



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

September 17, 2024

Robert Compernelle, President
Fansteel Metals, Inc
Formerly known as FMRI
10 Tantalum Place
Muskogee, OK 74403

SUBJECT: FANSTEEL METALS – NRC INSPECTION REPORT 2024-001

Dear Robert Compernelle:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on August 20-21, 2024, at your facility located in Muskogee, Oklahoma. This inspection examined activities conducted under your license as they relate to public health and safety, and to confirm compliance with the Commission's rules and regulations and with the conditions of your license.

Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, independent radiation measurements, and interviews with personnel. The inspection findings were discussed with James Burgess, General Manager, and Robert Miller, Radiation Safety Officer, on August 21, 2024. The enclosed report presents the results of the inspection. No violations were identified as a result of this inspection.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you chose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <https://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Martha Poston-Brown at 817-200-1181 or the undersigned at 817-200-1249

Sincerely,



Signed by Warnick, Gregory
on 09/17/24

Gregory G. Warnick, Chief
Decommissioning, ISFSI, and Reactor Branch
Division of Radiological Safety and Security

Docket No. 04007580
License No. SMB-911

Enclosure:
Inspection Report No. 040-07580/2024-001

cc w/enclosure:
K. Bufford, ODEQ
M. Hartman, ODEQ
J. Burgess, Fansteel Metals, Inc

FANSTEEL METALS – NRC INSPECTION REPORT 2024-001 - DATED SEPTEMBER 17, 2024

DISTRIBUTION:

JMonninger, ORA
 JLara, ORA
 TBloomer, DRSS
 JGroom, DRSS
 BVonTill, NMSS/DUWP/URMDB
 JSmith, NMSS/DUWP/URMDB
 GWarnick, DRSS/DIOR
 MPoston, NMSS/DUWP/URMDB
 SAnderson, DRSS/DIOR
 R4-DRSS-DIOR-DECOM

james.burgess@fmri-inc.com
kelsey.bufford@deq.ok.gov
Makenna.hartman@deq.ok.gov

DOCUMENT NAME: FANSTEEL METALS – NRC INSPECTION REPORT 2024-001

ADAMS ACCESSION NUMBER: **ML24248A265**

<input checked="" type="checkbox"/> SUNSI Review By: MRP1	ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available	Keyword NRC-002
OFFICE	NMSS/DUWP/URMD:B	SHP:DIOR:DRSS	C:DIORS:DRSS	
NAME	MPoston	SAnderson	GWarnick	
SIGNATURE	MRP1	SMG8	GXW2	
DATE	09/16/24	09/17/24	09/17/24	

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION REGION IV

Docket No. 040-07580

License No. SMB-911

Report No. 040-07580/2024-001

Licensee: Fansteel Metals, Inc., formerly known as FMRI, Inc.

Facility: Muskogee Plant

Location: Muskogee, OK

Dates: August 20-21, 2024

Inspectors: Martha R. Poston, Senior Health Physicist
Uranium Recovery and Materials Decommissioning Branch
Decommissioning, Uranium Recovery and Waste Programs
Division Office of Nuclear Materials Safety and Safeguards

Stephanie G. Anderson, Senior Health Physicist
Decommissioning, ISFSI, and Operating Reactor Branch
Division of Radiological Safety and Security

Accompanied By: James Smith, Senior Project Manager
Uranium Recovery and Materials Decommissioning Branch
Decommissioning, Uranium Recovery and Waste Programs Division
Office of Nuclear Materials Safety and Safeguards

Kelsey Bufford, Superfund Program Manager
Site Restoration and Revitalization
Cleanup and Redevelopment Branch Land Protection Division
Oklahoma Department of Environmental Quality

Makenna Hartman, Project Manager for FMRI
Site Restoration and Revitalization
Cleanup and Redevelopment Branch Land Protection Division
Oklahoma Department of Environmental Quality

Approved By: Gregory G. Warnick, Chief
Decommissioning, ISFSI, and Operating Reactor Branch
Division of Radiological Safety and Security

Enclosure

EXECUTIVE SUMMARY

Fansteel Metals, Inc.
NRC Inspection Report 040-07580/2024-001

This inspection was a routine, announced U.S. Nuclear Regulatory Commission (NRC) inspection of decommissioning activities being conducted at the Fansteel Metals, Inc. (FMRI) site in Muskogee, Oklahoma. Within the scope of the inspection, no violations were identified.

The licensee has indicated that the decommissioning fund will be depleted on or before October 1st of this year. The history of the decommissioning activities and the handling of the decommissioning fund by Fansteel and FMRI is detailed in an April 2014 Site Summary Document¹. Information associated with the contaminants onsite are provided in a December 1993 Remediation Assessment Report². Details from these documents are provided in the inspection report.

Decommissioning Inspection Procedure for Materials Licensees (Inspection Procedure 87104)

Observation of Decommissioning Activities (Risk Module (RM)-01)

NRC staff walkdown of the facility to observe the status of materials and equipment and the conditions of the building identified some issues with the buildings but due to the lack of funding it is not clear when or if these issues will be resolved. (Section 1.2)

Occupational Radiation Protection (RM-02)

The licensee implemented its radiation protection program in accordance with license and regulatory requirements. The licensee's records indicated that no workers were assigned an occupational exposure since the last inspection, all workers received required training, and no contamination issues were identified. (Section 2.2)

Security and Control of Radioactive Material (RM-03)

The licensee has adequate controls in place to protect occupational workers and the public from the radioactive materials. To the extent possible, access to radioactive materials and hazardous materials are controlled by the use of locked doors and fences as well as appropriate posting and labelling. The impact on these security programs once funding is exhausted was not evaluated. (Section 3.2)

Public Dose, Effluent Releases and Environmental Monitoring (RM-05)

The licensee conducted environmental and effluent monitoring in accordance with the license and regulatory requirements. (Section 5.2)

¹ Agencywide Document Access System (ADAMS) Accession No. ML14083A459

² ADAMS Accession No. ML060310407 (Technical Report) with supporting Tables and Drawings in ADAMS Package Accession No. ML060300444.

Management Organization and Controls (RM-06)

The licensee maintained adequate staffing and a program commensurate with the scope and risk associated with the site activities to ensure compliance with license and regulatory requirements. The licensee had emergency response and fire protection programs in effect that were appropriate for the current mode of plant operation and for licensee response. (Section 6.2)

Risk Modules 4 (Section 4.0 Waste Generation, Storage and Transportation) and 7 (Section 7.0 Final Status Surveys) were not evaluated during this inspection.

REPORT DETAILS

Site Status

The history of the decommissioning activities and the handling of the decommissioning fund by Fansteel and FMRI is detailed in an April 2014 Site Summary Document³. Information associated with the contaminants onsite are provided in a December 1993 Remediation Assessment Report⁴.

Details from these documents are as follows:

- The Fansteel/FMRI site operated to process raw materials such as slag from tin extraction, raw ore and beneficiated ores to extract tantalum and columbium from 1958 to January 1967 without a radioactive material license and from January 1967 to December 1989 under a radioactive material license granted by the AEC/NRC.
- The processing included the use of hydrofluoric acid to digest the raw materials in the Chem C Building, creating a digestion residue (including dissolved tantalum and columbium).
- Use of a series of other chemicals to separate the dissolve tantalum and columbium in the digestion residue to produce tantalum and columbium powders in either Chem A, Chem C or the sodium reduction building.
- Chemicals used in the second stage included methyl isobutyl ketone (MIBK), sulfuric acid, potassium, fluoride, sodium metals, sodium chloride, nitric acid, sodium hydroxide, and ammonia.
- The raw materials used in the first stage of processing contained low levels (approximately 0.15 percent each) of uranium oxide and thorium oxide remained in the digestion residue (waste stream) which was stored in Ponds 2 and 3. The concentrations of radioactive material (350-450 pCi/gm) in these radioactive waste stream ponds caused the Fansteel/FMRI to be issued a license by the AEC in 1967.
- Chemical Wastes were primarily calcium fluoride and were stored in Ponds 5-9.
- The failure of Pond 3 in June of 1989 that resulted in the release of approximately 90,000 gal of radioactive process waste into the Arkansas River contributed to the decision to cease operations.
- The northwestern part of the property used to store raw materials was terminated from the license in 1996 and sold, the northern part of this released property was purchased by the Port of Muskogee.

Previous inspection reports for the Fansteel/FMRI site were reviewed⁵ and the following details are highlighted in this inspection report:

³ Agencywide Document Access System (ADAMS) Accession No. ML14083A459.

⁴ ADAMS Accession No. ML060310407 (Technical Report) with supporting Tables and Drawings in ADAMS Package Accession No. ML060300444.

⁵ ADAMS Accession Nos. ML15240A196, ML17145A015, ML18106A019, ML190958A592, ML20280A722, ML21293A323, ML 22277A817 and ML23230A673.

- The licensee started Phase 1 decommissioning work in 2005. Phase 1 decommissioning work included removal of Work-in-Process (WIP) residue material from Ponds 2 and 3 and shipment of the material to an out-of-state uranium mill for use as alternate feed material.
- The removal of WIP from Pond 3 was completed in 2010.
- Removal of WIP from Pond 2 is incomplete and what removal that has occurred required the removal of soils down to the bedrock.
- Costs to complete remediation of the Fansteel/FMRI site were estimated at \$78M (in 2015 dollars)⁶, which equates to \$105 M (in 2024 dollars)⁷.
- The licensee began removing WIP material from Pond 2 in August 2011 but suspended this work in December 2011. At the time of this inspection, the licensee continued to suspended Phase 1 decommissioning due to insufficient funds.
- At the current spend rate, the funds for decommissioning the site are expected to be exhausted in October of 2024.
- In January of 2023⁸, the Governor of Oklahoma wrote to the U.S. Environmental Protection Agency and requested they add the FMRI site to the National Priority List (NPL) and complete the cleanup of the FMRI site.
- In March of 2023⁹, the EPA issued a press release to announce the Fansteel site had been added to the NPL list.

Site activities in progress during the inspection included routine license compliance activities. The licensee continued to operate the wastewater treatment system and to conduct routine radiological monitoring and surveys. In addition, the licensee occasionally decontaminated, surveyed, and free-released material from the site.

License Conditions 10 and 26 include requirements for the licensee's wastewater discharge permit. The licensee received an updated permit from the Oklahoma Department of Environmental Quality which became effective on October 1, 2020. The revised permit changed several of the water sampling frequencies and sample analysis requirements.

In accordance with NRC Materials License SMB-911, License Condition 42, the licensee is required to submit annual updates of the decommissioning schedule to the NRC. The licensee submitted the most recent schedule to the NRC by letter dated January 12, 2024¹⁰. According to the licensee's letter, the only activities scheduled for 2024 and beyond were groundwater treatment and routine health and safety activities.

License Conditions 43, 44, and 45 require the licensee to submit annual updates for expenses, income, and cost estimates. The licensee provided the requested information by letter dated March 31, 2024¹¹. The inspectors confirmed that the licensee had submitted the required financial information, although review of these requirements is performed by the NRC Project Manager. The inspection was performed in accordance with Inspection Procedure 87104 titled Decommissioning Inspection Procedure for Materials Licensees.

⁶ ADAMS Accession No. ML19074A066.

⁷ https://www.bls.gov/data/inflation_calculator.htm using January 2015 and July 2024 and starting with a value of \$78K as the calculator will not accept values over 10M. Calculated value was \$104,978.11 so rounded to \$105

⁸ ADAMS Accession No. ML230378A875.

⁹ <https://www.epa.gov/newsreleases/epa-add-oklahoma-superfund-site-national-priorities-list>.

¹⁰ ADAMS Accession No. ML24012A144.

¹¹ ADAMS Accession No. ML24114A109 and ML24114A110.

1 Observation of Decommissioning Activities (Risk Module (RM)-01)

1.1 Inspection Scope

Perform a walkdown of the licensed facility with licensee and the Oklahoma Department of Environmental Quality (ODEQ) and discuss site status under the license and regulatory requirements and assist the ODEQ Superfund Program in getting familiar with the site. Observe ongoing or completed activities that require written procedures, work plans, hazard assessments, or radiation work permits. Identify hazards and review licensee commitments in license documents and reference documents such as material safety data sheets to familiarize themselves with potential hazards onsite.

1.2 Observations and Findings

The inspectors conducted a site walkdown accompanied by representatives of ODEQ, Land Protection Division, due to FMRI being added to the U.S. Environmental Protection Agency's National Priority List at the request of the Governor of Oklahoma. During the walkdown, the inspectors were able to assess the condition of the various buildings and the ponds onsite. Pond 3 has been remediated. In addition to the radioactive materials stored in the Chem C building and the sodium reduction building discussed in Section 3 (Security and Control of Radioactive Materials), trash and some non-hazardous liquids are stored in the Chem C building. Liquids have been removed from metal drums and transferred to plastic drums and the majority of the trash has been transferred from metal drums to supersacks. Due to the rusted condition of some metal drums, a small amount of trash was left in the drums rather than risking injury to laborers during transfer. The rusted drums (most empty) continue to be stored in the Chem C building. The roof on the Chem C building has open areas due to a skylight where the glass has been removed or broken, but otherwise appeared to be in reasonable condition.

Some hazardous liquids and potentially contaminated trash were stored in the Chem A building, either in the small bay at the back of the building (trash) or the north side of the large main bay. The floor of the Chem A building has depressions where grating should be in place to make the floor level, however, the grating has either fallen into the depression or has been removed. The north side of the building where the floor for the second story (roof of the first story) is in relatively good condition, but the south side of Chem A which is a mixture of distinct levels as seen on the north side of the building and an open bay with no floor separation, shows signs of damage. Specifically, debris on the floor of the open bay shows a lot of crumbling of the structure and there are several places where sunlight shines into the Chem A building. Despite this evidence of building degradation, the inspectors did not identify any issues associated with the safe control and storage of licensed material.

The inspectors did not go inside the former sodium reduction building due to limited walk-in access to the building due to the stacking of the supersacks. The inspectors walked around the ponds to assess conditions, the pond levels were low with many floats resting on what appeared to be dry soil.

1.3 Conclusions

The inspectors identified some building and housekeeping degradation during a walkdown of the facility to observe the status of materials and equipment and the conditions of the buildings and operating systems. The housekeeping and building degradation issues were observed but did not involve the safe control and storage of licensed material. The licensee has taken action to store hazardous materials in safer parts of the building. Pictures taken during the site walkdown are attached as Enclosure 1 to this inspection report.

2 Occupational Radiation Protection (RM-02)

2.1 Inspection Scope

Assess trends in radiation protection program performance such as increase in occupational exposure. Assess implementation of ALARA principles. Review employee training, radiation work permits, routine monitoring, instrument calibration and other elements of the radiation protection program.

2.2 Observations and Findings

The licensee maintained a radiation protection program commensurate with the limited activities in progress. Activities in place at the time of the inspection included routine radiological surveys, worker training, and instrument calibrations. Equipment release surveys were conducted as needed to support site activities. No special work permits were issued since the last inspection.

Due to funding issues, the site is operating in a surveillance and maintenance mode. Other than sampling and surveys required by license conditions or radiation safety requirements, the licensee's occupational workers are not expected to come into contact with radioactive materials that could result in a significant external or internal exposure. As a result of this funding crisis, the licensee discontinued use of external personnel monitoring devices at the end of 2007 as allowed by Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1502, based on historical results and the work activities onsite. The licensee also discontinued the use of personnel lapel air samplers for monitoring internal dose in 2012.

Radon sampling required under License Condition 10 is conducted on a quarterly basis in the Chem A building only. Records since the last inspection indicate that these quarterly sampling events are conducted quarterly, and no items or issues of concern associated with radon levels in the Chem A building were identified.

The inspectors reviewed a selection of the daily, weekly, bi-weekly, monthly, quarterly, and annual surface contamination and area radiation surveys conducted since the previous inspection. The Radiation Safety Officer (RSO) established the survey frequencies based on prior history and a checklist of required surveys is maintained by the health physics technician responsible for conducting the surveys at the site. All survey forms were determined to be complete with the specific locations of measurements being specified on the forms. No survey result exceeded the associated action levels. The inspectors noted that the completed surveys were reviewed by the RSO.

The licensee established a program for routine site inspections. The routine inspections were documented on log sheets that specified the attribute to be inspected and the frequency requirement. The items inspected included survey meter source checks, perimeter sample station checks, pond pH level measurements, and visual inspection of the licensed area including fire protection equipment, locked doors, secure environmental sampling equipment, and posting. The inspectors confirmed that the licensee was maintaining its program for routine site inspections. Routine site inspections and surveys are performed by the health physics technician and reviewed and approved by the RSO. These records were reviewed, and only minor errors were identified.

Radiation safety training was provided annually to all site workers in June and July of 2024. The training included emergency response training. Visitors to the site were provided safety and health training before being allowed to access areas other than the administration building.

The licensee continued to maintain calibration records for the radiological survey meters, filter sample counter, and environmental air samplers in use at the site. The inspectors verified instruments in use had current calibrations and were in working order.

License Condition 33 requires, before the release of any equipment, characterization of all interior and exterior surfaces including remediation as appropriate in accordance with Regulatory Guide 1.86. Four equipment release surveys to allow for equipment maintenance or repair were conducted in calendar year (CY) 2023 since the previous inspection and five equipment release surveys have been conducted so far in CY2024. and no concerns were found.

2.3 Conclusions

The licensee implemented its radiation protection program in accordance with license and regulatory requirements. The licensee's records indicated that no workers were assigned an occupational exposure since the last inspection, all workers received required training, and no contamination issues were identified.

3 **Security and Control of Radioactive Materials (RM-03)**

3.1 Inspection Scope

Observe the licensee's security and control of radioactive materials with particular emphasis on storage of radioactive waste.

3.2 Observations and Findings

The inspectors observed the licensee's security of the facility and control of licensed material. The licensee uses a monitored security system for detection of unauthorized entries. The licensee also maintains a posted perimeter fence and gates around the licensed area.

The inspectors reviewed the licensee's indoor storage of licensed material. At the time of the inspection, the licensee was storing bagged WIP material within the Chem C building and the sodium reduction building. The licensee also continued to store about 7,000 cubic yards of potentially contaminated soil in an outdoor area under synthetic liners. The liner had deteriorated such that approximately half of the soil was exposed, and vegetation has started to grow in that exposed soil.

3.3 Conclusions

The licensee has adequate controls in place to protect occupational workers and the public from the radioactive materials. To the extent possible, access to radioactive materials and hazardous materials are controlled by the use of locked doors and fences as well as appropriate posting and labelling.

4 **Waste Generation, Storage and Transportation (RM-04)**

Risk Module 4, Waste Generation, Storage and Transportation was not reviewed during this inspection as the licensee has not changed the storage conditions for the waste onsite, generated any new waste or transported any waste offsite since the previous inspection.

5 **Public Dose, Effluent Releases and Environmental Monitoring (RM-05)**

5.1 Inspection Scope

Verify that the licensee is implementing a radiation protection program that ensures radiation dose levels and effluent releases in unrestricted areas did not exceed the limits for public dose during decommissioning. Assess trends in effluent and environmental monitoring data, including groundwater monitoring.

5.2 Observations and Findings

The licensee's airborne effluent monitoring program was described in the July 24, 2003, decommissioning plan letter referenced in License Condition 10. The program included monitoring the licensee's release rates of uranium and thorium by measuring alpha activity in weekly air samples continuously collected at six locations. The inspectors confirmed the alpha sample results were below the licensee's approved administrative level of $2.85E-14$ microcuries per milliliter ($\mu\text{Ci}/\text{mL}$) and the action level of $4.3E-14$ $\mu\text{Ci}/\text{mL}$ (both of these values are listed on the appropriate form for ease of review) since the previous inspection. In addition, quarterly radon samples were collected at three locations: the background perimeter, environmental perimeter (which represents the maximum exposed member of the public), and the front gate. Radon concentrations since the previous inspection were verified by the inspectors to be below ten percent of the effluent limit.

License Conditions 10 and 26 reference Part B of the license application and the 2003 decommissioning plan. Section 11 of the 2003 decommissioning plan described the requirements for the liquid effluents and environmental

monitoring programs. Additional liquid effluent requirements were provided in the licensee's discharge permit issued by ODEQ. Groundwater collected from the intercept trench and the Pond 3 french drain is treated and discharged into the Arkansas River through Outfall 001. Three additional outfalls into the Arkansas River, Outfalls 002, 003, and 005, are used only for discharge of storm water runoff.

Nineteen wells and four sumps were used to monitor groundwater at the site. Samples collected since the last inspection were reviewed and none of the sample results exceeded the 15 picocuries per liter (pCi/L) action level for gross alpha or the 50 pCi/L action level for gross beta.

5.3 Conclusions

The licensee conducted environmental and effluent monitoring in accordance with the license and regulatory requirements.

6 Management Organization and Controls (RM-06)

6.1 Inspection Scope

Verify the licensee has implemented the appropriate programs for management oversight and control of decommissioning activities. Ensure the licensee maintained adequate staffing and a program commensurate with the scope and risk associated with the current activities to ensure compliance with the license and regulatory requirements.

6.2 Observations and Findings

The licensee's organizational requirements are provided in Figure 9-1 of the 2003 decommissioning plan, referenced in License Condition 10.

Staffing consisted of the general manager, health physics technician, and a part time primary RSO. The general manager assumes the position of alternate RSO when the primary RSO is not onsite. The general manager reported to the company president, who occasionally visited the FMRI site. The licensee had established arrangements with a contract firm for a supply of laborers should the need arise for additional staff but due to funding issues this arrangement has not been used. Site staffing was adequate to ensure compliance with regulatory and license requirements and commensurate with the scope and risk associated with current site activities (maintenance and surveillance only).

License Conditions 10 and 14 specify the requirements for the radiation safety committee. The licensee's records indicated that the committee met quarterly as required. Annual program reviews were conducted as required by 10 CFR 20.1101(c) and License Condition 10.

6.3 Conclusions

The licensee maintained adequate staffing and a program commensurate with the scope and risk associated with the site activities to ensure compliance with license and regulatory requirements.

7 Final Status Surveys (RM-07)

Risk Module 7, Final Status Surveys was not reviewed during this inspection as there was not property identified by the licensee that was ready for survey to release from the licensed area.

8 Exit Meeting Summary

The inspectors presented the inspection results to the licensee's representatives on August 21, 2024. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

Partial list of Persons Contacted

Licensee

J. Burgess, General Manager
G. Daniels, Health Physics Technician
R. Miller, Radiation Safety Officer

Inspection Procedure Used

IP 87104 Decommissioning Inspection Procedure for Materials Licensees

Items Opened, Closed and Discussed

Open

None

Closed

None

Discussed

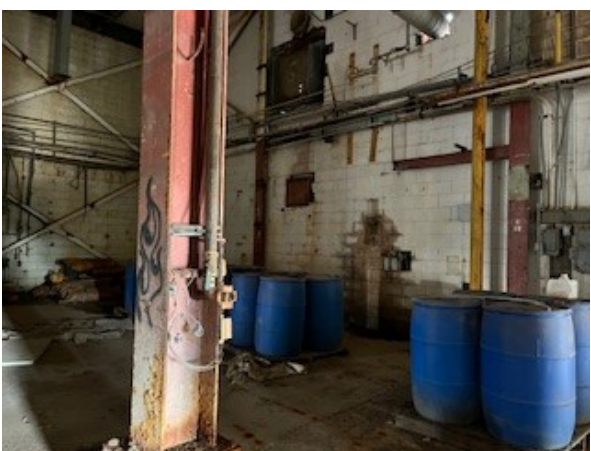
None

List of Acronyms

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
CY	Calendar Year
IP	Inspection Procedure
µR/hr	microrentgen/per hour
NRC	Nuclear Regulatory Commission
ODEQ	Oklahoma Department of Environmental Quality
RM	Risk Module
RSO	Radiation Safety Officer
WIP	Work in Process

Site Photos as of August 21, 2024

Chem A Building



Chem C Building





Pond 3 Area (pond, nearby monitoring stations and sumps)



Records Storage Buildings



Pond 2 Trench Area



Boneyard and Lime Amendment Area



Chemical Waste Ponds (5 through 9)



Soil Burrito

