June 28, 2002

Fansteel, Specialty Metals
Mr. A. Fred Dohmann
General Manager
10 Tantalum Place
Muskogee, OK 74403

SUBJECT: QUESTIONS FOR EARTH SCIENCES

Dear Mr. Dohmann:

Attached are some questions about the Remediation Assessment done by Earth Sciences for Fansteel. The answers will be used by our contractor to perform an independent cost estimate for decommissioning the Muskogee site.

Please pass them along to Earth Sciences so they can provide the requested information. We would appreciate an expedited response from them, since our contractor must complete its work by the end of September 2002.

Note: If you or Earth Sciences want clarification of the questions, you may contact our contractor directly. You may contact either:

Jennifer Mayer	or	Donald Hammer
703-218-2717		(703) 218-2604
ICF Consulting		ICF Consulting

In addition, you may contact me at 301-415-5971.

Sincerely,

/RA/
Thomas L. Fredrichs, Project Manager
Decommissioning Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: Questions for Earth Sciences

cc: Mr. Keyton Payne, Fansteel

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AN: ML-021770447 Template No.: NMSS/RGN Materials-001

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Questions for Earth Sciences

General

Is the July 1992 Work Plan - Remedial Assessment available? This document includes the basic plan for the characterization activities performed in 1993, and may answer many of the questions below.

Soil

The *Remediation Assessment* indicates that soil samples were only analyzed for specific isotopes if "gross alpha or beta was detected at levels significantly above background concentrations, individual radionuclide analyses were performed to determine the contributing species. (p. 2-17)" In *Response to the NRC Environmental Assessment Comment Request*, Fansteel indicated that "samples with a gross alpha particle activity greater than or equal to the background mean alpha particle activity plus one standard deviation were submitted for radiochemical analysis." (Response to soil question 9) Thus, the indicator level for isotopic analysis would seem to 20 pCi/g gross alpha (15.6 pCi/g background + 4.5 pCi/g standard deviation).

1. If this is the case, why was isotopic analysis not performed on samples B13 (0-0.5 ft), B31 (7.5-9.0), B35 (11-12), B39 (8-10), B74 (0-2.5), MW-53S (0-0.5), MW-66S(0-2), and MW-67S (22-24.5)?

2. Why were samples with concentrations in excess of one standard deviation above gross beta not analyzed for individual isotopes?

3. Samples B20, B21, B41, B42, and B46 were not analyzed for gross alpha or gross beta. Why?

4. How were borehole, well, and test pit locations chosen?

5. How was the number of samples chosen? Does Earth Sciences believe this number of samples adequately identifies all contamination at the site?

6. What was the reason test pits were only dug in one location on the site?

7. What site activity or historical information led to the collection of soil samples about 300 feet north of Pond 3? Monitoring well MW-69S was installed in this area.

8. Fansteel's February 1997 response to NRC's Environmental Assessment Comment Request indicated soil contamination based on >10 pCi/g in the first 2.5 feet of soil and >30 pCi/g at depths greater than 2.5 feet. Why was 30 pCi/g used?

Groundwater

1. The groundwater flow map shows an area of radial flow near the center of the site. Radial flow means that groundwater is flowing from one area and flowing in all directions. This is

not a sustainable flow pattern unless there is a source of groundwater at the center of the radial flow. It is our understanding that given the site geology and hydrogeology, the likelihood of a groundwater source on the site is low. Hence, we believe the groundwater map presented in the Earth Science's report most likely captures a transient condition of the groundwater flow on the site. Has Earth Sciences done any more sampling at the site to determine the source of this radial flow, or to determine if this flow pattern was transient? If not, what does Earth Science believe causes this groundwater flow pattern?

2. Some wells that were expected to be upgradient appear to have been affected by site activities. Specifically wells MW-56S near the borrow pit in the southwest corner of the site and MW-55S to the south of Pond 3. Is the source of this contamination known?

3. Samples from many wells were analyzed only for gross alpha and beta but not for individual isotopes. What thresholds were used to determine if a sample was analyzed for individual isotopes? How were these thresholds selected?

<u>Surface Water and Sediment</u>

1. What was the overall logic employed in determining the number and location of sediment and surface water samples to be taken? For example, why was only one surface water sample and one sediment sample taken for each outfall versus two or three?

2. Where were sediment samples taken in relation to the outfalls?

3. What was the limitation to obtaining any sediment samples for outfall 001 (SS-001). Why was its absence deemed acceptable for the remediation assessment?

4. Why was the borrow pit selected for surface water and sediment sampling? Is there an intermittent stream through the borrow pit that accommodated the sampling?

5. Are you aware of any activity in or near the borrow pit that would be responsible for the elevated readings of gross alpha and gross beta, as well as columbium and tantalum? What is the possibility of cross-contamination of this sample?

6. It appears that no sampling of the river itself to establish background surface water conditions was conducted. While results were compared to MCLs, why was there no comparison to actual conditions in the Webber Falls Reservoir?

<u>Ponds</u>

1. Why were the following samples not analyzed for all radiological/chemical constituents: (8 out of the 67 pond samples)
   Sample P5-2, P9-2B, C and P9-5A were not analyzed for radioactive constituents.
   Samples P5-2A, B, and C were not analyzed for chemical constituents.
   P8-1B was not analyzed for total metals or TCLP metals.

2. What was the methodology for determining how many samples were taken from each of the ponds?

3. Soils and Sediments were analyzed for Th-228, Th-230, and Th-232. Pond residues were only analyzed for Th-230. Why were Th-228 and Th-232 not evaluated for pond residues?

Buildings

1. What are the action levels that were used to evaluate the measurements collected from the building surveys? The footnote in the data tables seems to indicate that >200 dpm/100 cm^2 was used for alpha and >1000 dpm/100 cm^2 for beta-gamma. However, only the beta-gamma results >5000 dpm/100 cm^2 have been shaded as above action levels.

2. The 200 dpm/100 cm^2 level corresponds to the *removable* alpha radioactivity release limit in the license for natural thorium. The 5000 dpm/100 cm^2 level corresponds to the *total* beta-gamma radioactivity release limit in the license for thorium or uranium and thorium. If these are the appropriate action levels, why weren't both removable or both total levels used?

3. Were "hot spots" identified at some level >5000 dpm/100 cm^2?

4. Has any smear sampling been conducted to quantify the amount of removable contamination?

5. Why weren't the surface gamma results converted into dpm/100 cm^2?

6. Was there any building decontamination conducted during the 1993 assessment? At any time before or since?

7. The assessment report indicates that a selected portion of the building grids were selected for survey. Were the grids selected for survey at random or were grids selected based on historical knowledge of potential contamination?