

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 40-07580/93-02

License: SMB-911

Licensee: Fansteel Incorporated  
Number Ten Tantalum Place  
Muskogee, Oklahoma 74401

Facility Name: Fansteel

Inspection At: Muskogee, Oklahoma

Inspection Conducted: November 17-18, 1993

Inspector: Robert J. Evans, Radiation Specialist

Accompanied By: Harvey J. Spiro, Office of Nuclear Materials Safety and  
Safeguards, Decommissioning and Regulatory Issues Branch

Approved: William L. Fisher  
William L. Fisher, Chief,  
Nuclear Materials Licensing Section

12/27/93  
Date

Inspection Summary

Areas Inspected: Special, announced inspection of the licensee's decommissioning activities as they relate to radiation safety and compliance with the Commission's rules, regulations, and conditions of the license. The primary goals of this inspection were to review the licensee's corrective actions taken in response to previous violations and to review the site remediation process. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, independent measurements, a site tour, and observations by the inspector.

Results:

- At the time of the inspection, activities in progress included all normal actions such as routine sampling, as well as winterization of the facility, and compilation of the site characterization data (Section 1).
- The east side characterization survey has been completed. This indicated the licensee would probably be able to meet the December 31, 1993, deadline for submittal of the remedial assessment (site characterization) report to the NRC (Section 1).
- The licensee's management and organization were adequate for the activities in progress at Fansteel (Section 2).

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- The licensee has developed a primary plan of action involving the export of source material to Thailand. The licensee's concern for personnel safety was evident throughout the inspection. None of the plans discussed with the NRC inspector appeared to violate any NRC regulation or license condition (Section 3).
- The corrective actions taken in response to ten previous violations were reviewed and were determined to be acceptable at this time (Section 4).

Summary of Inspection Findings:

- Violation 40-07580/9101-A was closed (Section 4.1).
- Violation 40-07580/9101-B was closed (Section 4.2).
- Violation 40-07580/9101-C was closed (Section 4.3).
- Violation 40-07580/9101-D was closed (Section 4.4).
- Violation 40-07580/9102-A was closed (Section 4.5).
- Violation 40-07580/9102-B was closed (Section 4.6).
- Violation 40-07580/9201-A was closed (Section 4.7).
- Violation 40-07580/9201-B was closed (Section 4.8).
- Violation 40-07580/9301-1 was closed (Section 4.9).
- Violation 40-07580/9301-2 was closed (Section 4.10).

Attachment:

- Attachment 1 - Persons Contacted and Exit Meeting

## DETAILS

### 1 SITE STATUS

The Fansteel facility was used for the production of tantalum and columbium metal products. The U.S. Atomic Energy Commission granted Source Materials License SMB-911 to Fansteel on January 27, 1967, for the possession of source materials, uranium and thorium, which were residues of the production process. The licensee ceased process production in late 1989. During February 1993, Fansteel informed the NRC that they would not perform onsite resource recovery activities as originally expected, but planned to export the process residues to Thai Tantalum Co., Ltd., in southern Thailand, which would perform the metals recovery more cost-effectively.

A sample shipment of eight barrels left the site in April 1993 and arrived in Thailand in July 1993. The material was sent to the facility in Thailand to allow for the demonstration of the feasibility of the metal recovery process to the Thai government. At the time of the inspection, the licensee was still waiting on an import license to allow for full scale shipments into Thailand. The licensee suspects that full scale shipment of pond residuals will not begin until the fourth quarter of 1994. The licensee had hoped to begin shipments in January 1994. Fansteel plans to complete the decommissioning of the site after the process residues are shipped to Thailand.

During July 1993, the licensee submitted to the NRC an application for an amendment to License SMB-911. The amendment was submitted for the release for unrestricted use of a portion of the facility referred to as the Northwest Property Area. This area consisted of approximately 35 acres of open land, and several buildings, including the Services Building (which also includes a warehouse), Sintering Building, Electron Beam Building, a guardhouse, and two metal storage buildings. The licensee's Radiation Survey and Remedial Assessment for the Northwest Property Area is currently under NRC review. The NRC's confirmatory survey of the Northwest Property Area has not been scheduled as of yet.

Activities in progress at the time of the inspection included all normal activities such as well sampling, as well as winterization of the site and assembly of the site characterization data. The site was being prepared for winter, in part, by isolating and draining water lines to unheated buildings and turning off power to unused buildings. Additionally, the remedial assessment/site characterization data was being assembled for submittal to the NRC. The field work was completed in September 1993 and the final report was required to be submitted to the NRC by December 31, 1993.

The licensee informed the NRC inspector that they had located a buyer for the electron beam furnace. The licensee also stated that the name of the buyer was proprietary information. The NRC inspector acknowledged the licensee's request.

## 2 ORGANIZATION AND MANAGEMENT

The licensee's organization and management were reviewed by the inspector.

### 2.1 Discussion

The licensee's organization consisted of five full-time employees, including: (1) the Corporate Project Manager, who was also the Plant Safety Director and Plant Manager, (2) the Plant Radiation Safety Officer, (3) one Well Sampler, (4) a secretary, and (5) one Maintenance Superintendent. Fansteel also employs four contractors, including one consultant, two maintenance workers, and one janitor. The consultant was used occasionally as a bookkeeper, shipper, or purchasing agent, on a part-time basis. Since the last inspection in August 1993, two employees have left the company. The Plant Radiation Safety Officer and one maintenance worker are no longer employed at the facility. The Alternate Plant Radiation Safety Officer was recently promoted to the position of Plant Radiation Safety Officer.

The licensee was considering promoting the Maintenance Superintendent to the position of Alternate Plant Radiation Safety Officer. The NRC inspector reminded the licensee that the facility must comply with License Condition 11, which requires both the Plant and Alternate Plant Radiation Safety Officers to possess a bachelor's degree in the biological or physical sciences, engineering, or industrial hygiene. If the licensee wants to promote someone without a bachelor's degree to the position of Alternate Plant Radiation Safety Officer (apparently the Maintenance Superintendent only possessed an Associates Degree), then the licensee should submit a license revision request to the NRC to change License Condition 11.

### 2.2 Conclusions

The licensee's management and organization were adequate for the activities in progress at Fansteel.

## 3 LICENSED MATERIAL PROGRAMS (87100)

An inspection of selected portions of the licensee's programs was conducted to determine compliance with NRC and license requirements. The inspection also was performed to determine if licensed activities were being conducted or planned in a manner that would ensure the health and safety of workers and the general public.

The program area inspected consisted of the licensee's processes and procedures planned for use during the retrieval, packaging, and shipment of radioactive sludges from three on-site ponds. The inspection included a site tour and a detailed discussion by the Corporate Manager of the proposed short term remediation plans.

### 3.1 Site Remediation Plans

The site contains roughly 18,000 tons of residue material. The licensee plans to reclaim, package, and ship the material located in Ponds 2, 3, and 5 to a company in Thailand as part of the decommissioning process. The licensee has also developed a contingency plan to process the pond sludges within the United States if the primary plan (shipment to Thailand) cannot be implemented.

Prior to any onsite activity, personnel training and testing would be necessary and should include mining techniques. Personnel safety and equipment requirements would have to be established. From a radiological standpoint, the licensee plans to use the same protocol that was used during the site characterization program, including mobile air sampling and bioassays. Since the licensee plans to package the sludge material wet, this method would eliminate the need to perform stack sampling during dryer operation (License Condition 24). The licensee also plans to use a contractor to support the health physics activities as required.

The material in Pond 2 would be recovered first. Pond 2 is currently covered with about 1 foot of topsoil and is estimated to be 12 feet deep. This pond has been covered with topsoil for about 12 years. The licensee plans to use a backhoe to excavate the material, starting from the western side of the pond. The backhoe will have an enclosed cab with fresh air supplied through an elevated stack. Once an opening was established in the pond, a low ground pressure dozer would be used to move material to the backhoe. All equipment is expected to be cleaned daily.

The material from Pond 2, estimated to be at least 55 percent solids, would be placed in a feeder bin. The bin would be used to transfer the material into lined 55 gallon drums. The barrels would then be sealed and placed on pallets for shipping. Pond 5 would be reclaimed using the same basic method as was used on Pond 2. Pond 5 is estimated to have material that is at least 80 percent solids. The licensee plans to start excavating Pond 5 on the north side. Some of the material from Pond 5 was previously excavated and is stored in unapproved shipping containers in the Chemical A Building.

Pond 3 would then be excavated after the first two ponds. Pond 3 was scheduled last because it was the location where water from the other ponds was going to be dumped during the excavation process. Pond 3 was estimated to contain material that was about 31 percent solids. An electric powered pump mounted on floats would be used to excavate the pond material. The pump operator would be located in an enclosed cab on the south end of the pond. Unlike the other two ponds, the slurry material from Pond 3 would be decanted to remove free liquids prior to packaging. This method would be used to reduce the volume of the pond material for shipment.

The licensee estimated that about 62,000 barrels may be needed to ship all of the material to Thailand. The barrels will be placed on pallets, with four barrels per pallet. The pallets will be moved by flatbed trailer or rail car

to the Port of Muskogee, located adjacent to the facility. The pallets will be placed on barges (1100 pallets per barge) and shipped to New Orleans. From the Port of New Orleans, the material will be placed on a ship bound for Thailand. The licensee claimed that the material will be moved only by properly licensed haulers during the trip to Thailand.

A contingency plan has been developed in case the company in Thailand decides not to process the pond sludges. The licensee is continuing research and development activities with a consultant to determine if domestic reprocessing can be an economical alternative. A tailings plant in Denver has all of the required equipment needed for the reprocessing, except the ion exchange columns. If this domestic reprocessing is determined to be the most economical method and is implemented, the pond sludge material would be shipped by rail to the plant in Denver.

On October 5, 1993, the licensee sent a letter to the NRC in response to a request for more information about the pond reclamation activities. The NRC was concerned with the process because the activities planned may not be authorized under the conditions established by the current license. In the October 5, 1993, letter, the licensee briefly described the process to be used and stated their position that a license revision was not necessary. During the November 1993 inspection, the licensee committed to expand on the reclamation process in a letter to the NRC. This letter was received by the NRC in late November 1993. At the end of the inspection period, the decision of whether or not a license amendment is needed for pond reclamation had not been made by the NRC.

### 3.2 Conclusions

The licensee has developed a primary plan of action involving export of source material to Thailand, where the material originated from. The licensee's concern for personnel safety was evident throughout the inspection. Additionally, none of the plans discussed with the NRC inspector appeared to violate any NRC regulation or license condition. If the licensee decides to pursue the contingency plan (domestic reprocessing), then the licensee should immediately inform the NRC and provide detailed information on their proposed plan of action.

## 4 FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS AND DEVIATIONS (92702)

### 4.1 (Closed) Violation 40-07580/9101-A: Radiation Safety Committee Not Properly Staffed

The licensee submitted a revision request for License SMB-911 to the NRC in July 1990. The submittal requested, in part, a change to the organizational structure of the radiation safety committee. During the April 1991 inspection of the facility, the NRC inspector noted that two members of the Radiation Safety Committee had terminated their employment with the company prior to the July 1990 revision request. The inspector concluded that the licensee had

revised the organizational structure without first obtaining approval from the NRC.

In the violation response letter to the NRC, the licensee stated that two members of the committee, the process engineer manager and the chemical operations manager, left the company when their positions were eliminated. The positions were eliminated after the facility formally closed in February 1990. The licensee committed to provide documentation to the NRC in a timely manner when there is a change in the organizational structure of the radiation safety committee. The licensee's July 1990 revision request has not been incorporated into their license as of yet. However, during an inspection conducted in August 1993, the NRC inspectors concluded that the licensee's management and organization was adequate for the activities in progress at Fansteel.

4.2 (Closed) Violation 40-07580/9101-B: Failure to Perform Air Samples During Equipment Move

During the April 1991 inspection, the NRC inspector concluded that the licensee failed to take air sample surveys for radioactive materials during equipment removal from the "ball mill room" in July 1990. This violation was disputed by the licensee. The NRC, in a letter dated December 3, 1992, accepted the licensee's response to the violation.

4.3 (Closed) Violation 40-07580/9101-C: Failure to Administer Training Tests

This violation was issued when the NRC inspector concluded that the licensee was not administering written tests during initial radiation safety training sessions contrary to License Condition 18 requirements. In the response letter, the licensee committed to be in compliance by May 1991. During NRC inspections conducted in November/December 1991, the inspector verified that corrective actions had been taken. The inspector noted that examinations had been given to the training participants in that inspection period.

During the November 1993 inspection, the NRC inspector reviewed the file containing the previously administered tests. A common test error was found, which suggested that inaccurate information involving radiation hazards was being provided to training participants. The question of concern asked which type of radiation was the most hazardous if internally deposited. The test answers were routinely "beta," however, the alpha particle is in fact the type of radiation that is internally the most hazardous. Alpha particles are the most hazardous from a biological standpoint because of its high linear energy transfer (rate of energy loss per unit of length) properties. The inspector reminded the licensee to ensure the material presented to training participants was technically correct. Additionally, the inspector noted the dates of the annual training tests were inconsistent. Tests were administered in December 1992, June 1992, and January 1993. The inconsistency in test dates indicated that the licensee should establish a fixed month for annual training.

4.4 (Closed) Violation 40-07580/9101-D: Failure to Develop Written Procedures for Radiation Safety

This violation was issued when the NRC inspector concluded that procedures had not been developed for selected activities involving radiation safety, contrary to License Condition 15 requirements. This violation was disputed by the licensee. The NRC, in a letter dated December 3, 1992, accepted the licensee's response to the violation.

4.5 (Closed) Violation 40-07580/9102-A: Failure to Calibrate Two Survey Meters

During an inspection conducted in November/December 1991, the NRC inspector identified two survey instruments that were out of calibration. In their response letter to the violation, the licensee stated that the instruments had not been used for over two years. The licensee committed to segregate the instruments used on a daily basis from instruments that have been retired from use. Additionally, the licensee committed to use a calibration chart to keep track of instrument calibration.

4.6 (Closed) Violation 40-07580/9102-B: Failure to Properly Label Drums Prior to Shipment

This violation was issued when the NRC concluded that the licensee failed to properly label drums of ore and slag process waste prior to shipment in August 1991. The white "Radioactive Level I" sticker, required by Department of Transportation regulations, was not attached to the drums prior to shipment. Corrective actions taken were appropriate. The eight barrels shipped in May 1993 were confirmed to have been properly labelled prior to shipment.

4.7 (Closed) Violation 40-07580/9201-A: Failure to Calibrate Three Survey Instruments

During a September/October 1992 review of the licensee's portable survey instrument calibration records, the inspector determined that three survey instruments had calibration intervals greater than the required 3 month intervals. This was a repeat violation of License Condition 9. The corrective actions taken in response to the previous Violation 40-07580/9102-A apparently were inadequate to prevent a repeat of the situation. Further discussion of the licensee's corrective actions taken in response to this repeat violation is provided in Section 4.9 below.

4.8 (Closed) Violation 40-07580/9201-B: Failure to Maintain NRC Form-5 Information

During the September/October 1992 inspection, the licensee did not have exposure records for the last quarter of 1991 and the second quarter of 1992 on file. In the response letter, the licensee stated the records were being held by the vendor pending resolution to a billing dispute. Corrective



actions taken included changing vendors. Copies of the missing records were attached to the violation response letter.

4.9 (Closed) Violation 40-07580/9301-1: Failure to Calibrate One Survey Instrument

During the August 1993 inspection, one survey instrument was identified that had not been calibrated in the required three month interval. This was a repeat violation of License Condition 9. In the response letter, the licensee named two reasons for the violation. First of all, the licensee experienced an unanticipated delay in the return of meters which had been sent out for calibration. The second reason for the violation was that two people were responsible for meter calibration, which caused internal confusion. During the November 1993 inspection, the licensee's longer term corrective actions for the repeat violations were discussed with the NRC inspector. The licensee claimed that the survey instruments used during the site characterization were well controlled; however, the instruments used during day to day operations were not as well controlled. Most of the licensee's survey meters have since been retired and only five are still in use. The inspector confirmed that all instruments in use at that time were up to date in calibration.

4.10 (Closed) Violation 40-07580/9301-2: Failure to Maintain NRC Form-5 Information

During the August 1993 inspection, the licensee did not have exposure records for the first quarter of 1993. This was determined to be a repeat violation of 10 CFR 20.401 requirements. In the response letter, the licensee claimed that the thermoluminescent badges were lost in the mail. The corrective actions taken in response to the first violation could not have prevented the second violation since the causes of the events were different. In the response letter, the licensee committed to use a different carrier service. The NRC inspector verified that the new carrier service had been successfully used for the third quarter 1993 badges.

## ATTACHMENT

### 1 PERSONS CONTACTED

#### 1.1 Licensee Personnel

J. Hunter, Corporate Project Manager  
C. Vaughn, Plant Radiation Safety Officer

#### 1.2 Contractor Personnel

T. Carlile, Fansteel Consultant

#### 1.3 State of Oklahoma

L. Kirk, Acting Section Manager, Hazardous Waste Division, Oklahoma State  
Department of Environmental Quality

#### 1.4 NRC Personnel

H. Spiro, Project Manager, Office of Nuclear Materials Safety and Safeguards,  
Decommissioning and Regulatory Issues Branch

### 2 EXIT MEETING

An exit meeting was conducted on November 18, 1993. During this meeting the inspectors reviewed the scope and findings of the inspection with the personnel listed above. The licensee identified as proprietary information the purchaser of the electron beam furnace; therefore, that information was not provided in this inspection report.