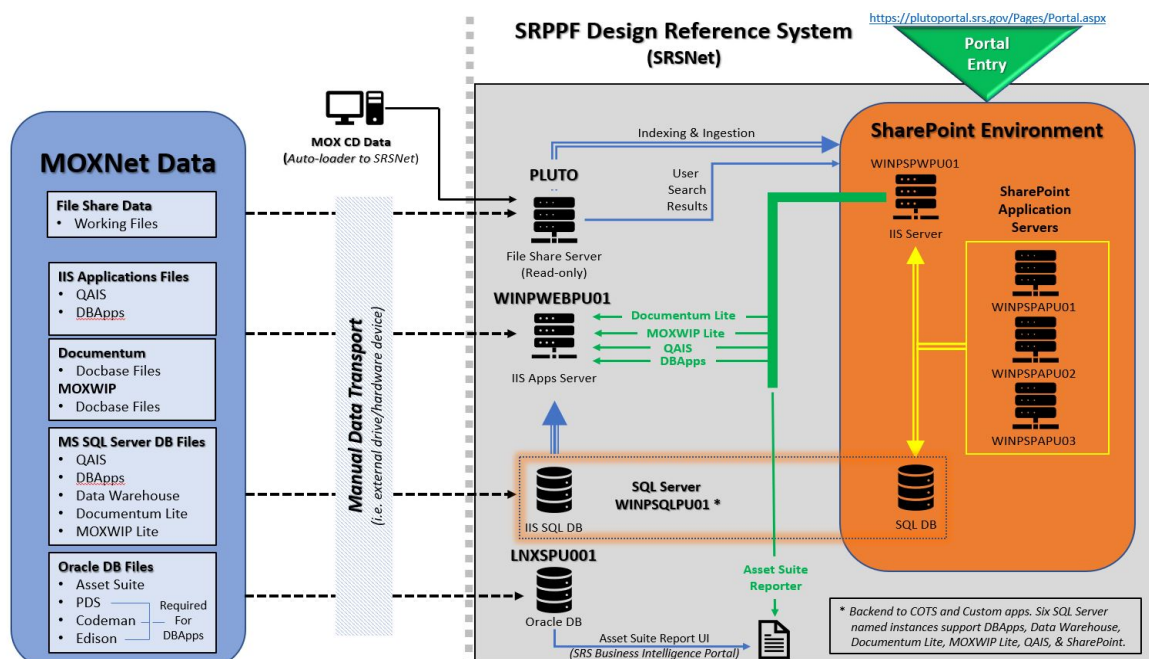


Table 5.2.1-2: Data transferred from MOXnet to SRSnet

Data	Description	Status	Completion Date
All Engineering Working Files (~30TBs)	All working files from the MOXnet File Servers as it applies to the MFFF facility	Complete	29-Jul-20
Complete Working Files QA	Validate ~30 TBs of data to assure all copies are complete.	Complete	30-Sept-20
All PDS Engineering Drawing Files	All MicroStation CAD Files from the PDS Server on the MOXnet	Complete	30-Oct-19
Asset Suite Data Repository (COTS export to custom Interface)	Complete migration of the backend Asset Suite Database. Migration to include predefined Crystal Reports that will be migrated to the OBIEE syntax for reporting purposes. Including: - PDS Database - Edison Database - CodeMan Database	Complete	29-Jul-20
Custom Front-End for Documentum Extracts	User Interface and Relationship Documents for Documentum Cabinets	Complete	29-Jul-20
Data Warehouse (Custom App)	Backend data extraction repository from various MOXnet Information Systems leveraged by MOXnet Construction Engineering team for status reporting	Complete	23-Apr-20

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Revision A
September 23, 2021

DBApps (Custom App)	Data reporting application developed by former MOXnet Construction Engineering team for tracking work packages and project status	Complete	23-Jul-20
Documentum Extract (COTS export with custom Interface)	Complete cabinet export of engineering identified records (Provide Cabinet List) <i>Engineering – MFFF</i> <i>Procurement</i> <i>Quality Assurance</i> <i>Termination</i> <i>Vendor</i> <i>Construction</i> <i>Procedures</i> <i>Site Development & Infrastructure</i>	Complete	29-Jul-20
Documentum Working in Progress (WIP) Extract (COTS export with custom Interface)	Complete cabinet export of engineering identified WIP data (Provide Cabinet List) <i>Assembly and Test Group</i> <i>Construction</i> <i>Construction Testing & Turnover</i> <i>Contracts</i> <i>Engineering</i> <i>Mechanical Engineering</i> <i>Procurement</i> <i>Quality Assurance</i>	Complete	29-Jul-20
Engineering CDs (3425)	Engineering calculation native files that were too large to put into Documentum.	Complete	27-Feb-20
Master Equipment List (MEL)	MEL is a tool developed by MOX IT to provide a summary listing of physical equipment and components included in the MOX Fuel Fabrication Facility.	Complete	25-Jun-20
MOXnet Mroom	MOXnet SharePoint Document Libraries	Complete	28-Sept-20
QAIS (Custom App)	Quality Assurance / Conformance Compliance tracking database	Complete	30-Apr-20
SRNS Transition Team Dropbox	Collaboration data developed by the SRNS Transition Team and being utilized during the MOX Termination work activities.	Complete	29-Jul-20
Teamcenter Data	Teamcenter is a PLM Suite developed by Siemens. Provides revision control, change management, user controls, etc. to manage cad data and related documents.	Complete	21-May-20

5.2.2 MOXnet Footprint Reduction Activities

The MOXnet footprint was significantly reduced. The successful copy of the MOXnet data desired by the SRPPF engineering teams was tracked in MOX Termination Operations and Material Disposition schedule (tasks IS-142 – IS-146) resulted in a dramatic MOXnet user reduction (~119) in July 2020, at which point SRNS no longer required access to the MOXnet and continued ongoing data access requirements from the SRSnet. The current end user status in support of DOJ / Litigation activities is enumerated below:

- Four ORANO End Users
- Two NNSA PMO End Users
- IT / Cyber support as required to maintain network

In addition, the network access to the MOXnet has been reduced to one network connection in 706-5F for NNSA and a limited number of connections within 706-4F for SRNS IT / Cyber support activities. Remote internet access remains available to MOXnet via Citrix services to accommodate the ORANO access as part of DOJ and litigation settlement activities.

5.2.3 MOXnet Operation and Decommission in FY22

Operation and Decommission of the MOXnet in FY22 is accomplished by the Milestones listed below. These Milestones were developed as a result of the NNSA recently communicated direction to SRNS via CO letter NA-APM-21-0012 to maintain MOXnet in an operational status until 6/30/2022 and to complete the decommission and disposition of the MOXnet by 9/30/2022.

Table 5.2.3-1: MOXnet Milestones for FY22

Milestones	Duration	Start	Finish
Develop Plan for Secure Destruction Process of MOXnet Sensitive Equipment	110 days	Mon 8/2/21	Fri 12/31/21
Execute Ongoing MOXnet Data Transfers as Directed by NNSA for DOJ and Litigation Request	326 days	Thu 4/1/21	Thu 6/30/22
Sanitization / Disposition of MOX Property	369 days	Mon 5/3/21	Thu 9/29/22
MOXnet Subcontracts Cancellation	105 days	Mon 5/2/22	Fri 9/23/22
MOXnet System Shutdown	4 days	Mon 6/27/22	Thu 6/30/22
MOXnet Systems Decommissioning	62 days	Wed 7/6/22	Thu 9/29/22
MOXnet Closure	18 days	Tue 9/6/22	Thu 9/29/22
MOXNet Final Closeout of Security Plan with AO	18 days	Tue 9/6/22	Thu 9/29/22

5.2.4 MOXnet Operations and Cyber Support Resources

Support of the MOXnet is accomplished by 7 Full Time Equivalents (FTEs) in Level of Effort (LOE). Most of the support is provided by partial time of IT personnel with specific skillsets to accomplish the overall operational and cyber security posture of the MOXnet in compliance with the MOXnet Information System Security Plan (ISSP) approved by the NNSA-SRFO Authorizing Official.

5.2.5 Active Hardware / Software Subcontracts

The following table below reflects the baseline recognized hardware / software subcontracts as it would apply to FY22. As with last year, the renewals would be executed as part maintaining the operational status of the MOXnet in the event the network were to remain online in FY22 to support ongoing litigation activities.

Table 5.2.5-1: FY22 Subcontract Renewal Forecast

Product	Vendor	Category	Next Start of POP After Current Award	Start Procurement Process	Unburdened Costs Based on FY2021
Dell Server Extended Maintenance and Support	CAROLINA COMPUTERS	Operational Support	7/1/2021	4/2/2021	\$7,228.72
IBM AIX 720 Maint & Support	IBM CORPORATION	Information Systems	7/14/2021	4/15/2021	\$1,927.44
Dell Compellent & Shelves with maint/support	CAROLINA COMPUTERS	Operational Support	8/31/2021	6/2/2021	\$94,036.36
EMC DCTM & Foundation Seats Renewal	OPEN TEXT INC	Information Systems	9/1/2021	6/3/2021	\$22,644.40
McAfee EPO Annual Maint & Support Renewal	IRON BOW TECHNOLOGIES	Desktop	9/30/2021	7/2/2021	\$4,330.50
Microsoft Enterprise Premier Support Account Mgmt & US National Problem Resolution support	ALVAREZ LLC	Operational Support	10/1/2021	7/3/2021	\$44,411.00
DATADVANTAGE (Varonis) FOR WINDOWS PERPETUAL LICENSE FOR 1300 USERS	THUNDERCAT TECHNOLOGY LLC	Cyber Centric	10/1/2021	7/3/2021	\$6,599.00
Asset Suites/Passport Maint Renewal	ABB	Information Systems	10/1/2021	7/3/2021	\$223,820.76
PolicyPAK Subscription	PolicyPAK, Inc	Cyber Centric	10/20/2021	7/22/2021	\$875.00
EMC Data Domain System incl HW, SW and maintenance support	TVAR SOLUTIONS	Infrastructure	11/18/2021	8/20/2021	\$136,000.38
1GB Ethernet Services for MOX Aiken SC Site.	SAGRA (Formerly Spirit Communications)	Infrastructure	12/4/2021	9/5/2021	\$22,200.00
SQL Navigator Base Ed. Annual maint & support	Lyme Computer Systems Inc	Operational Support	12/30/2021	10/1/2021	\$288.00
CISCO SYSTEMS, INC ESA INBOUND ESSENTIALS SW BUNDLE (AS, AV, OF) LICENSE. POP: 31DEC18 - 30DEC19.	EN NET SERVICES LLC	Infrastructure	12/30/2021	10/1/2021	\$1,866.00

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TENABLE SECURITYCENTER – SUBSCRIPTION	FORCE3	Cyber Centric	12/30/2021	10/1/2021	\$36,305.47
CISCO Smartnet, Firesight SOURCEFIRE & FirePower Maint Renewal for MOXNET	ID Technologies, LLC	Infrastructure	12/31/2021	10/2/2021	\$147,458.59
IBM XL C/C++ for AIX SW	SIRIUS COMPUTER SOLUTIONS INC	Information Systems	1/31/2022	11/2/2021	\$1,006.00
QUANTUM SCALAR I500 14U LIBRARY, NO DRIVES; SUPPORT PLAN, GOLD (7X24X4 CRU); ANNUAL RENEWAL.	Sterling Computers	Operational Support	2/1/2022	11/3/2021	\$24,950.19
VMWare, VCenter & vSphere US Federal Subscriptions	Sterling Computers	Infrastructure	2/12/2022	11/14/2021	\$36,790.44
LogBinder for SharePoint (mRoom)	Monterey Technology Group, Inc	Cyber Centric	3/8/2022	12/8/2021	\$5,187.00
IBM AIX 740 Maint & Support	Ideal System Solutions, Inc.	Information Systems	3/30/2022	12/30/2021	\$2,508.28
RSA Replacement FOBs/Tokens	Sterling Computers	Infrastructure	3/31/2022	12/31/2021	\$7,933.46
RSA SecurID Software Maintenance Renewal	Sterling Computers	Infrastructure	4/1/2022	1/1/2022	\$3,350.00
Microsoft Enterprise Agreement Renewal. FY20. Yr. 3	Regan Tech	Operational Support	4/30/2022	1/30/2022	\$110,726.18
LUMENSION DEVICE CONTROL ENTERPRISE MAINT RENEWAL.	Iron Bow TECHNOLOGIES	Cyber Centric	5/1/2022	1/31/2022	\$346.85
CITRIX XENAPP (Presentation Server) Enterprise Subscription	Citrix Systems, Inc.	Infrastructure	5/3/2022	2/2/2022	\$9,010.00
SUPPORT CENTRAL MANAGEMENT 4400 GOVT-1YR- US FIREEYE RENEWAL. PART#: RN-4400CM-GOV-1Y-US. SN: FM1416CA03L	EMPOWER SOLUTIONS LLC	Cyber Centric	5/22/2022	2/21/2022	\$69,470.50
Quest Security Explorer	DLT SOLUTIONS LLC DBA DLT SOLUTIONS	Cyber Centric	5/30/2022	3/1/2022	\$201.34
Oracle Database WebLogic Renewal	Lancer Information Solutions	Information Systems	5/31/2022	3/2/2022	\$178,374.07
F5 Big-IP Load Balancers & Switches Annual maint/support	ID Technologies, LLC	Infrastructure	6/3/2022	3/5/2022	\$39,892.98
Forcepoint/Websense Security Gateway Subscription (NOT APPLIANCES)	Assurance Data Inc	Cyber Centric	6/28/2022	3/30/2022	\$23,125.00
TOAD for Oracle Annual Renewal	DLT SOLUTIONS LLC DBA DLT SOLUTIONS	Operational Support	6/30/2022	4/1/2022	\$1,453.76
MS Microsoft Win Svr 2008 Ext Security updates	Regan Technologies	Cyber Centric	7/1/2022	4/2/2022	\$32,718.59
ForcePoint Appliances - maintenance, support and professional services	Assurance Data Inc	Cyber Centric	12/31/2022	10/2/2022	\$18,800.00
Domain Name Renewals for DCSMOX.com & MOXProject.com	GoDaddy.com	Cyber Centric	8/27/2030	5/29/2030	\$760.00

Total Unburdened Estimated: \$1,316,596.26

5.3 DESIGN DOCUMENTATION

Design documentation generated during the MOX Project has been stored and configuration controlled to support the continued operations and occupancy of MOX Complex Area (MCA). The design documents are necessary to maintaining Structures, Systems, and Components SSC(s) and for future operations within the MCA facilities.

5.3.1 Design Documentation Transfer and Storage

During the MOX-Termination project, Engineering used the existing MS Documentum data management system to identify, compile and transfer documentation that could be used in the future to SRNS document management systems (e.g. PLUTO, EPFM). The design and engineering documents include drawings, specifications, amendments, and calculations for the MCA facilities. Several documents generated during the life of the MOX project were originally retained only in hardcopy form but were uploaded electronically to ensure all documentation was retrievable. In addition, relevant design document amendments were compiled for potential use in the future (e.g., structural qualification and drawing a-builts).

The documents included the structures and utilities listed below.

Structures including:

- 226-F
- 226-2F
- 706-1F
- 706-2F
- 706-3F
- 706-4F
- 706-5F
- 706-6F
- 706-7F
- 706-8F
- 731-2F
- 211-44F

Yard Utilities/Civil including:

- Roadway, Parking and Grading Plan
- Fire Protection and Detection
- Domestic Water
- Storm Water
- Sanitary Sewer
- Plant Water
- Grounding
- Transfer Lines (incomplete)
- Temporary Construction Power
- Duct Bank and Vaults
- Communication Cable

5.3.2 Current and Future State

As the MOX-Termination project has progressed, SRNS engineering determined that some documents would be required to establish the Technical Baseline (TB) for the SRPPF project.

Building 226-F and Supporting Facilities Technical Baseline Reconstruction Plan (C-RPT-F-00025) documents the process used to execute a Technical Baseline Reconstruction of existing SSC identified for potential use by the SRPPF project in accordance with Manual E7, Procedure 1.05. Former MOX documents updated or verified during the TB reconstruction will be stored and controlled in the SRNS document and data management systems.

The transfer of design documents for the Non 226-F facilities to the SRS data management system Engineering Plant & Facilities Management (EPFM) has already been executed and is documented via The Non 226-F facilities Technical Baseline Report (C-RPT-F-00047). Engineering extracted all pertinent information (e.g. Vendor Print Files, Calculations, Analyses) and transferred the information into EPFM.

Former MOX engineering documents placed into the SRNS document control system assigned a unique SRNS document number, but also maintained the MOX document number for future reference.

All design documentation is currently accessible by personnel and available for continuing operations for the MOX-Termination project via SRSnet and EPFM.

5.4 SAFETY DESIGN BASIS DOCUMENTATION

The MOX project's safety basis was developed under Nuclear Regulatory Commission (NRC) regulations and guidelines that are not applicable to Department Of Energy (DOE) NNSA facilities. The SRPPF has a separate hazard analysis and safety design strategy with supporting documents that was approved by NNSA at Critical Decision -1 (CD-1). As such, the MOX project safety documents are of no use to the SRPPF project.

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The tables below contain the MOX Project safety basis documentation found in the Documentum database.

Table 5.4-1: Accident Analysis and Hazards Results

Name	Title	Version	Revision	Date
ASI DS CAL R 10976-A ANSYS-7.1	Container Thermal Mechanical Analysis for Fire Hazards Reusable Cans	1	A	12/20/2005
DCS01 AAS DS ANS H 38326	Process Hazards Analysis of the MOX Fuel Fabrication Facility Receiving Workshop	3	1	4/12/2007
DCS01 AAS DS ANS H 38328	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Pellet Workshop	6	4	1/10/2018
DCS01 AAS DS ANS H 38329	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Powder Workshop	6	3	7/17/2018
DCS01 AAS DS ANS H 38337	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Rod Workshop	4	2	8/10/2008
DCS01 AAS DS ANS H 38340	Process Hazards Analysis of The MOX Fuel Fabrication Facility Assembly Workshop	4.1	2	1/10/2018
DCS01 AAS DS ANS H 38346	Process Hazards Analysis of The MOX Fuel Fabrication Facility Waste Workshop	3.1	1	2/20/2008
DCS01 AAS DS ANS H 38355	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Pneumatic Transfer System	3	1	6/23/2008
DCS01 AAS DS ANS H 38356	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Aqueous Polishing Powder Units	5	3	2/26/2018
DCS01 AAS DS ANS H 38358	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Aqueous Polishing Glovebox Units	3	1	2/26/2008
DCS01 AAS DS ANS H 38361	Process Hazards Analysis of the MOX Fuel Fabrication Facility HVAC Workshop	5	3	5/14/2014
DCS01 AAS DS ANS H 38393	Nuclear Safety Evaluation of Natural Phenomena Hazards and External Man Made Hazards	9	7	7/2/2018
DCS01 AAS DS ANS H 38396	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Laboratory	4	2	9/13/2010
DCS01 AAS DS ANS H 38419	Process hazards Analysis of Mox Fuel Fabrication Facility External Glovebox Dedusting Loops	1	0	3/12/2007
DCS01 AAS DS ANS H 38422	Process Hazards Analysis of MOX Fuel Fabrication Facility Double Door Docking System	2	1	4/26/2012
DCS01 AAS DS ANS H 38540	Process Hazards Analysis of the MOX Fuel Fabrication Facility - Direct Metal Oxide Process Unit	1	0	8/29/2012

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DCS01 AAS DS ANS H 38609	Preliminary Hazards Analysis - Direct Metal Oxidation MOX Fuel Fabrication Facility	1.1	0	8/2/2013
DCS01 ASI DS ANS R 10400	Preliminary Fire Hazards Analysis for the Mixed Oxide Fuel Fabrication Facility.	1.1	A	7/18/2006
DCS01 ASI DS ANS R 10408	Fire Hazards Analysis for the Mixed Oxide Fuel Fabrication Facility	12	7	9/6/2017
DCS01 KDJ DS ANS H 35640	Evaluation of the Chemical Hazards Associated with Impurities in the PuO2 Feedstocks - KDB.KDD Units	3	2	11/5/2012
DCS01 KPA DS ANS H 38397	Hazard and Operability Analysis HazOp of the Purification Unit KPA	2	B	2/8/2007
DCS01 KPC DS ANS H 38347	Hazard and Operability Analysis HazOp of the Acid Recovery Unit KPC	4	2	6/30/2016
DCS01 KWG DS ANS H 38354	Hazard and Operability Analysis (HazOp) of the Off Gas Treatment Unit (KWG)	5	3	9/27/2013
DCS01 RRJ DS ANS H 38305	Natural Phenomena Hazard List	2	0	5/3/2012
DCS01 RRJ DS ANS H 38307	External Man Made Hazards Screening	5	1	10/22/2013
DCS01 RRJ DS ANS H 38310	Dose Consequences for Potential Radioactive Releases from Hazard Events	5.1	E	3/25/2010
DCS01 RRJ DS ANS H 38324	Hazard and Operability Analysis HazOp Of The Dechlorination Dissolution Unit KDD	2	B	8/15/2006
DCS01 RRJ DS ANS H 38332	Environmental Consequences for Potential Radioactive Releases from Hazard Events	4.1	D	8/5/2010
DCS01 RRJ DS ANS H 38335	Hazard Operability Analysis(HAZOP) of the Dissolution Unit KDB	2	B	8/15/2006
DCS01 RRJ DS ANS H 38336	Hazard and Operability Analysis HazOp of the Oxalic Precipitation Unit KCA	5	3	8/4/2011
DCS01 RRJ DS ANS H 38399	Support System Hazard and Operability Study HazOp	1	A	9/28/2004
DCS01 RRJ DS ANS H 38400	Hazard and Operability Analysis HazOp of the Liquid Waste Units KWD and KWS	4	2	11/15/2011
DCS01 ZJJ DS ANS H 38301	Preliminary Hazard Analysis	5.1	E	6/8/2005

Table 5.4-2: Licensing & Regulatory Items

Name	Title	Version	Revision	Date
DCS01 ZJJ DS LIC W 00003	Strategic Regulatory Analysis 10 CFR 95 Applicability	1	A	5/12/2004
DCS01 ZJJ DS LIC W 000003	Strategic Regulatory Analysis 10 CFR 95 Applicability	1	A	5/25/2004
DCS01 ZJJ DS LIC W 00001	Strategic Regulatory Analysis Source and Byproduct Materials License Issues	1	A	7/15/2004
DCS01 ZJJ DS LIC W 00005	Strategic Regulatory Analysis Evaluation of a Separate Source Material License	1	A	7/15/2004
DCS01 ZJJ DS LIC W 00009	Strategic Regulatory Analysis Licensing Baseline Configuration Management Prior to Licensed Operation	1	A	7/15/2004
DCS01 ZJJ DS LIC W 00004	Strategic Regulatory Analysis Derivation of Minimum Qualifications and Experience Requirements for MFFF Key Personnel Positions for Design and Construction	1	A	8/10/2005
DCS01 ZJJ DS LIC W 00008	Strategic Regulatory Analysis DOE Transports MFFF SSNM	1	A	10/5/2005
DCS01 ZJJ DS LIC W 00002	Strategic Regulatory Analysis Coordinating Agency for Emergency Management & Response	1	A	10/20/2005
MFFF ISA SUMMARY	Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary - January 2018	10	NA	1/23/2018
MFFF LICENSE APPLICATION	Mixed Oxide Fuel Fabrication Facility License Application January 2018	11	NA	1/23/2018
REDACTED MFFF LICENSE APP	Mixed Oxide Fuel Fabrication Facility License Application (REDACTED) January 2018	10	NA	1/23/2018
SUMMARY OF FACILITY CHANGES	10CFR70.72 and LA Chapter 16 Summary of Changes during 2017	6	NA	1/23/2018
NOV 06 EMERGENCY PLAN EVALUATION	MFFF Evaluation Pursuant to 10 CFR 70.22(i)(1)(i) - Emergency Plan Assessment	1	NA	11/27/2006

**SRNS, cannot guarantee that the tables above reflect the complete list of safety basis and regulatory documents developed for MFFF as it did not prepare the accident analysis nor license documents.*

5.5 ENVIRONMENTAL SAFETY & HEALTH

5.5.1 Permits for MOX Termination Project

At the end of the MOX contract and beginning of MOX-Termination a summary of the status of the environmental regulatory compliance and permitting program permits were provided in *MOX Transition Implementation Phase Final Report* (SRNS-M0000-2019-00003). SRNS had identified and evaluated the status of 62 “permits”, plus an additional 17 asbestos project licenses for building demolition that was performed by MOX prior to April 1, 2019. The list of permits included many internal “permits”, such as site use and site clearance permits. These were added because site procedures required a current owner/organization be identified as the contact and these had been issued to the MOX contractor. State permits and the NRC license required termination and the termination documentation was obtained and entered in the SRNS records retention system. The grading and erosion control permits were closed as forecasted and complete by the April 1, 2019 turnover. All the permits mentioned in the transition report were either closed, transferred, or assumed by another party, including the transfer of the Industrial Wastewater Permits by the state to SRNS (See correspondence SRNS-MOXT-2019-00052).

5.5.2 Federal & State Regulatory Statutes, Laws, and Agreements

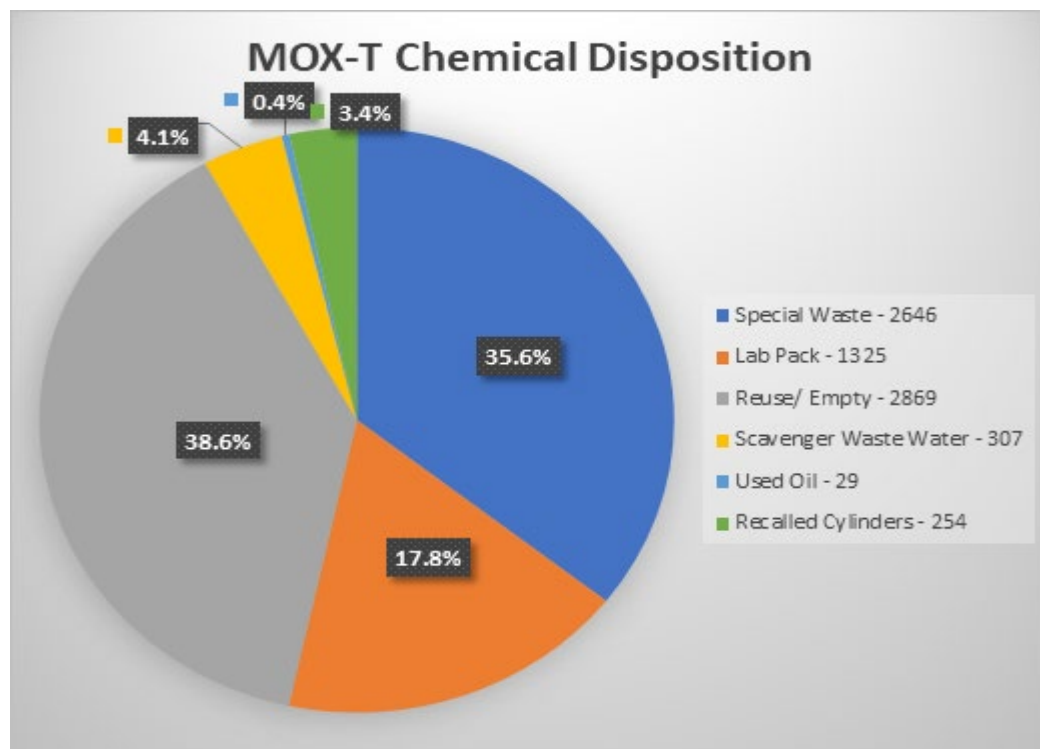
Due diligence of the MS facilities and programs were performed for the Federal and State Regulatory statutes, laws, and agreements listed below:

- Resource Conservation and Recovery Act (RCRA)
- SRS Federal Facility Agreement
- Clean Water Act
- Safe Drinking Water Act
- Clean Air Act
- National Emission Standards for Hazardous Air Pollutants for Asbestos
- South Carolina Hazardous Waste Management Regulations, etc.
- Endangered Species Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- State demolition requirements
- Emergency Planning and Community Right-to-Know Act (EPCRA)
- Migratory Bird Treaty Act
- NRC license
- State Infectious Waste Regulations
- Groundwater and monitoring wells
- National Environmental Policy Act

RCRA: (Both hazardous and solid waste)

- MOX Services made its last hazardous and universal waste shipments on March 27, 2019.
- Any remaining chemicals and items identified as waste were dispositioned per federal and state regulations. A total of 7430 units of Surplus Chemicals remained at MOX and these chemicals were inventoried and characterized. A disposition path was determined for each chemical and they were advertised for reuse for the entire SRNS site. As of May 25, 2021, all chemicals from the original inventoried have been dispositioned as seen in the graph below.

Figure 5.5.2-1: MOX Surplus Chemical Disposition



- The MapPro gas cylinders that remained were found to have been under a voluntary recall by the manufacturer, Worthington Industries. 281 gas cylinders were shipped from SRS by Worthington on December 16, 2020 at no cost to SRS. Had the cylinder recall not been discovered, then gas cylinders would have been disposed of as a hazardous waste at a total cost of \$82K.
- SRNS received copies of the last 3 years of hazardous waste manifests for their shipments of hazardous waste and the other RCRA records prior to transition and there were no outstanding items.
- Most computers and phones were transferred and identified as on "litigation hold". These were not considered electronic waste subject to disposition requirements.

- Universal waste lamps and batteries generated by MOX-T were handled by the site's existing Universal Waste program and were dispositioned as required by federal and state regulations.

SRS Federal Facility Agreement (FFA)

- MS has no facilities identified in the FFA, but they are located adjacent to a closed unit. MOX has had no releases or spills that would subject them to this agreement.

Clean Water Act

- Permit 19241-IW (line from MFFF to WSB) has been transferred to SRNS.
- Bureau of Water Quality General NPDES Permits SCR10B123 and SCR10V760 were terminated upon inspection of the area and receipt of as-builts.
- Grading permits 05-10-F-52.0, 09-02-E0.6 and 05-09-F-60.0 were closed after stabilization, seeding and as-built receipts.
- There were no active domestic water and sanitary sewer permits.
- MOX facilities were rolled into the Site Spill Prevention Control and Countermeasure (SPCC) Plan. SRNS has a Stormwater and Pollution Prevention Plan and any modifications to include the MOX facilities were made prior to transition.

Safe Drinking Water Act

- There were no issues related to the Safe Drinking Water Act and no items for MOX-T to address.

Clean Air Act

- SRNS did not operate the Concrete Batch Plants and MOX Services had terminated the air permit. The Concrete Batch Plants were dispositioned by MOX-T.
- Ozone Depleting Substances (ODS) regulations identify requirements for maintenance, service and repair of refrigeration and air-conditioning equipment. MOX Services used only certified vendors and maintained a logbook to show compliance. The spreadsheet identifying the equipment subject to the regulations was transmitted to SRNS on April 1, 2019. MOX-T dispositioned any remaining air conditioners and refrigerators consistent with regulatory requirements. ODS were removed by qualified technicians prior to disposal and the remaining equipment was dispositioned consistent with the regulatory requirements.
- Reciprocating Internal Combustion Engines (RICE) information was transmitted on March 4, 2019. The engines subject to RICE included diesel generators and light plants, which have been dispositioned.
- There were no outstanding air permits or issues related to the Clean Air Act for MOX-T to address.

National Emission Standards for Hazardous Air Pollutants for Asbestos

- All demolition activities performed by MOX-T followed federal and state regulations as well as site procedures. Asbestos inspections were performed by certified inspectors and the appropriate permits were obtained and closed out.

South Carolina Hazardous Waste Management Regulations, etc.

- See RCRA as these are the regulations under RCRA for hazardous waste management.

Endangered Species Act

- Compliance with this statute is ensured by the Site Use/Site Clearance Program that identifies any potential impacts to endangered species habitat.
- The Administration Building 706-5F has an endangered plant, the purple coneflower, growing in the planted beds at the front entrance.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

- There were no outstanding issues related to FIFRA for MOX-T to address.

State demolition requirements

- See Clean Air Act.

Emergency Planning and Community Right-to-Know Act (EPCRA)

- SRNS completed the EPCRA Tier II report for the site and MOX-T information was included. The EPCRA Tier II report was transmitted as document number SRNS-J2200-2020-00058 on 02/26/2020.
- The 2019 Toxic Release Inventory was submitted by SRNS for their activities and included information from MOX-T. The TRI Report was transmitted as document number SRNS-J2200-2020-00177 on 06/25/2020.

NRC license

- Not applicable as the license was terminated by MOX Services.

State Infectious Waste Regulations

- All MOX Services medical waste was dispositioned by SRNS and there was no remaining waste for disposal.
- Any excess medications were used, sent to be used by other organizations or dispositioned as non-hazardous waste.

Groundwater and monitoring wells

- MOX Services did not have any groundwater wells.

National Environmental Policy Act

- MOX-T prepares Environmental Evaluation Checklists for all maintenance and work activities as required by site procedures. These are available in site databases for review.

5.6 QUALITY ASSURANCE

Quality Assurance Information System (QAIS) was the electronic database to track Nonconformance Reports (NCR)s and Condition Reports (CR)s. At the time of closure, there were 319 NCRs that were still open. These 319 NCRs were then closed as Project Termination Closed (PTC). Engineering was tasked with reviewing the PTC NCRs to determine if the NCRs could affect SRPPF design. If there was a possible effect, then the NCR was migrated to the SRNS STAR database for SRPPF to track as an open NCR.

Since the transition, the following nonconformance issues have been discovered and NCRs have been written:

- 2019-NCR-39-0001: Missing 706-3F Fire Damper and Incorrect 2hr Fire/Smoke Barrier Configuration, Initiated 05/04/2019 (*Status-Closed*)
- 2020-NCR-39-0001: Building 226-2F roof purlins code issue, Initiated 06/02/2020 (*Status-Closed*)
- 2020-NCR-39-0002: Misc Fire Barriers and Barrier Penetration Seals Inadequate For 2hr Fire/Smoke Barrier Configuration, Initiated 12/07/2020 (*Status-Closed*)
- 2021-NCR-39-0001: Missing Fire Barrier Penetration Seals in 706-4F and 706-5F, Initiated on 04/27/2021 (*Status-Closed*)
- 2021-NCR-40-0002: Security & Fire Alarm System (SFAS) not present in building 706-7F, Initiated 05/12/2021 (*Status-Open*)
 - This NCR is under the purview of SRPPF since the project was the building custodian at discovery.

MOX Documentum was the database for Quality Assurance (QA) records. Eight (8) cabinets have been migrated to the SRSNET in Pluto. All the records contained in those files were moved to the Pluto server. Those cabinets are as follows:

- Construction
- DC Project Procedures
- Engineering-MFFF
- Procurement
- Quality Assurance
- Site Development & Infrastructure Improvements (SDII)
- Termination
- Vendor

In early 2019, a review was performed to decide the MOX Services QA program acceptability by identifying and documenting notable inconsistencies between the MS MOX Project Quality Assurance Plan (MPQAP) and the SRNS QA Management Plan. The scope was a high-level regulatory compliance review that examined elements of the MOX Services QA management plan and implementing procedures as compared against the SRNS QA Programs and procedures. A compliance review at the programmatic level found that the MOX MPQAP revision 17, effective date 05 September 2017, was compliant for the purposes of an Engineering, Procurement, and Construction (EPC) project. Procedures reviewed contain sufficient detail to guide trained personnel toward a consistent product. Review of select implementation reports verified compliance and provided reasonable assurance that the MPQAP is compliant, procedures were adequately developed, and quality assurance records were maintained as proof of implementation.

5.7 SAFEGUARDS, SECURITY AND EMERGENCY SERVICES (SS&ES)

5.7.1 Emergency Preparedness

SRNS Emergency management assigned a group of SMEs to the 226-F facility to ensure that the MOX Transition Project was integrated into the SRS Emergency Response Plan requirements. An Emergency Management Program within the facility was developed and maintained throughout the Transition and Termination phases of the project. Upon Termination of the MOX Termination Project, SRPPF will absorb the Emergency Preparedness Program developed during the transition and termination phases of the MOX project. The transition from MOXT to SRPPF is being conducted by revising existing procedures and implementing a First Aid Support Team and basic Emergency Response Organization to assist in responding to emergency situations within the facility.

Emergency Management organization began the process of performing an assessment on the MOX Services Emergency Preparedness Program in December of 2018. The assigned group of SMEs performed an assessment of the MOX Services Inc. Emergency Preparedness Program and compared it to the 15 elements of DOE Order 151.1D. Based on the assessment, a GAP Analysis Report was created and submitted to the MOX Transition Management Team and the Emergency Management Manager for approval.

SRNS, Emergency Management, took a two-phased approach to attain compliance with DOE Order 151.1D within the MOX Transition/Termination Project. Phase I was administrative in nature and required an All-Hazards Survey (AHS) (S-EHS-F-00003, Rev. 0) be performed in the facility to determine the emergency preparedness program required within the facility. Based on the results of the AHS it was determined that a Core program was required. In addition to the AHS, procedures were developed and implemented to include a facility Emergency Preparedness Administrative Procedure, MOX-T-EPAP-1000, NCP-SRPPF Accountability During Emergency Response Procedure, NCP-ADM-ACCT-9000, Medical Response, NCP-AOP-MR-0001, and several revisions to the Memorandum of Understanding between MOX Complex Area and F-Area for Emergency Response (G-MOU-F-00012). Facility walkdowns of the emergency evacuation egresses, rally points, emergency equipment, shelters, and ventilation shutdown instructions were also performed resulting in revisions.

Phase II of the MOX Transition/Termination Project consisted of implementing the facility drill program, developing and providing facility training to first responders and key personnel, establishing sheltering/haven locations/accommodations for personnel, and developing a Core Emergency Response Organization within the facility. Due to the requirements outlined in the MOU, facility participation in all F-Area drills began and personnel's emergency response actions to protective actions have been evaluated in the facility. A member of the SRS Emergency Response Training and Evaluation Group (ERTEG) has been assigned to the facility and facility drill scenarios have been developed.

In response to the decommissioning of the F-Area Complex Control Room an Area Emergency Coordinator (AEC)/Facility Emergency Coordinator (FEC) Strategy for MOX/SRPPF has also been implemented to ensure that emergency response is readily available within the facility during off shifts, weekends and holidays.

Based on the self-assessments performed and the gap analysis, the following documents were developed:

- 2019-SA-001750 – MOX Transition Emergency Preparedness Programmatic Assessment
- SRNS-MOXT-2019-00046 - GAP Analysis Report
- SRNS-MOXT-2019-00048 – MOX Services Implementation Plan, Phase I
- SRNS-MOXT-2019-00047 – CAIR MOX Services Transition, Comprehensive Emergency Management System
- 2019-SA-004143 – MOX Transition Emergency Preparedness Programmatic Assessment
- SRNS-J4000-2020-00049 – DOE Order 151.1D, Implementation Plan, Phase II for MOX Termination Project
- SRNS-RP-2020-00275 Rev1- CAIR Phase II MOX Termination Project Phase II Comprehensive Emergency Management System
- SRNS-RD-2020-00276 - MOX Termination Project Implementation Plan, Phase II
- SRNS-RP-2020-00699 - Area Emergency Coordinator (AEC)/ Facility Emergency Coordinator (FEC) Strategy for MOX/SRPPF

5.7.2 Safeguards & Security

The Safeguards and Security (S&S) Program has had an essential role in successfully ensuring the MOX-T project integrates S&S functional and operational requirements into the transfer of all security documents and physical security equipment.

The S&S program integrated the following DOE orders and SRNS manual into the MOX Termination project:

- DOE O 470.4B Chg 2 (Min Chg), Safeguards and Security Program
- DOE Property Management regulations (Code of Federal Regulations, Title 41, Chapter 109)
- DOE O 471.6 Chg 3 (Admin Chg), Information Security
- DOE O 471.3 Chg 1 (Admin Chg), Identifying and Protecting Official Use Only Information
- DOE O 471.1B, Identification and Protection of Unclassified Controlled Nuclear Information
- Savannah River Site, Manual 7Q, Security Manual

5.7.2.1 Transfer of documents

At the end of the MOX project, on 12 Oct 2018, all security related documents were under the custodial control of NNSA for storage and safe keeping. All documents associated with the MOX project, including building drawings, writeups, etc., do not exceed Unclassified Controlled Nuclear Information (UCNI).

5.7.2.2 Transfer of Physical Locations

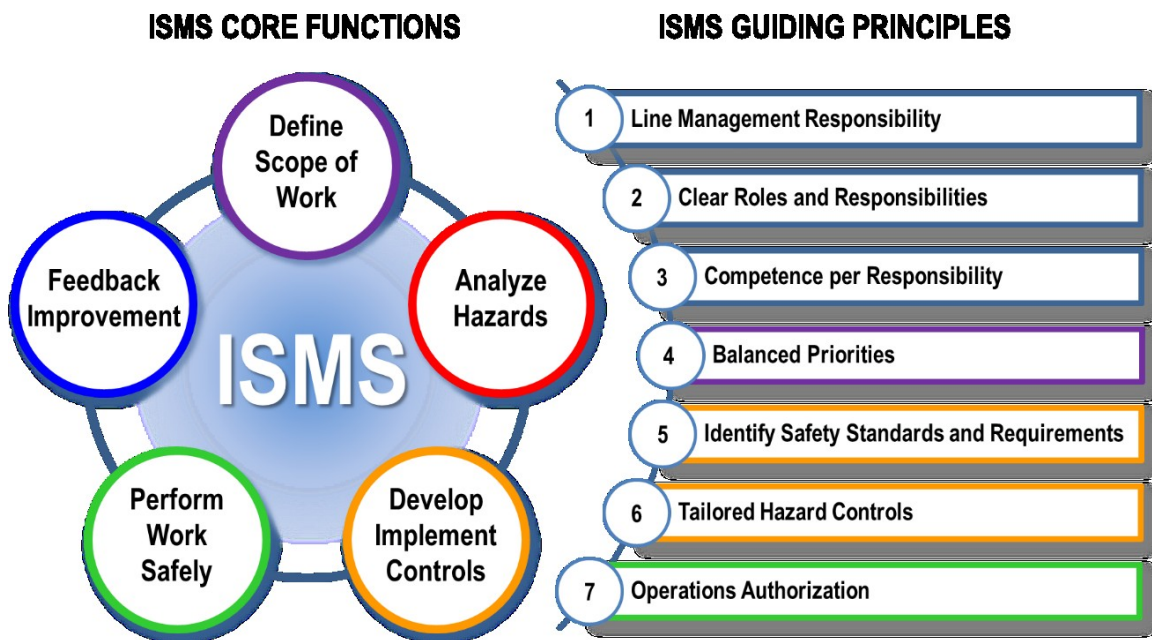
From October 12, 2018 until March 18, 2021, the Barnwell Warehouse, located at 1090 Joey Zorn Blvd, Barnwell, South Carolina, was used as storage for “high value property for the former MOX Project”. To ensure the security of the facility, alarm systems were used for monitoring and various walk downs by the SRPPF Security team had been performed. As of March 18, 2021, all property that once resided at this facility was either sold or repurposed throughout the DOE Enterprise. Officially, on March 25, 2021, NNSA-SRFO approved the closure and termination of the contract for the Barnwell Warehouse.

5.8 SAFETY

The Integrated Safety Management System (ISMS) is a standards-based system wherein the framework for safety and health across the DOE Complex is based upon a set of written Policies, Rules, Orders, and Standards. The implementation of these standards enables SRNS to conduct work in a manner that ensures protection of the workers, the public, and the environment.

The basic structure of ISMS (Core Functions and Guiding Principles) is the overarching system SRNS uses to manage the conduct of work under the Contract. SRNS supports and enhances ISMS through the introduction of new and improved standards and processes.

Figure 5.8-1: DOE Integrated Safety Management Policy



The DOE Integrated Safety Management Policy, DOE P 450.4A, subdivides the concept of the ISMS into seven Guiding Principles and five Core Functions. Through the application of SRNS Manual 1-01, Policy 1.22, Integrated Safety Management System (ISMS), Rev. 12, SRNS adopts these components as follows: Do work safely. Integrate safety into management and work practices at all levels so that missions are accomplished while protecting the worker, the public, and the environment.

Figure 5.8-2: Integrated Safety Management

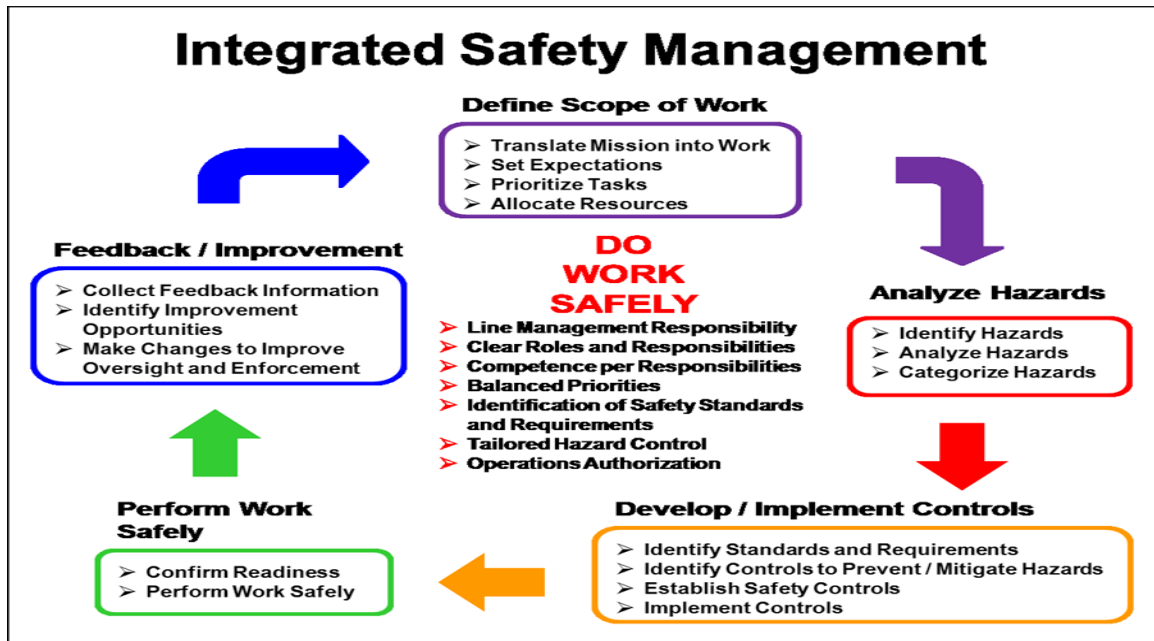


Figure depicts the Integrated Safety Management Core Functions and sub-functions. Although arrows indicate a general direction, these functions are not independent, sequential functions. They are a linked, interdependent collection of activities that may occur simultaneously. Outcomes during the accomplishment of one function may affect other functions and potentially the entire system.

Before any work is conducted that involves multiple hazards the safety organization reviews the Work Package. In addition to the review, a walkdown of the area is conducted to ensure that all the hazards are captured and that controls are identified to mitigate the risk of injury. Numerous Safety Improvements were created using the ISMS process:

- Helped develop procedures for material disposition to become compliant with 2S Manual, *Conduct of Operations*.
- Developed Barricade protocol for use of the hydraulic sheers for material disposition and building demolition.
- Changed Site Elevator entry protocol to align with OSHA requirements and National Elevator Industry practices.
- Enhanced procedure use and adherence and converted MOX Procedures to SRNSNS procedures.
- Improved quality of pre-job briefings to ensure all workers were present and roles were discussed to ensure engagement. Reinforced the requirement to include Individual Hazards Analysis along with the Assisted Hazardous Analysis.
- Global improvements to Technical Work Documents and Assisted Hazards Analysis.
- WebEx Safety Meetings with specific emphasis on issues, concerns or injuries in NNSA Capital Projects.

5.9 LESSONS LEARNED

The MOX Termination Project employed a Lessons Learned program that was procedurally implemented and executed in accordance with DOE Order 210.2A, DOE Corporate Operating Experience Program and DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets. The procedure defined the processes by which Lessons Learned were received, identified, documented, validated, and disseminated. Various sources and projects were systematically reviewed and Lessons Learned were determined applicable to the project based on the nature of the work, hazards, organizational complexities, similar projects, and trends. Some of the Lesson Learned Items are below:

- 7/23/2019: Site-wide communication was distributed regarding a construction lifting accident at Los Alamos National Laboratory that resulted in serious injuries to a subcontract employee. As a result, pre-job briefings and tailgates review of the principal safety devices, equipment and controls that are necessary to keep activities safe and enable the equipment and machinery that is used to complete tasks to perform their intended safety function. Management, workers, and oversight must then be continually mindful of, and monitoring for, the correct installation and use of the necessary safety devices, equipment and controls.
- 2/11/2020: A Special Information Notice titled “Security Reminder from an Incident of Security Concerns” was distributed to MOX-T personnel. This notice was regarding the unauthorized transmission of sensitive information. An employee failed to check the document markings in a timely manner before transmission occurred on an unclassified system. As a result, efforts were taken to ensure the employees were trained to the Classified Matter Protection and Control procedure.
- 11/13/2020: Thomas Jefferson National Accelerator Facility received suspected counterfeit N95 masks from a registered vendor. This incident was shared across SRS through the Early Warning system, Lessons Learned Program, and the Infectious Disease Response Team.
- 3/22/2021: MOX-T personnel were alerted of various Lessons Learned from the Environmental Impact Statement. The main objective of defining and describing lessons learned in the preparation of the Environmental Impact Statement for the Plutonium Pit Production at the Savannah River Site in South Carolina is to identify how to sustain strengths and improve weaknesses on future National Environmental Policy Act projects.
- 5/20/2021: Tritium Finishing Facility drafted a lessons learned document, which was distributed to MOX-T. The document discusses successes and challenges experienced during the project. Pre-job briefings and walkdowns were noted as successes, while ensuring subcontractors use and understand contract requirements for native files was noted as a challenge.

Since the inception of the MOX Services MFFF project there were 3 documents created describing the Lessons Learned. They are as follows:

- *Plutonium Disposition Program, 2014*
- *Plutonium Disposition: Observations on DOE and Army Corps Assessments of the Mixed Oxide Fuel Fabrication Facility, 2017*
- *NNSA, APM Lessons Learned Report, 2021*

The MOX-T project will submit a Lessons Learned document by December 31, 2021 in accordance with the milestone listed in the statement of work document, *DNN Construction FY 2022 Implementation Plan*, Rev 0.0 dated 8/31/2021

5.10 PROCUREMENT

The only active subcontracts remaining after September 30, 2021 will be for MOXnet. The listing for those subcontracts can be found in SRNS-F2000-2021-00143. All other subcontracts will be closed to material and labor. The Purchase Orders for these accounts will be financially closed in FY22 to ensure there are no more charges outstanding.

5.11 SURVEILLANCE & MAINTENANCE OF FACILITIES

The SRNS Operations & Maintenance (O&M) organization has played a key role in enhancing the facilities across the MOX complex as seen in the three activities below.

Installation of Ionizing Device to help stop the Spread of Covid-19

SRS developed a COVID-19 Response Plan, using guidance from the Centers for Disease Control (CDC) and Occupational Safety and Health Administration (OSHA), to ensure employees were protected.

It was discovered that building 706-3F had many COVID-19 symptomatic cases clustered in a single area of the 2nd floor. An investigation by the Infectious Disease Response Team (IDRT) determined that the individual air conditioning units arranged in zones had created an environment conducive to the spread of COVID-19 by recirculating the inside air. The building is equipped with over 100 of these A/C units. All occupants of the building were relocated or directed to telework until the issue was resolved. The unique autonomous set-up of the ventilation system presented an uncommon situation compared to other buildings across the site.

Management and Engineering met to determine a path to correct the issue. A work package was developed to install an ionizing device and extra filtration. The ionizing device uses an electronic charge to create a plasma field filled with a high concentration of positive and negative ions. As these ions travel with the air stream, they attach to particles, pathogens, and gases. The ions help to agglomerate fine sub-micron particles, making them filterable and eliminate pathogens by robbing them of life-sustaining hydrogen. The ions break down harmful VOCs within Electron Volt Potential under twelve (eV<12) into harmless compounds like O₂, CO₂, N₂, and H₂O. The ions produced travel within the air stream into the occupied spaces, cleaning the air everywhere the ions travel and causes the particulates to fall out of the breathing zone. This device along with an 8 MERV filter were installed in each individual A/C unit and tested to ensure the device would serve the intended purpose of allowing the return of the building occupants. This method of modifying these type units serves as a benchmark for the entire site and a significant accomplishment to combat the COVID-19 virus.

Erosion Issues

- Heavy rains during the winter months of 2020 and 2021 resulted in the rupture of a temporary wooden closure at the south west corner of 226-F. The wood closure (plywood) had been placed over a 4' x4' opening in the basement wall that would be used later in the construction of the MOX Project. Saturated soil and aged wood finally led to failure of the plywood, releasing several hundred gallons of mud, water and debris into the basement-access area of the 226-F building and creating a large, eroded area adjacent to the outside of the basement wall. NCP O&M worked with construction to excavate saturated soil, remove the accumulated basement-area debris and install a more permanent metal closure over the opening. Clean backfill and additional grading restored the surface area and properly routed future run-off.
- A significant erosion issue was discovered on the 226-F East perimeter fence line after a series of record rainfalls. This erosion cycle continued and was conducive to a significant degradation of the perimeter fence line. This erosion event was attributed to elevation changes brought on by the removal of facilities, equipment, materials, and associated property left from the cancelled MOX Project. Compensatory measures were established using left over concrete barricades from the MOX Project and re-grading of the area to divert water from the erosion site until a work package could be developed.

Work package development to correct the issue involved many construction disciplines over several months of work. Larger drainpipes were installed with a more robust design, large volumes of earthen material were removed from the adjacent basin, and careful landscaping helped ensure the newly seeded area would withstand excessive amounts of rainfall. The equipment to help maintain the newly seeded area was taken from existing inventory to save the customer added expense; these items included a water truck in the MOX Termination inventory, leftover fertilizer in the existing chemical inventory and leftover fence material.
- ECA's performing a quarterly walkdown discovered an area of erosion concern East of 211-44F. A work package was developed to rebuild culvert and reinstall the piping and improve drainage design to include regrading and re-seeding of the affected area.
- While performing a walkdown to determine a new sample location for the 300 and 500 Basin, it was discovered that one of the three culverts making up the drainage system had developed a significant area of erosion and the lid section had been dislodged. It was discovered that the bottom granite diffusers installed in each culvert to prevent erosion to the bottom of the culverts, became dislodged blocking the discharge side of culvert #2. The water flow was so great that it blew off the cover of culvert #2. This allowed enough water to erode the area around the culvert and a small portion of the hillside. Work package development to correct the issue involved many construction disciplines over several months of work. As a result of these efforts, stabilization and reconstruction of the eroded slope was completed, the original design's hydraulic flow characteristics were restored within the entire outfall system by the removal of dislodged granite pieces in the invert of each manhole, the storm dislodged manhole lid assembly was reinstalled to original design intended position, and the effort eventually concluded with reseeded of the disturbed areas to provide temporary erosion control measures (straw/mats) to mitigate any additional erosion while allowing seeded areas to reestablish an enduring, permanent turf system. This work required confined space

permits, Fire Department rescue squad and rigging personnel. Repairs have been completed by the end of FY21; however, the permanent turf has yet to reestablish. NCP O&M/SRPPF will monitor seeding system growth and make adjustments until an enduring turf system is reestablished.

Fire Barriers

- Fire Protection Engineering identified an incorrectly installed 2hr fire/smoke barrier configuration issues on the first floor of 706-3F. An NCR (NCR 2019-39-0001) was generated to address the non-conforming conditions. Actions listed in the NCR included development of a list of discrepancies and a work package to effect repairs. During the fire penetration seal repair work, new deficiencies were discovered inside room 127 above the ceiling tiles, an incomplete 2 hour rated fire wall was discovered along with missing penetration seals. NCR 2019-39-0001 was closed, and NCR 2020-39-0001 was generated to include the newly discovered issues as well as those include in the NCR. The repairs to the fire barrier will be complete by the end of FY21.
- During the 5 Year building assessments Fire Protection Engineering identified missing fire penetration seals in 706-4F and 706-5F. An NCR (NCR 2021-39-0001) was generated to address the non-conforming conditions for both buildings. Additionally, STAR items 2020-CTS-10047 to track 706-4F pen seal repairs and 2020-CTS-11176 to track 706-5F pen seal repairs, with work orders 1870841 and 1870843 respectively are directing and documenting actions in the field. The pen seal repairs for both buildings were completed by the end of FY21.

5.12 PHYSICAL CLOSEOUT

SRNS was requested to inventory and disposition facilities, equipment, materials, and associated property left from the cancelled MOX Project. The property had a current or future use relative to the missions of NNSA Program Offices, NNSA Organizational Property Management Officer (OPMO), and/or other organizational entities or may be declared excess as deemed appropriate by NNSA.

NNSA retained ownership of the MOX Termination Project property during transition and continue to have ownership through the inventory and disposition process. During transition, SRNS was assigned as the custodian of the property with the responsibility to inventory and disposition the property. SRNS based the inventory and disposal process on the NNSA provided copy of the MS Inventory Data Export dated March 29, 2019 and exported from MS IT to SRNS IT. SRNS compared new packages against previously prepared packages to prevent duplication. SRNS did not perform evaluation of losses identified and reported by MS prior to transition. Disposition of installed Personal and Real property was not included in the plan.

SRNS dispositioned MOX Termination Project inventory items by prioritizing packages previously screened by Property Screening Work Group (PSWG) then by location as forecasted and planned in the resource loaded schedule (SRNS-P0000-2019-00044). Considerations used during the development of this strategy were footprint reduction, re-use of facilities and equipment, etc. The disposition strategy was integrated with Savannah River Site projects for Surplus Plutonium Disposition (includes SPD line item project, removal of plutonium from South Carolina and Dilute and Dispose process for plutonium) and Savannah River Plutonium Processing Facility needs to support these project schedules as prioritized in MFFF-PLN-004, *MO Project Property Screening Plan*. Attributes of this plan include:

- SRNS assumed the role to compile and administer the property screening process. SRNS responsibilities included forecast planning for disposition. SRNS followed the package development guidelines as described in MFFF-PLN-004. Those guidelines provided for an efficient yet regulatory compliant process. SRNS included quality level, as identified by MOX Services, on all packages submitted for screening.
- The inventory of MOXNet equipment has been transferred to NNSA ownership and assigned to SRNS as custodians and inventoried in accordance with SRNS Property Program Procedure. Inventories were completed based upon schedule outlined in 41 CFR, Part 109, DOE Property Management Regulation or as otherwise directed by NNSA.
- The authorized source for the start of all MOX Termination Project property disposal actions were processed using Declaration of Available Asset (DAA) forms, which include Contracting Officer Representative (COR) approvals.
- SRNS sold or donated material declared surplus that was originally destined to be installed in the MOX Project. Donations were executed using standing arrangements. Prior to the award of any additional sales agreement, SRNS provided a summary of the agreement to NNSA Organizational Property Management Officer (OPMO) for approval review and concurrence per Procurement Practices, MOX Procurement Guide 98-17, Sale of MOX Surplus Government Property and 3B Property and Materials Management Manual.
- SRNS performed inventory activities as disposition activities were being completed. Bulk items, such as containers of fasteners, pipe spools, imbed plates, pipe hangers, etc. were inventoried based on estimated weight or other means of estimating item counts. The best inventory approach, as decided by the Project Manager, with concurrence of the MOX PMO, TCO, and OPMO, was used for other bulk items such as unbent pipe, sheet metal, wiring, etc. Hand tools were inventoried by validating the items that were collected and accounted to the inventory as it was shipped to the destination. SRNS administratively controlled items through 3B Property and Materials Management Manual Procedure, 5-1 Management of Government Property at Savannah River.

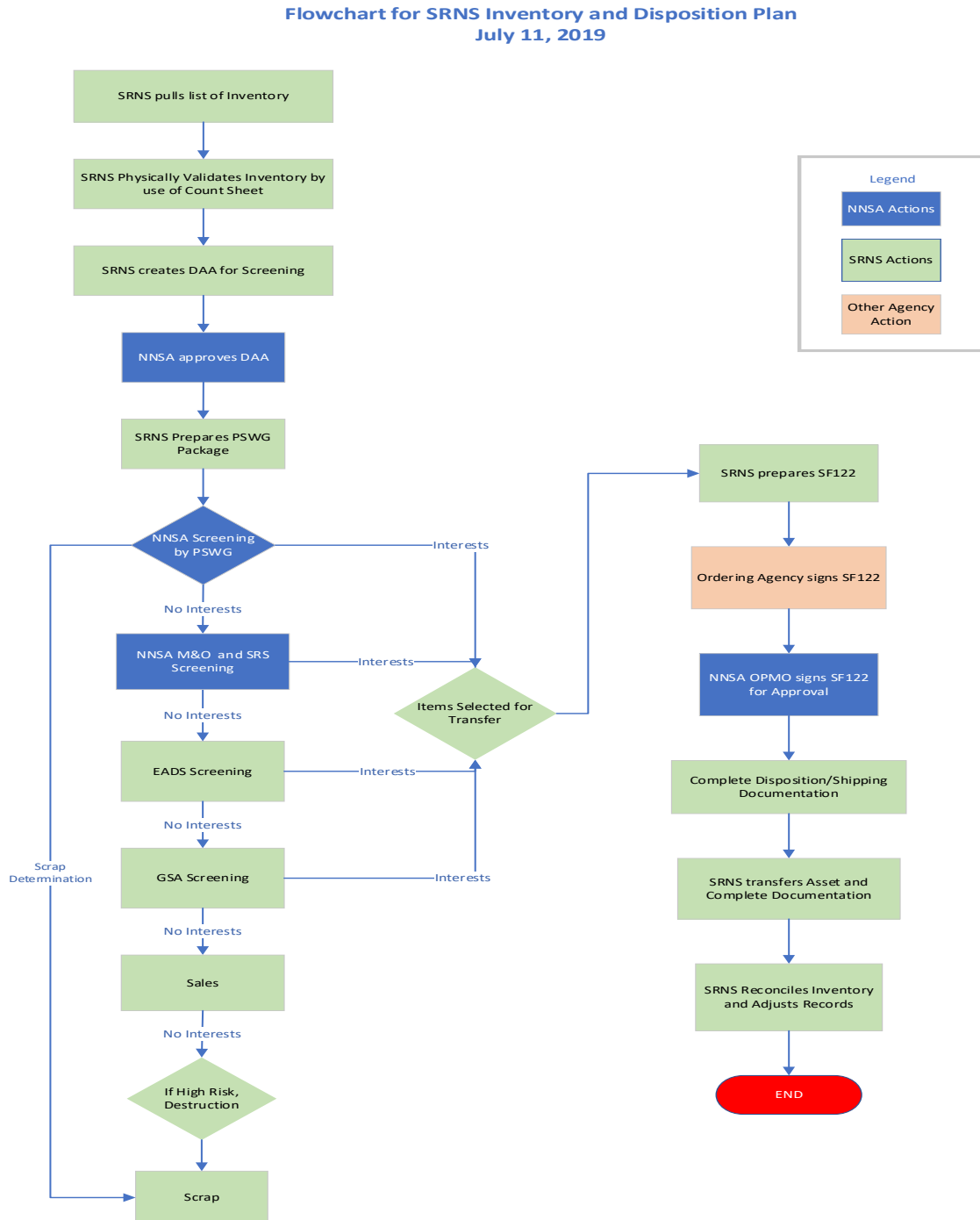
- SRNS did not perform validation of MOX Services valuations by researching purchase orders and did not perform any fair market value assessments. MOX Services inventory record values were used if they existed. If the MOX Services inventory record did not include values, SRNS estimated a value per SF122.
- Personal Property was verified/segregated for disposition and potentially relocated to facilitate a safe, secure, and efficient shipment/disposition process.
- Real Property was transferred following the same process utilizing the PSWG review and approval. Once a new owner was identified for the property, an OSR 3-227 was generated to initiate the transfer of the real property from the former MOX Services to the new owner and an SF-122 was generated to transfer any personal property that was located inside the building (desks, chairs, refrigerators, etc.)
- As materials in laydown yards were dispositioned, the areas were cleared of any signage, rope, weed barrier. MOX-T notified Supply Chain Management and they would request a Site Clearance Permit to return the yard to the Site so it could be claimed by other Site users as needed.
- Buildings that were in FIMS (Facilities Information Management System) went through a rigorous process prior to demolition. An SF118 (Report of Excess Real Property) was generated and approved including concurrence from Government Services Administration (GSA) and Housing and Urban Development (HUD) posting. Once the approvals were obtained, then Site Clearance DHEC Permits were secured and demolition was able to occur. A final report including before and after photos was submitted to NNSA, Federal Project Director.
- Chemical Property that was clearly a solid or hazardous waste was dispositioned in accordance with 3Q, Environmental Compliance Manual.
- At transfer, MOX Services did not identify any metals originating from radiological areas. Scrap Metal was dispositioned in accordance with Manual 3B, Asset Management Manual, 4-4 Salvage Yard Operations.
- The MOX Services inventory records have been migrated into SRNS systems and managed through those systems. SRNS made a reasonable effort to locate inventory items, reconcile discrepancies between the DAAs and the March 29, 2019 exported inventory records, and adjust those records accordingly.
- Inventory identified as Lost, Stolen, Damaged, or Destroyed (LSDD) Property was evaluated and documented in accordance with 3B Property and Materials Management Manual, Procedure 5-1 Management of Government Property at Savannah River Site. LSDD property was reported to NNSA.
- High Risk Property found during disposition activities that were currently in the SRNS inventory was managed and dispositioned in accordance with SRNS Property Program, 3B Property and Materials Management Manual, Procedure 5-1 Management of Government Property at

Savannah River Site. All property packages received a high risk review prior to PSWG screening and the high risk review forms were attached to the packages at screening. Of the 31 packages deemed high risk, 24 were destroyed/scrapped and five (5) were transferred to other DOE entities (Y-12, SRNL and SRNS).

- Inventory of sensitive/high risk and accountable property was conducted in accordance with NNSA direction/approval. Results were submitted to NNSA OPMO. Administrative/bench stock/commodity was performed on a three-year cycle in parallel with disposition activities. The final reconciled report was submitted to NNSA at the end of disposition.
- MOX Material Disposition Property Manager and Supply Chain Management (SCM) ensured the property inventory and disposition documentation were maintained in accordance with SRNS Property Program, 3B Property and Materials Management Manual, Procedure 5-1 Management of Government Property at Savannah River Site.
- SRNS utilized existing DOE Property Management regulations and SRNS Procedures, unless otherwise directed in writing by the NNSA OPMO or CO. SRNS strived to identify efficiencies and requested waivers to procedures, as appropriate.
- SRNS utilized the General Service Administration's (GSA) Standard Form, SF122, to authorize personal property transfers from the MOX PMO to other agencies, programs, projects or authorized recipients. NNSA OPMO approval was obtained for transfers. SF120 (Electronic Transfer) was used for property claimed via GSA excess.
- SRNS requested NNSA OPMO approval prior to final disposition authorization for all sales, donations, and destruction of property.
- Project Manager reported MOX Termination Project property inventory and disposition status monthly to NNSA, throughout the life cycle of the SRNS Inventory and Disposition Plan for MOX Termination Project Property (6/20/19 – 9/30/21).

The following Flowchart illustrates a detailed breakdown of the disposition processes:

Figure 5.12-1: Flowchart for SRNS Inventory and Disposition Plan



Metrics were developed as needed through the life of the project based on agreement between NNSA and SRNS. Metrics were reported to MOX PMO monthly. Below are examples of developed metrics used to track progression of material disposition.

The metrics below depict methods of disposition measured in units as well as total units dispositioned:

Figure 5.12-2: Material Disposition in Units

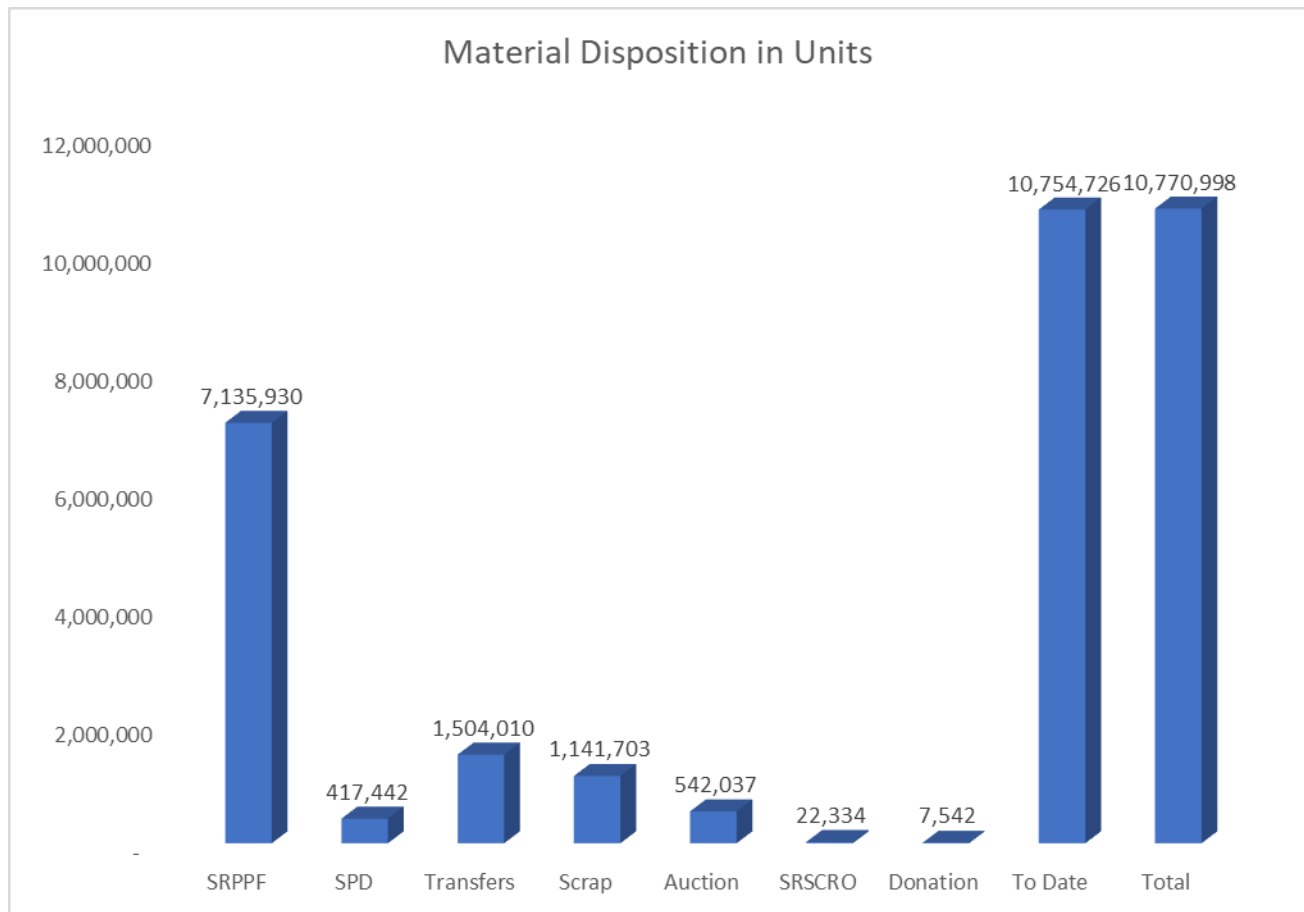
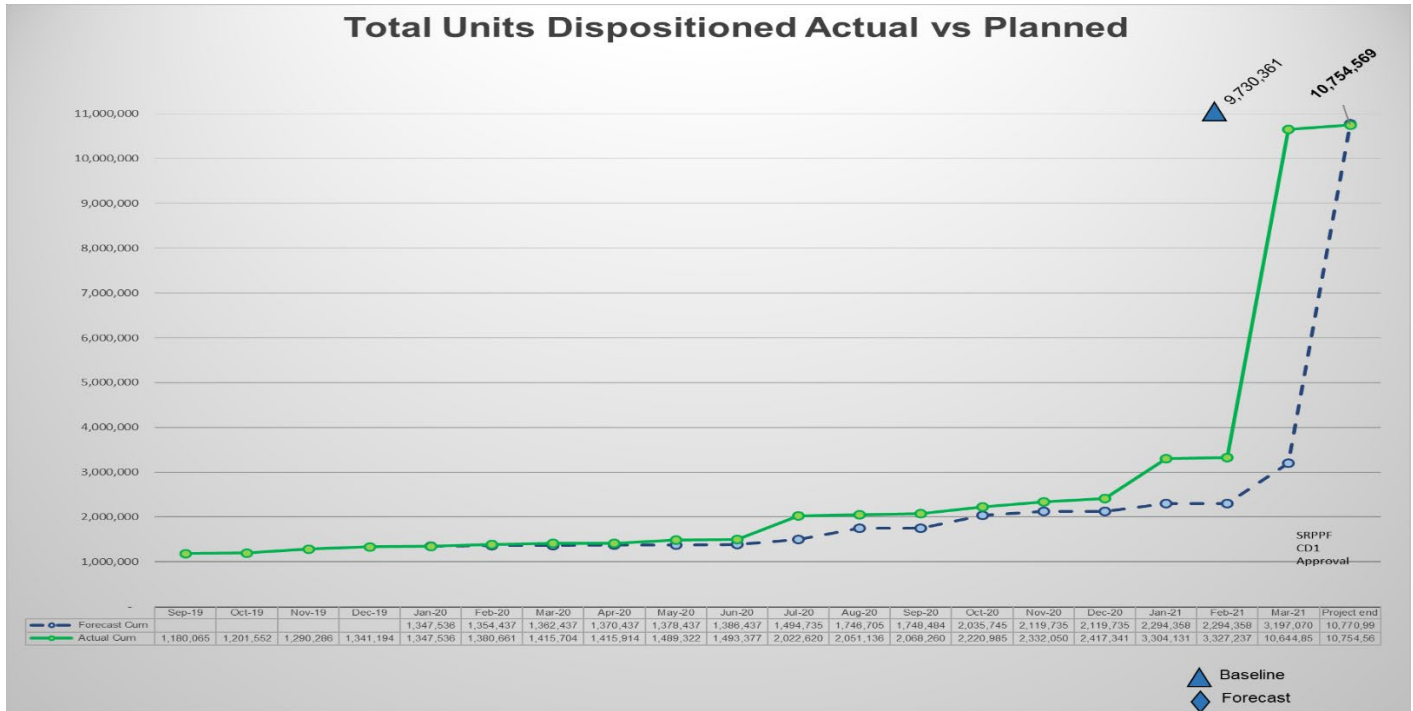


Figure 5.12-3: Total Units Dispositioned Actual vs Planned



The table below identifies the total pounds of material that was dispositioned as scrapped:

Table 5.12-1: Total Pounds of Material Scrapped

STAINLESS STEEL TOTAL FOR ALL YARDS	2,072,468
MIXED METAL TOTAL FOR ALL YARDS	3,570,740
TOTAL WEIGHT COMBINED	5,643,208 (AS OF 4/20/2021)

The six charts below show square footage metrics being counted down. These accounted for square footage of space within Laydown Yards, Temporary Facilities, Permanent Buildings, on-Site SRNS Warehouses and the off-site Barnwell Warehouse.

Figure 5.12-4: Laydown Yards - Work off Curve

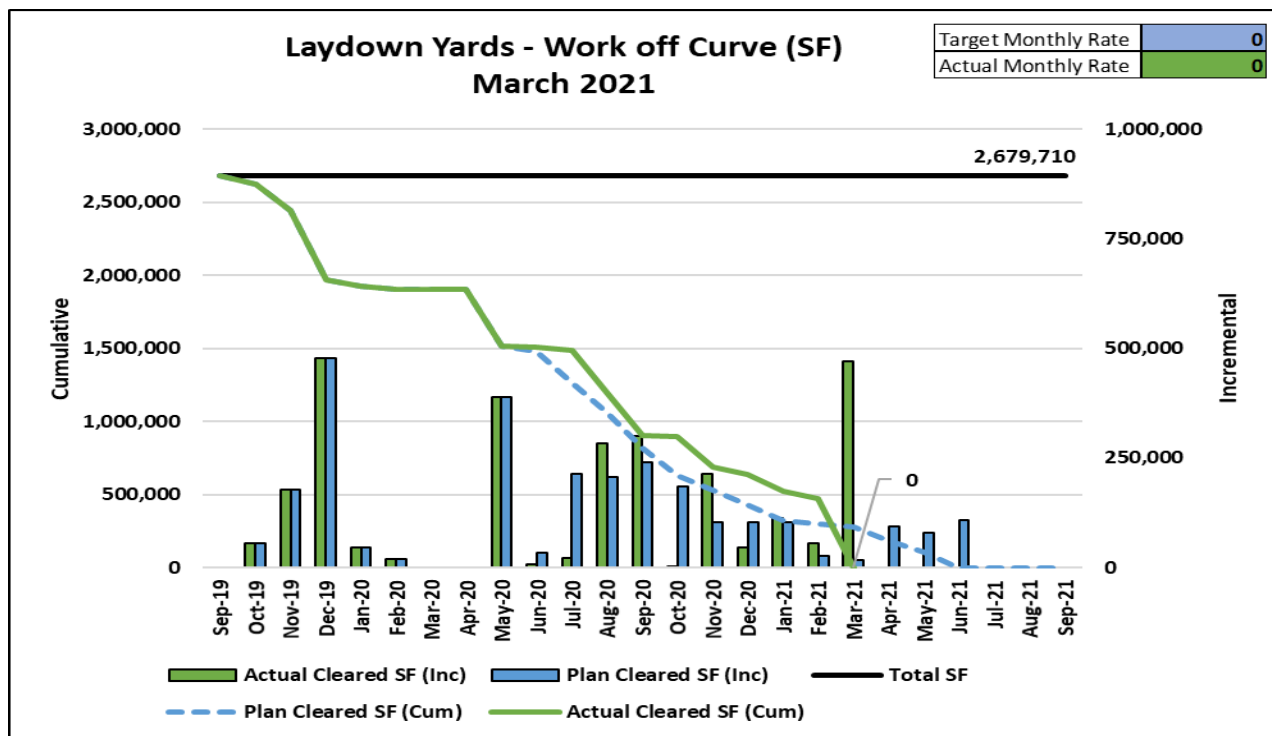


Figure 5.12-5: Temporary Facilities - Work off Curve

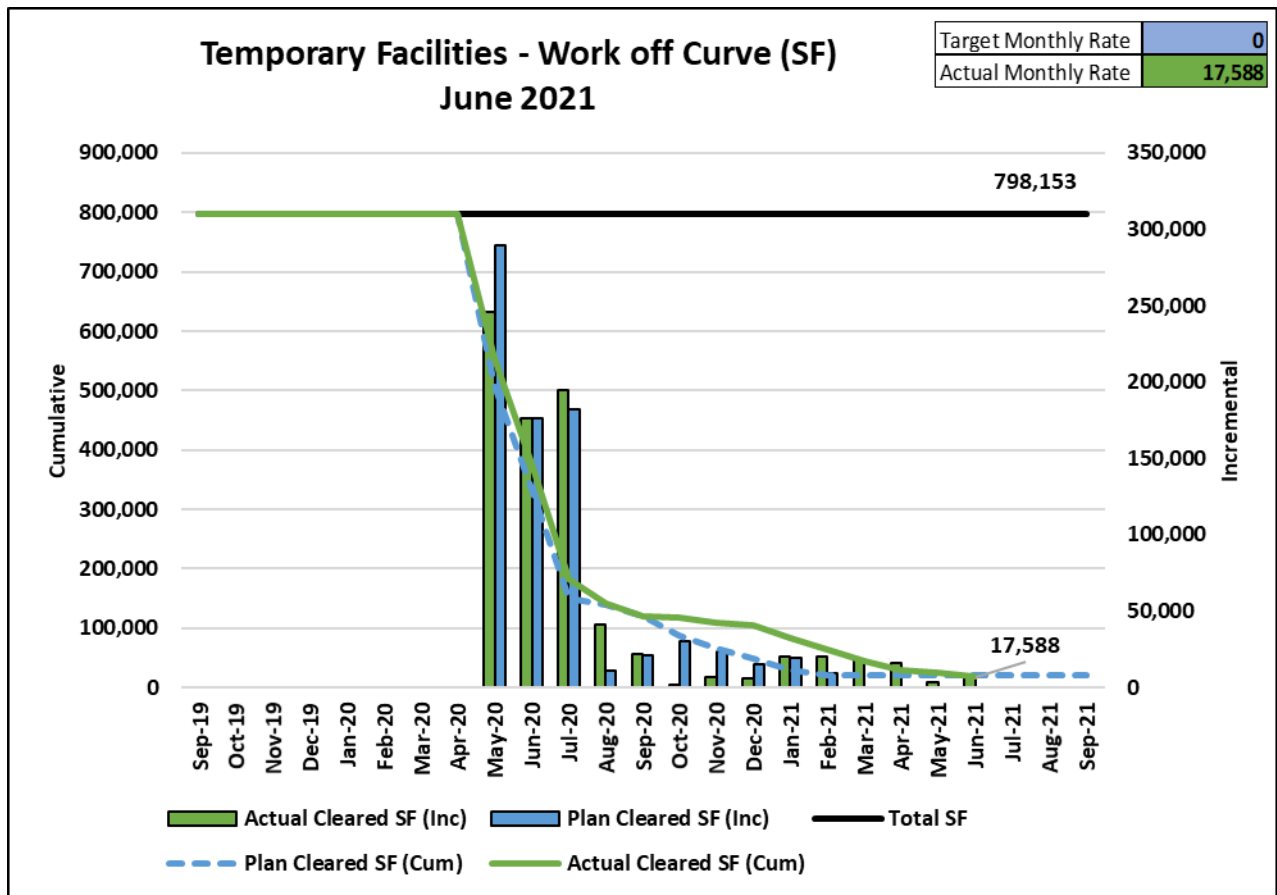


Figure 5.12-6: Permanent Buildings - Work off Curve

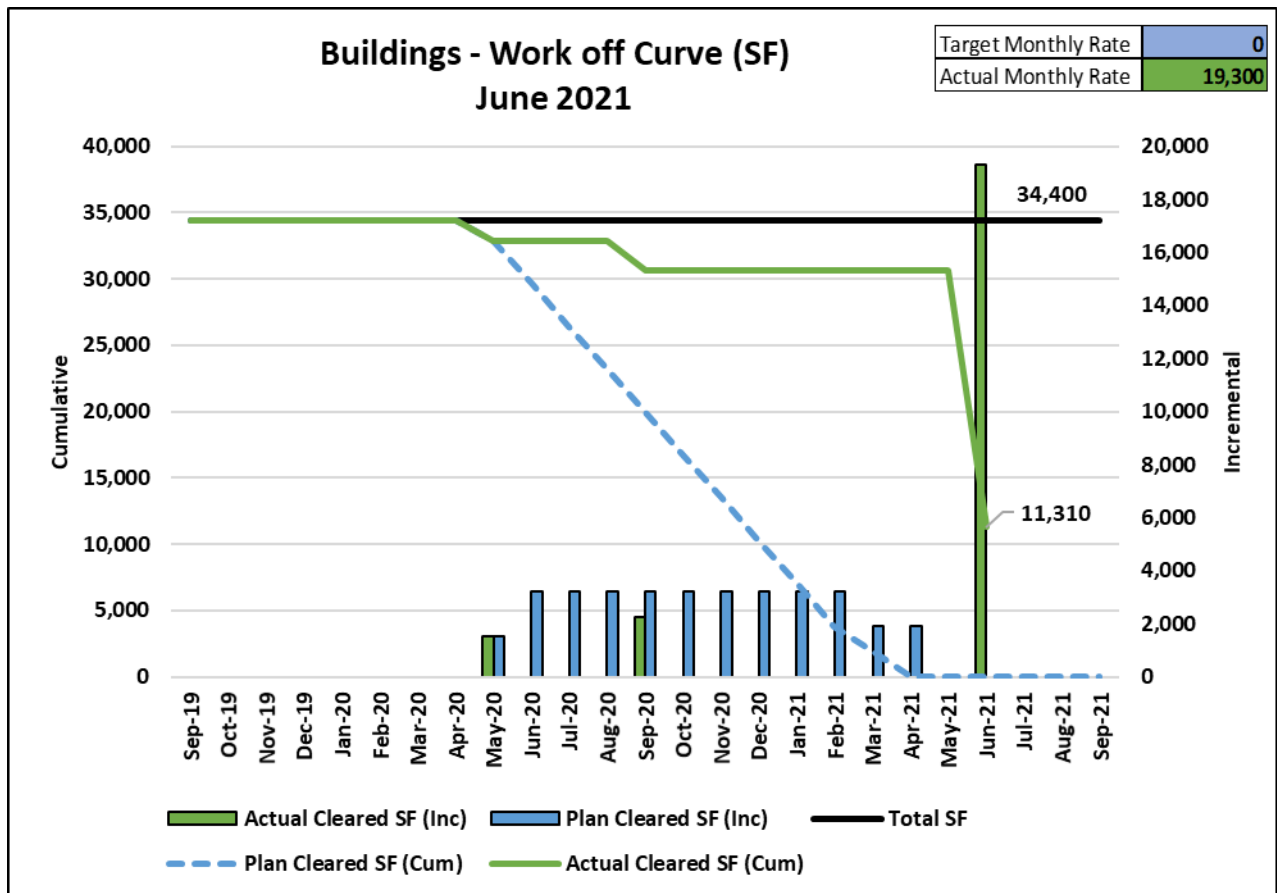
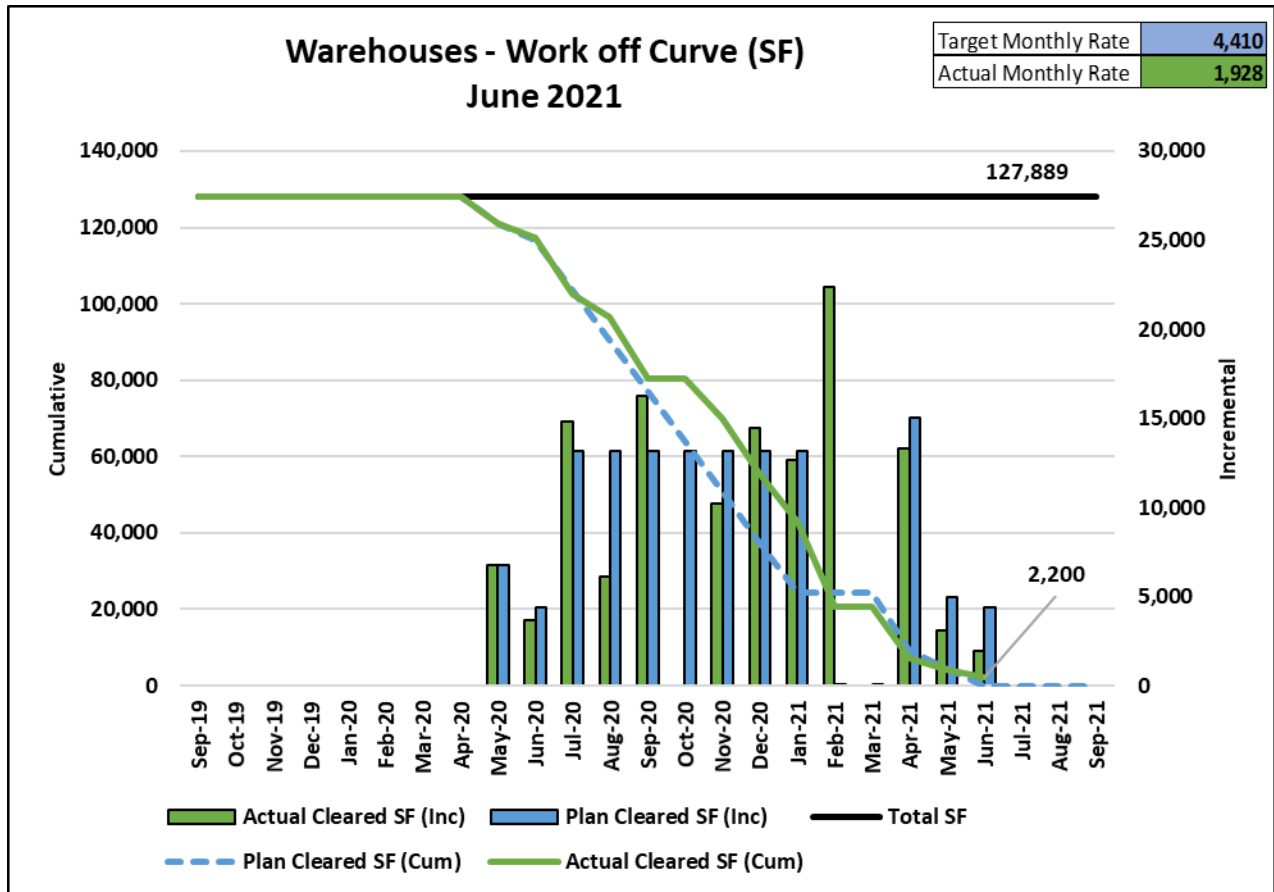


Figure 5.12-7: SRNS Warehouses – Work off Curve



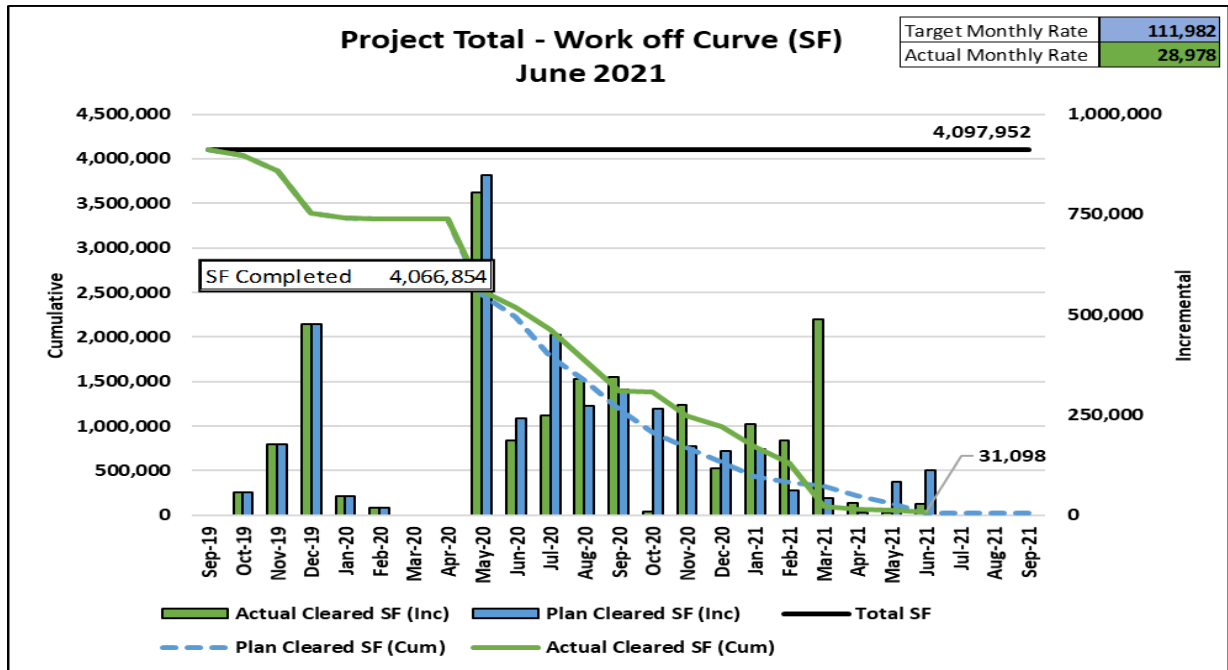
Barnwell - Work off Curve (SF) March 2021

Target Monthly Rate	0
Actual Monthly Rate	0

The chart displays the work-off curve for Barnwell in March 2021. The left Y-axis measures Cumulative SF (0 to 500,000), and the right Y-axis measures Incremental SF (0 to 180,000). The X-axis shows months from Sep-19 to Sep-21. A solid black line at 457,800 represents the Total SF. A solid green line represents Actual Cleared SF (Cum), which drops sharply in April 2020 and then fluctuates. A dashed blue line represents Plan Cleared SF (Cum), which decreases steadily. Bars represent Actual Cleared SF (Inc) in green and Plan Cleared SF (Inc) in blue.

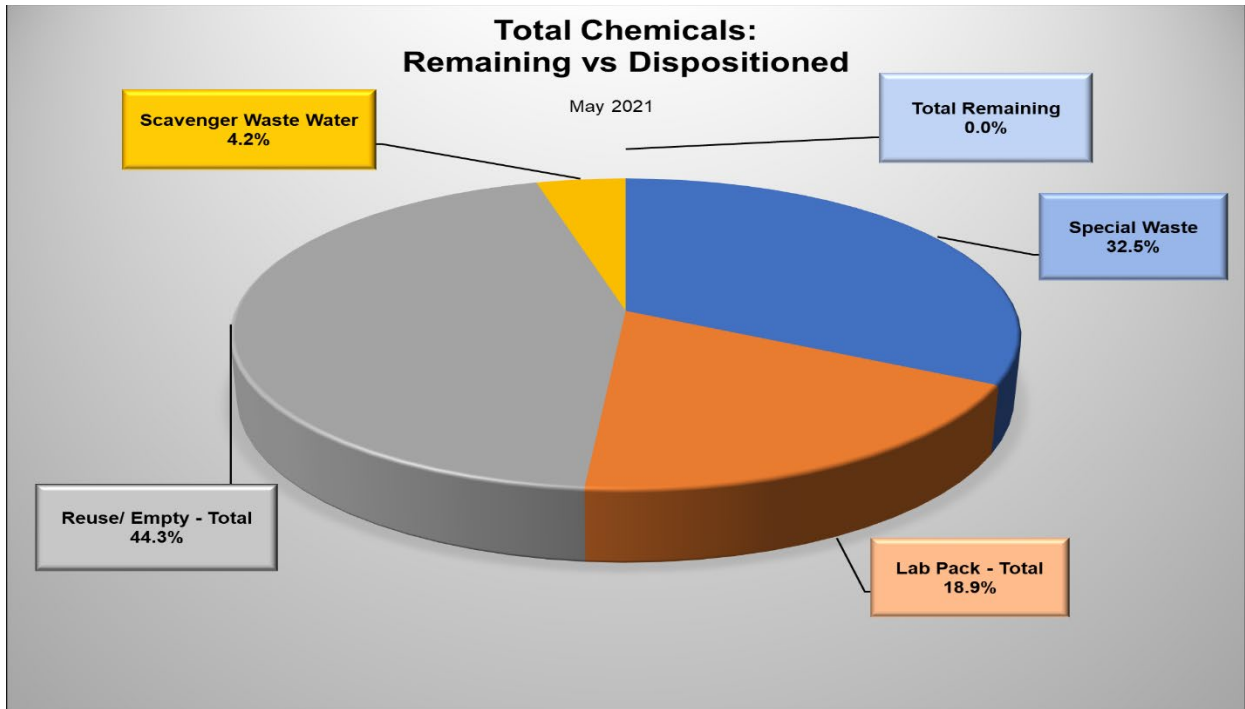
Month	Actual Cleared SF (Inc)	Plan Cleared SF (Inc)	Actual Cleared SF (Cum)	Plan Cleared SF (Cum)
Sep-19	0	0	457,800	457,800
Oct-19	0	0	457,800	457,800
Nov-19	0	0	457,800	457,800
Dec-19	0	0	457,800	457,800
Jan-20	0	0	457,800	457,800
Feb-20	0	0	457,800	457,800
Mar-20	0	0	457,800	457,800
Apr-20	180,000	180,000	277,800	277,800
May-20	180,000	180,000	277,800	277,800
Jun-20	50,000	70,000	227,800	207,800
Jul-20	50,000	100,000	177,800	157,800
Aug-20	20,000	100,000	157,800	117,800
Sep-20	10,000	100,000	147,800	87,800
Oct-20	10,000	90,000	137,800	57,800
Nov-20	120,000	70,000	257,800	27,800
Dec-20	140,000	70,000	397,800	0
Jan-21	220,000	70,000	617,800	0
Feb-21	240,000	70,000	857,800	0
Mar-21	0	70,000	857,800	0
Apr-21	0	0	857,800	0
May-21	0	0	857,800	0
Jun-21	0	0	857,800	0
Jul-21	0	0	857,800	0
Aug-21	0	0	857,800	0
Sep-21	0	0	857,800	0

Figure 5.12-9: Project Total – Work off Curve



Below depicts the methods of disposition for chemicals identified within the MOX-T Project:

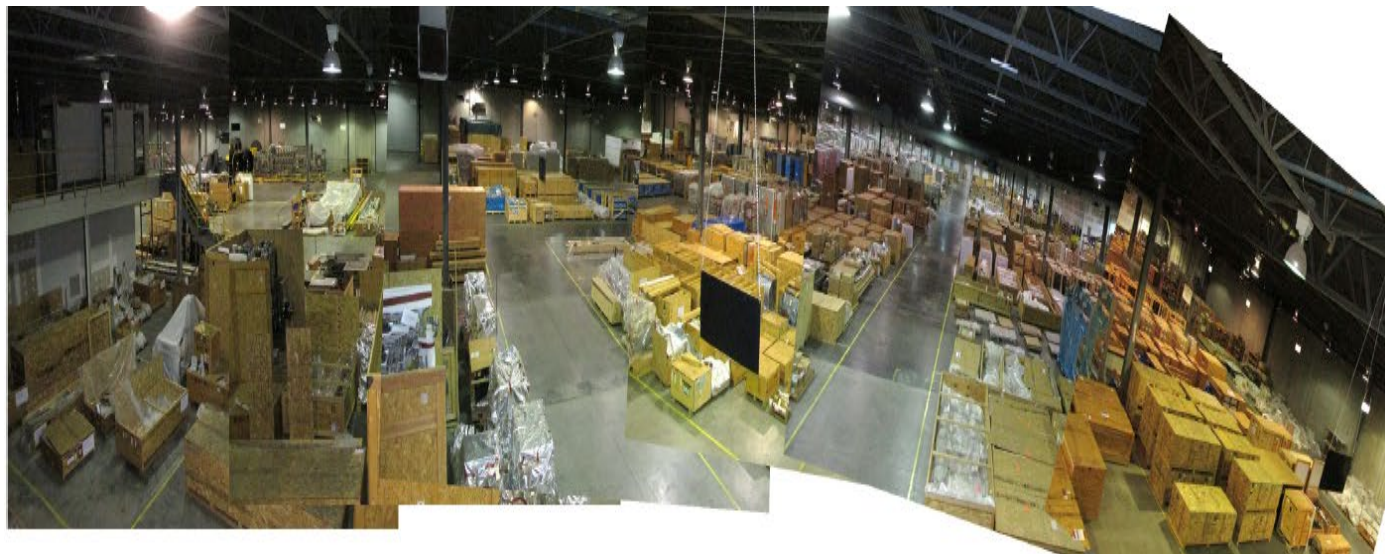
Figure 5.12-10: Total Chemicals: Remaining vs Dispositioned



Below are before and after pictures of laydown yards and warehouses that were emptied of stored material.

Figure 5.12-11: Barnwell Warehouse

BEFORE



AFTER

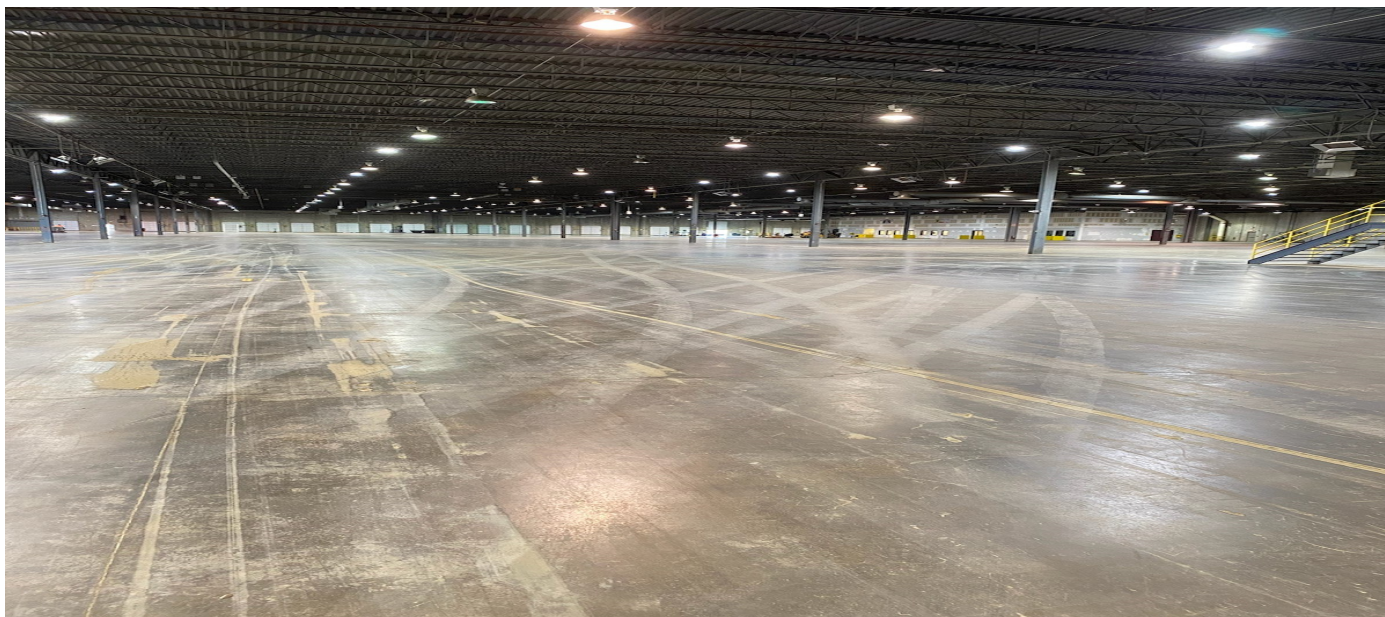


Figure 5.12-12: 226-2F Assembly Floor

BEFORE



AFTER

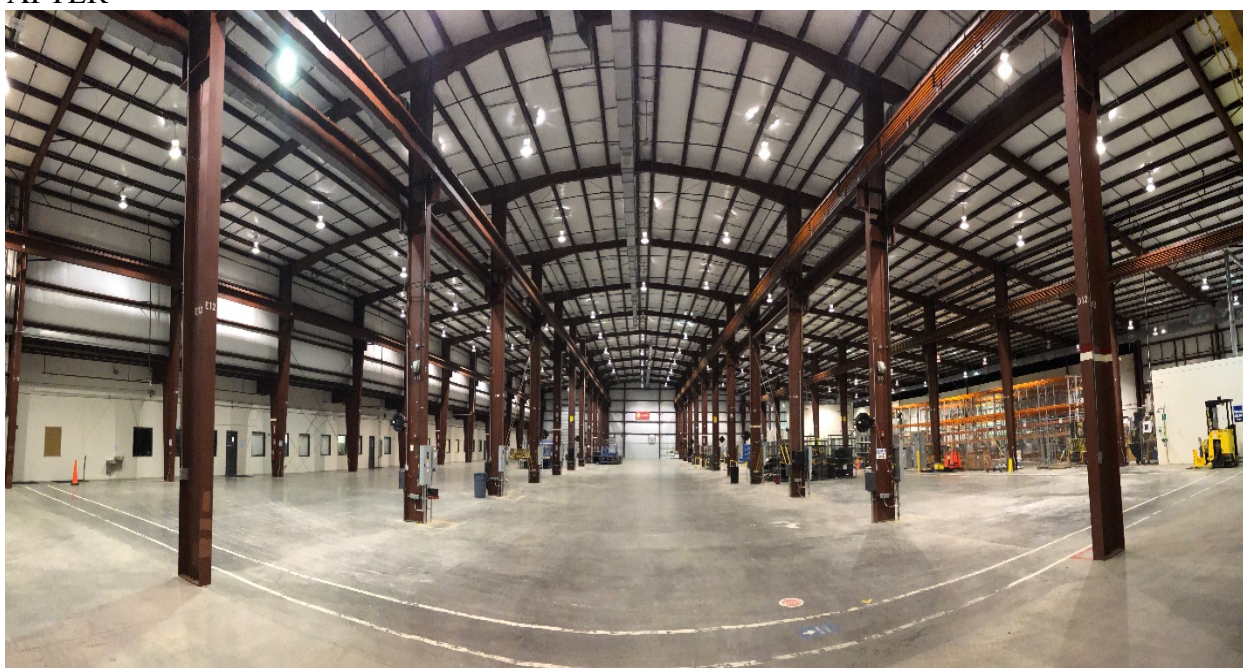


Figure 5.12-13: Laydown Yard W

BEFORE



AFTER



Figure 5.12-14: Laydown Yard Y

BEFORE



AFTER



Figure 5.12-15: Laydown Yard N

BEFORE



AFTER



6.0 REFERENCES

- 2019-NCR-39-0001, *Missing 706-3F Fire Damper and Incorrect 2hr Fire/Smoke Barrier Configuration*, dated 05/04/2019
- 2019-SA-004143 – *MOX Transition Emergency Preparedness Programmatic Assessment*, May 2, 2020
- 2020-NCR-39-0001, *Building 226-2F roof purlins code*, dated 06/02/2020
- 2020-NCR-39-0002, *Misc. Fire Barriers and Barrier Penetration Seals Inadequate For 2hr Fire/Smoke Barrier Configuration*, dated 12/07/2020
- 2021-NCR-39-0001, *Missing Fire Barrier Penetration Seals in 706-4F and 706-5F*, dated 04/27/2021
- 3B Property and Materials Management Manual, Procedure 5-1, Management of Government Property at Savannah River Site, Rev 8, dated May 11, 2021
- 41 CFR, Part 109, *DOE Property Management Regulation*
- C-RPT-F-00047, *Non 226-F Facilities Technical Baseline Report*, dated October 2020
- DOE G 413.3-16A, *Project Completion/Closeout Guide*, dated October 26, 2011
- Email, Lance p. Nyman to Maria Gauthier-Love, *Work Authorization DN 234 19 41003-01 – MOXnet*, June 20, 2019
- Manual E7, Procedure Number 1.05, *Technical Baseline Identification*, dated September 13, 2018, Rev. 11
- MFFF-PLN-004, *MO Project Property Screening Plan*, March 21019
- MOX Procurement Guide 98-17, *Sale of MOX Surplus Government Property*
- NA-APM-21-0012, Stewart to Johnson, *Contract No. DE-AC09-08SR22470, National Nuclear Security Administration (NNSA) Direction to Maintain MOXNet Through Fiscal Year (FY) 2022*, dated July 21, 2021
- NA-APM-19-0022, Cannon to MacVean, *Work Authorization No. DN 234 19 410003-00; MOX Fuel Fabrication Facility Project Termination and Transition Planning*, November 21, 2018
- NA-APM-19-0094, *Transfer of MOX Project Assets to SRNS; Due Diligence Review of Contract Compliance Issues and Request for Contractual Relief*, SRNS-F2000-2019-00074, dated March 19, 2019, March 29, 2019
- NA-APM-19-0100, *Contract DE-AC09-08SR22470, Work Authorization DN 234 19 41003-01, SRNS Contract Relief*, dated April 11, 2019
- NNSA, *APM Lessons Learned Report*, 2021
- Plutonium Disposition Program*, 2014

Plutonium Disposition: Observations on DOE and Army Corps Assessments of the Mixed Oxide Fuel Fabrication Facility, 2017

SRNS Manual 1-01, Policy 1.22, Integrated Safety Management System (ISMS), Rev.12, June 22, 2017

SRNS-F2000-2019-00074, *Due Diligence Review of Contract Compliance Issues and Request for Contractual Relief*, dated March 19, 2019

SRNS-F2000-2019-00091, *Submittal of Supplemental Information to Due Diligence Review of Contract Compliance Issues for MOX Project*, dated April 8, 2019

SRNS-F2000-2019-00152, *SRNS Assumption of Control of MOXnet*, June 21, 2019

SRNS-F2000-2021-00143, *Maintaining MOXnet Direction Through FY2022*, June 10, 2021

SRNS-J2200-2020-00058, *SRS 2019 Emergency Planning & Community Right-To-Know Act Tier II Chemical Inventory*, dated February 26, 2020

SRNS-J2200-2020-00177, *SRS 2019 Emergency Planning and Community Right-To-Know Toxic Chemical Release Inventory*, dated June 25, 2020

SRNS-J4000-2020-00049 – *DOE Order 151.1D, Implementation Plan, Phase II for MOX Termination Project*, April 28, 2020

SRNS-M0000-2019-00003, *Submittal of MOX Transition Implementation Phase Final Report*, May 31, 2019

SRNS-MOXT-2019-00046 - *GAP Analysis Report*, March 19, 2019

SRNS-MOXT-2019-00047 – *CAIR MOX Services Transition, Comprehensive Emergency Management System*, March 18, 2019

SRNS-MOXT-2019-00048 – *MOX Services Implementation Plan, Phase I*, March 19, 2019

SRNS-MOXT-2019-00052, *Transfer of Wastewater Construction Permit No. 19,241-IW from MOX to SRNS*, dated March 19, 2019

SRNS-P0000-2019-00044, *Re-Submittal of Resource Loaded Schedule for MOX Property Disposition*, dated October 31, 2019

SRNS-P0000-2020-00047, *Submittal of SRNS Plan for NNSA MOX Project Records*, May 20, 2020

SRNS-RD-2020-00276 - *MOX Termination Project Implementation Plan, Phase II*, May 1, 2020

SRNS-RP-2020-00275 Rev1- *CAIR Phase II MOX Termination Project Phase II Comprehensive Emergency Management System*, April 30, 2020

SRNS-RP-2020-00699 - *Area Emergency Coordinator (AEC)/ Facility Emergency Coordinator (FEC) Strategy for MOX/SRPPF*, October 6, 2020

Work Authorization No. DN 234 19 410003-00, Revision 0, *DNN Construction FY 2019 Implementation Plan (Statement of Work)*, Savannah River Nuclear Solutions (SRNS), November 8, 2018

Work Authorization No. DN 234 19 410003-01, Revision 1, *DNN Construction FY 2019 Implementation Plan (Statement of Work)*, Savannah River Nuclear Solutions (SRNS), February 7, 2019

Work Authorization No. DN 234 20 410003-00, Revision 0, *DNN Construction FY 2020 Implementation Plan (Statement of Work)*, Savannah River Nuclear Solutions (SRNS), September 26, 2019

Work Authorization No. DN 234 20 410003-00, Revision 0, *DNN Construction FY 2022 Implementation Plan (Statement of Work)*, Savannah River Nuclear Solutions (SRNS), August 31, 2021