

INSPECTION AND ENFORCEMENT

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**Fansteel**

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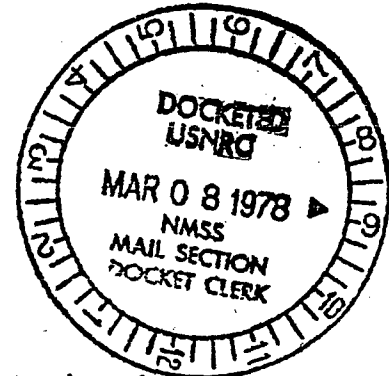
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February 15, 1978

U.S. ATOMIC ENERGY COMM.  
REGULATORY  
DIVISION

Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention Mr. Earl G. Wright  
Radioisotopes Licensing Branch  
Division of Fuel Cycle and  
Material Safety



Gentlemen:

In reply to your letter of December 5, 1977, in which you have asked for additional information concerning our License No. SMB-911 in relation to the Company's Muskogee, Oklahoma plant operations, we wish to advise you of matters relative to the waste retention system and raw material storage thus:

Note: A descriptive layout of the existing pond system is set forth in the attachment; the references to paragraph numbers below correspond to the references to paragraph numbers in your letter.

1. a) Pond 8, which was constructed, installed and lined in accordance with information supplied to the NRC, is used for the purpose of receiving, settling and storing of calcium base waste residues. These waste residues result from the addition of lime which neutralizes the acids and precipitates the fluorides contained in all the plant liquid wastes.

In Pond 8, a settling process with respect to solids in the calcium base waste residues takes place. The basic waste residues which remain in Pond 8 are comprised of insoluble calcium fluorides, calcium oxides, calcium sulfate and other metal hydroxides. The supernatant resulting from the sedimentation process is removed from Pond 8 to Pond 6 whereat additional settling of solids takes place. Pond 6 is continuously decanted through an outfall pipe to the river. A continuous sampler and flow measurement device is installed in the outfall pipe to monitor the discharge of effluent to the Arkansas River.

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As previously stated in writing to the NRC, the effluent is regularly sampled and analyzed. The sampling and analysis procedures are performed in accordance with federal and state environmental, health and water regulatory agency requirements. Under such requirements, the following procedure is used: a specimen is collected on a daily basis; three times each week a composite of the specimens taken daily is analyzed by the Company laboratory for certain chemical components including radioactive material content. In addition, a composite of the specimens taken daily is collected by the State Board of Health and analyzed for radioactive material content. Such analyses have been conducted by the Company laboratory and the State Health Department since approximately 1971 and records of such analyses are on file at the Muskogee plant. These records have been examined by NRC representatives during their plant visits.

- b) Since October 6, 1977, on which date NRC representatives visited the Muskogee plant, the Company has caused the following improvements to Ponds 1 and 2 to be made:

- 1) Pond 1: the embankment surrounding this pond has been enlarged and strengthened by adding large quantities of virgin compactible clay so as to establish a freeboard of not less than three feet. (The freeboard is measured from the surface of the pond waste residues to the crest of the embankment.) The Company expects to maintain the freeboard for Pond 1 during future operations at not less than three feet. If erosion or weakening of the embankment should occur, the embankment will be repaired and strengthened as necessary to maintain its integrity. A liquid (supernatant) level of approximately six inches in depth is maintained on the surface of Pond 1; this level is maintained by continuously decanting the supernatant in excess of six inches to the continuous lime treating station. A total slurry volume of less than 3,000 gallons is pumped to Pond 1 daily. The structure of Pond 1 does not permit surface water to enter the pond; any rain water falling into the pond is decanted by gravity to the continuous lime treating station.

- 2) Pond 2 is used for storage of solid waste residues which were produced in earlier processing campaigns and which as noted above contain unextracted tantalum and columbium ores, other minerals, fluorides, and radioactive source materials, namely,  $U_3O_8$  and  $ThO_2$  (as present in certain tantalum ores processed by the Company). The solid waste residues contained in present Pond 3 were transferred to Pond 2 in June, 1977. Upon the activation of new Pond 3, which is planned for late in 1978, the Company expects to use new Pond 3 in place of Pond 1 to receive, settle, and contain waste residues of unextracted tantalum and columbium ores, other minerals, fluorides and radioactive source materials, namely,  $U_3O_8$  and  $ThO_2$ . The waste residues contained in Pond 1 thereupon will be transferred to Pond 2.

The Company is in the course of purchasing an impervious plastic cover for installation over the entire surface of Pond 2. As part of the installation, the cover will be weighted with a layer of clay or soil to protect the cover from damage or deterioration due to wind, sun, and other elements. The cover will be installed in such manner that surface water which collects thereon will be directed to a trench or trough for gravity runoff or to a sump provided with adequate pumping thereby preventing the weakening and erosion of the pond embankments. The cover will serve to prevent wind erosion and rain water leaching of chemical compounds contained in this pond. However, the minimum freeboard will necessarily be reduced prior to the installation of the cover. During the past summer erosion of the embankment crest, i.e., the development of rills, has resulted from surface water flows on the freshly compacted buildup of the embankment. These have been repaired by the Company by adding large quantities of compactible virgin clay. In addition, the embankments of this pond have been planted with grass to prevent erosion. If erosion or weakening of the embankment should occur, the embankment will be repaired as necessary to maintain its integrity.

- c) The Company has commenced engineering studies for the construction of a new Pond 3 of a sufficient size to take the place of present Ponds 3 and 4. New Pond 3 will be used for the purpose of receiving, settling and storing of solid waste residues of the same kind which are being currently received, settled and stored in Pond 1. According to Company estimates, the capacity of new Pond 3 will be adequate to handle waste residues to be produced over the next eight to ten-year period. New Pond 3 will be similar in design and materials to Pond 8.

Core sampling and other preliminary engineering survey work has commenced in accordance with procedures discussed with NRC representatives in their visit of October 6, 1977. The Company will submit to the NRC for its review and comments, detailed plans for the design and construction of new Pond 3 as soon as the plans have been completed. The Company expects that the plans will be completed by February 15, 1978. The Company expects to commence construction on or about April 1, 1978. Following the completion of construction, the pond will be placed in service.

- d) The Company has no intention of discontinuing the operation of its Muskogee plant. Quite to the contrary, the Company expects to continue such operation for many years in the future. Also the Company believes that the waste residues located in Pond 1 and 2 as well as those which will be located in new Pond 3 could under certain conditions be recycled for their valuable mineral content; if the demand and market price for these minerals were to increase and if technology for recycling were to improve, the waste residues could be recycled and the valuable minerals contained therein extracted on an economic basis. The Company continues to investigate chemical processes for the recovery of valuable minerals in the residues. At this time, nevertheless, the Company is not aware of any recycling process which will recover the minerals on an economic basis. The Company believes that the present and contemplated storage system for these low level radioactive waste residues will eliminate any substantial risk that radioactive waste residues will be discharged to the air, soil or water, or will

otherwise contaminate the environment. The Company believes that according to present information the system will remain adequate for a period of eight to ten years. If the Company were to be required to move its radioactive waste residues to an off-site location, the Company would be obliged to expend large sums of money in addition to the large sums which have been and are currently being spent for on-site storage. The Company will disclose to the NRC plans for changing its storage system, including the discontinuation of operations of the Muskogee plant at such time as such plans may evolve. However, the Company has no plans other than those of which the NRC has been informed in the Company's application for source material license.

2. In its letter, the NRC also inquired about the method employed by the Company in storage of certain raw materials in uncovered piles. These raw materials are described as Malaysian tin slags. The Company purchased the Malaysian tin slags and has stored same at its Muskogee plant since on or about January 1977. The Malaysian tin slags were purchased by the Company as a raw material supply for upgrading into tantalum and columbium concentrates which could be processed at the Muskogee plant for their columbium and tantalum values. The Malaysian tin slags contain relatively low weight percentage quantities of tantalum and columbium minerals. The Malaysian tin slags also contain low-grade radioactive source materials. On a weight percentage basis the source material does not exceed 0.01% in  $U_3O_8$  and 0.05% in  $ThO_2$ , and in combination not to exceed 0.06%. (These levels are lower than reported during the NRC visit on October 6, 1977, which indicated  $U_3O_8$  and  $ThO_2$  in combination 0.25%.) In total quantity, the Malaysian tin slags weigh approximately 7500 metric tons and contain in source material approximately 10,572 kilograms. The physical appearance of the Malaysian tin slag particles is granular, black, glassy with a density equal to or greater than river sand. The particle size of the slag granules is 0.030 inches or larger in outside diameter.

The Company believes that the present means of uncovered storage does not constitute a hazard for the escape therefrom by wind or water erosion of critical quantities of radon or other radioactive materials. Measurements for the presence of radon and other radioactive materials were conducted by Nuclear Sources and Services, Inc., Houston, Texas, in and upon the tin slag piles and in

surrounding ground area. Measurements of specimens of run-off water and air made in the NSSI tests show the release levels of radionuclides from the slag piles are  $10^3$ - $10^4$  less than those allowed by CFR 1020.106. Please refer to the attached copy of Nuclear Resources and Services, Inc. report dated January 20, 1978.

After a comprehensive study of processes for the upgrading of Malaysian tin slags for tantalum and columbium content, the Company determined that the most economic upgrading could be performed by a German firm, namely, Hermann C. Starck Berlin at its Laufenberg, West Germany plant. The Company has contracted to ship and deliver all Malaysian tin slags to Starck in 1978 for upgrading.

Part of the Malaysian tin slags will be retained by Starck, and the balance will be returned as upgraded ores to the Company. The Company has been granted export License XU-8394 dated January 20, 1978 by the NRC which authorizes the exportation and shipment of the slags to Starck. Pursuant to its contractual commitment with Starck and in accordance with the terms of the export license, the Company will ship the entire quantity of tin slags to Starck. The Company expects to commence shipment of the tin slags from its Muskogee plant on or about February 15, 1978. The upgraded tantalum and columbium ores which Starck will return to the Company in 1978 and 1979 will not contain any measurable quantity of radon or other radioactive material, the same having been removed during the upgrading process. The Company believes that its source material license requires amending for the following purposes:

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- a) the possession and storage of Malaysian tin slags at the Muskogee plant from January 1977 to April 1, 1978;

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  - b) the proposed construction and operation of new Pond 3 for the receiving, settling and storage of waste residues; and

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  - c) the change in the use of Pond 8 (formerly described as the retention basin) whereby Pond 8 is being used exclusively to receive, settle and store calcium base residues without radioactive source material content, whereas Pond 8 was originally constructed and installed to receive and store waste residues containing various minerals including tantalum and columbium fluorides and radioactive source material.

**Fansteel**

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Nuclear Regulatory Commission

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February 15, 1978

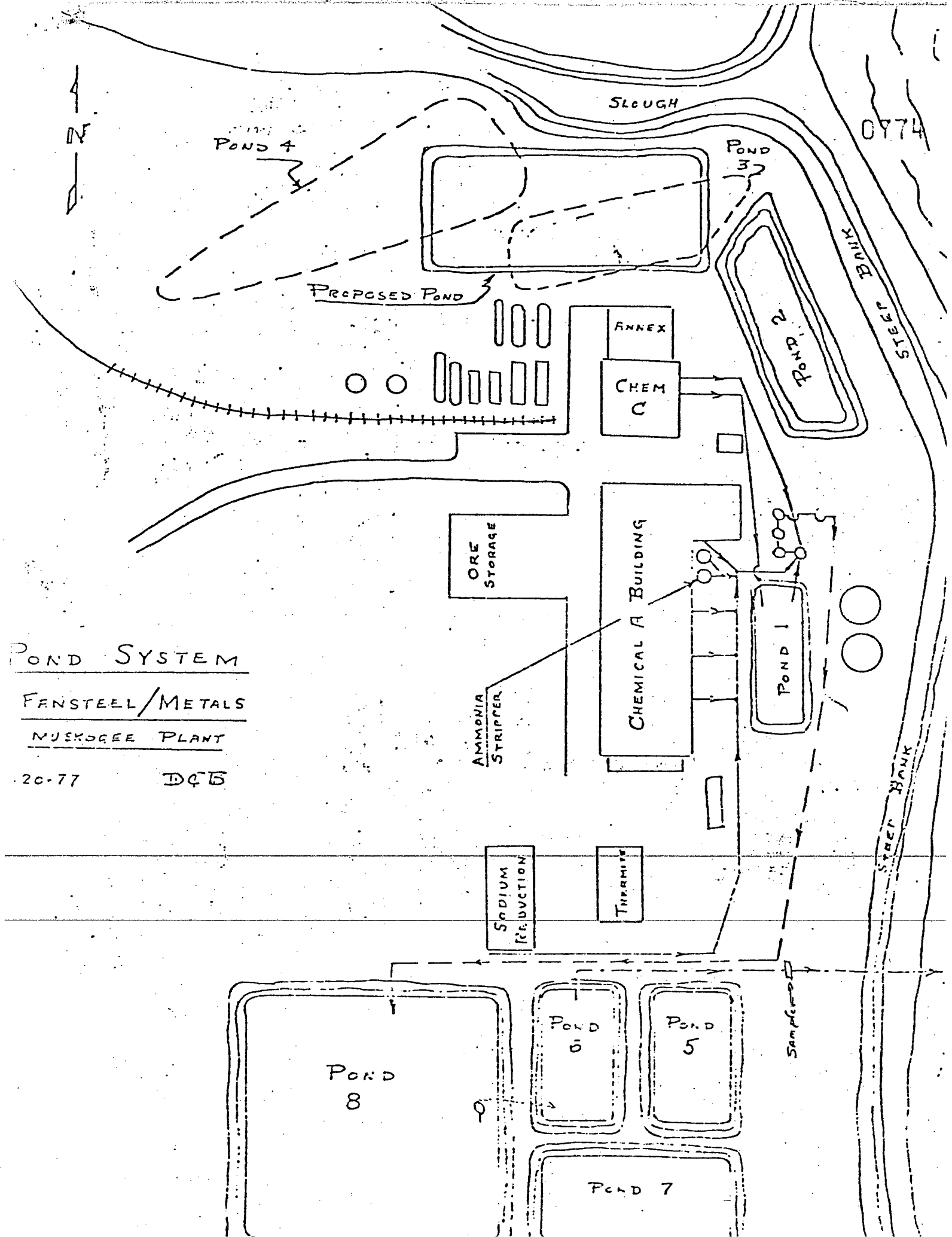
Separate and apart from the quantity of uncovered Malaysian tin slags described above, the Company's Muskogee plant in September 1977 made a shipment of approximately 100 metric tons of Malaysian tin slags to Philipp Bros. at Houston, Texas. These Malaysian tin slags were not processed by the Company and were at all times stored in sealed metal drums. The NRC has been advised of the particulars thereof. Also separate and apart from the uncovered Malaysian tin slags described above, the Company has retained possession of an additional quantity of approximately 100 metric tons of Malaysian tin slags. These Malaysian tin slags have not been processed by the Company and are still contained in sealed metal drums at the Muskogee plant. The Company has not as yet determined what disposition will be made of this quantity of Malaysian tin slags.

Very truly yours,

FANSTEEL INC.

  
J. G. Duggan

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Attachments



POND SYSTEM  
FANSTEEL/METALS  
MUSKOGEE PLANT  
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