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40-7580

Fansteel
Metals
number ten tantalum place · Muskogee, Oklahoma 74401 (918) 687-6303

September 12, 1989

United States Nuclear Regulatory Commission
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle & Safety, NMSS
Washington, D.C. 20555

ATT: Lee Rouse

RE: Fansteel, Inc., Muskogee, OK
Plant, NRC License SMB-911

Gentlemen:

We are considering process changes which would allow discontinuing the pond storage of radioactive residues. Specifically, residues from the solvent extraction and separation process may be neutralized and filtered through a filter press or other mechanical device. The liquid component will be fed to the wastewater treatment system and solids will be containerized for storage or disposal.

We would appreciate it if you would amend the subject license to accommodate these changes. The required changes to the "Information in Support of Fansteel Application for Source Material License" dated May 5, 1980, and the Radiation Safety Manual dated January 1980 are found in the attachments. The changes have been marked for your convenience with a black bar in the left hand margin.

Thank you for your cooperation. Please contact me if you have any questions.

Sincerely,

T. S. CARLILE, JR.
General Manager
Metals Group Muskogee

Log Oct 89-3
Remitter
Check No. 15428
Amount $150
Fee Category 2A
Type of Fee Amd
Date Check Rec'd 10/23/89
Date Completed 10/23/89
Reason
TSC/bsm

OF03
1/1

cc: J. B. Lambert
M. J. Mocniak
G. F. Scenter

+ fees

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The dissolution process consists of immersing the raw material in aqueous hydrofluoric acid. This is carried out on a batch basis with a number of batches in process at one time. The aggregate batch amounts in process at any one time do not exceed 25,000 kilograms of raw or feed material which contains not in excess of 100 kilograms of source material.

The feed material is first dumped from the containers into a hopper below the ramp level which feeds a belt conveyor. This conveyor is shielded and transfers the material inside the building over a sizing screen and onto a second conveyor which loads the feed hoppers. The hoppers are then raised to the third floor level by use of a mechanical hoist. They are then placed in position on a support stand and secured to a screw feeder which is attached to a covered digestion tank. A valve between the hopper and feeder is opened and the material is fed from the hopper through the screw feeder into the acid contained in the tank. Procedures have been put into effect whereby spilling and dusting are minimized.

After dissolution, the slurry is discharged into an extraction tank where the soluble fluorides of tantalum and columbium are preferentially extracted by contacting with methyl isobutyl ketone. During the batch extraction, the tantalum and columbium are separated from other constituents of the raw materials. Thus separated, the tantalum and columbium values in solution contain no radioactive materials and are further processed (refined) into semifinished and finished tantalum and columbium products. As noted above, these semi-finished and finished tantalum and columbium products contain no source material.

Upon completion of the above extraction, the residues, which consist primarily of insoluble fluorides and in which the source material is included, are discharged from the tank and transferred by pipeline to Pond 3. Water is added to the residues prior to piping in order to facilitate their flow.

Upon reaching Pond 3, the solids settle out and are retained while the supernatant (i.e. the liquid portion on top of the solids) is removed by surface decantation and pumped to the neutralization station where the supernatant is added to plant effluents and treated with lime.

Alternately, after dissolution, the slurry may be filtered through a filter press or some other mechanical separation device. The liquid is to be the feed stock for the liquid extraction process. The solids from the separation will then be stored in drums containing polyethylene drum liners. The drums of material will then be stored on site until final plans are made for proper disposal. The drums will be stored in such a manner as to preclude any unauthorized release of material. Any spillage will be washed into the neutralization system.

An alternate method of handling residues from the extraction process may consist of neutralization and mechanical separation. The liquid component of separation will be fed to the wastewater treatment system and solids will be drummed and handled as described above.

Revised 9/12/89

Item 12(c) The following is a detailed description of the radiation survey program and procedures:

See attached Fansteel Radiation and Safety Manual (January 1980, Revised)

7. (Item 13) Presently Fansteel has on hand an aggregate quantity of source material of approximately 40,000 kilograms. Such source material is in the form of raw material, chemical dissolution, and residues. The quantity of source material which is processed and subsequently form a part of the residues should not exceed approximately 8,000 kilograms per year. According to raw material processing plans and inventory requirements, the aggregate amount of source material on hand during the next five years in all forms should not exceed 100,000 kilograms.

After chemical processing of feed material, the source material, which is contained in an insoluble residue, is transferred through a piping system to Pond 3 or to a mechanical separation devise. The insoluble residues are of a viscous nature. They contain, besides the source material, unextracted tantalum and columbium values and other minerals. The source material content in the residues is dispersed in-situ and has not been found to be preferentially leachable or extractable into a more concentrated form under natural environmental conditions.

Like the starting raw materials, the residues are in a low specific activity state or form owing to the low concentration by the matrix. Thus, radiological health and safety become more easily managed than if the source material were concentrated.

As stated in paragraph 3 above, Pond 3 at the Muskogee plant in constructed and operated in accordance with information supplied by Fansteel to the NRC in its letters dated March 31, 1978; September 22, 1978; October 3, 1978; November 12, 1978; February 2, 1979; May 11, 1979; and September 20, 1979, and under the conditions set forth in NRC amendment No. 05 dated October 22, 1979, to the above-mentioned license. All of said letters were incorporated by reference in the said amendment. The residues produced in the period of plant operation prior to September, 1979, are now contained in Pond 2. This pond has been covered with a 20 mill thick polyvinyl chloride sheet in order to prevent wind erosion of such residues and also to prevent leach from surface water. Other ponds situated at the plant, specifically

RADIATION SAFETY MANUAL

FANSTEEL INC.
METALS DIVISION
Muskogee Plant

Revised October 16, 1987
Revised February 28, 1989
Revised June 21, 1989
Revised September 12, 1989

After grinding, the pulverized material is placed in a storage area for chemical processing. The grinding process does result in an increased surface area from which source materials could escape to plate out on nearby surfaces. However, these areas are washed after the grinding process and protective lids are placed on the ground material.

The raw material is transferred from the storage area to Chemical "A" or from the concrete storage pad to the Chemical "C" Building for dissolution and extraction of the tantalum and columbium. A concrete drive ramp was installed at these three sites in order to control spillage.

The batchwise dissolution process consists of contacting the material with aqueous hydrofluoric acid. It is initiated by dumping ore from the containers into a hopper below the remap level which feeds a belt conveyor. The conveyor is covered and it transfers the material over a sizing screen and onto a second conveyor which loads the feed hoppers. The hoppers are then raised to the third floor by use of a mechanical hoist. They are then placed in position on a support stand and secured to a screw feeder which is attached to a covered digestion tank. A valve between the hopper and feeder is opened and the material is fed from the hopper through the screw feeder into the acid contained in the tank.

After dissolution, the slurry is discharged into an extraction tank where the soluble fluorides of tantalum and columbium are more preferentially extracted by Methyl Isobutyl Ketone. During the batch extraction, the tantalum and columbium are separated from other constituents of the raw materials. The source material remains with the extracted residue. This residue is transferred to storage pond III through pipe. Water must be added to improve pumping efficiency. In the ponds, the residue solids settle and the supernate is decanted and treated with lime.

Alternately, after dissolution, the slurry may be filtered through a filter press or some other mechanical separation device. The liquid is to be the feed stock for the liquid extraction process. The solids from the separation will then be stored in drums containing polyethylene drum liners. The drums of material will then be stored on site until final plans are made for proper disposal. The drums will be stored in such a manner as to preclude any unauthorized release of material. Any spillage will be washed into the neutralization system.

An alternate method of handling residues from the extraction process may consist of neutralization and mechanical separation. The liquid component of separation will be fed to the wastewater treatment system and solids will be drummed and handled as described above.

In summary, the potential radiation hazards existing at the Fansteel Plant are limited to the following specific operations:

1. Potential radiation hazards associated with storage of raw materials.

2. Potential radiation hazards associated with pulverizing and handling certain raw materials.

3. Potential radiation hazards associated with chemical extraction of tantalum and columbium minerals from raw materials.

4. Potential radiation hazards associated with handling of residues undergoing settlement.

5. Potential radiation hazards associated with storage of residues in settling ponds.

6. Potential radiation hazards associated with storage of residue in containers

Raw material and subsequent waste materials are processed to minimize personnel exposure to radioactive materials.

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CONTROL NO. 25921
DATE OF DOC. September 12, 1989
DATE RCVD. September 14, 1989

TCUF ____ PDR ✓
CAF ✓ LPDR ____
I&E REF. ✓
SAFEGUARDS ____
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