



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

NOV 8 1990

Docket No. 40-7580

Mr. John J. Hunter  
Corporate Manager of Process Engineering  
and Facilities Construction  
Fansteel Metals  
Number Ten Tantalum Place  
Muskogee, Oklahoma 74401

Dear Mr. Hunter:

The NRC staff have completed their review of the Remedial Assessment Work Plan for the Fansteel facility which was prepared by your consultant, Earth Sciences Consultants, Inc., and enclosed with your letter dated June 7, 1990. The staff's major concerns and issues are summarized as follows:

- The work plan implies that Earth Sciences, not Fansteel, will be responsible for radiological safety and compliance with NRC regulations. Fansteel should realize that NRC holds the licensee, Fansteel, and not Earth Sciences, responsible for radiological safety. Furthermore, we have found numerous omissions and deficiencies in the radiological portions of the work plan which indicate a lack of health physics expertise. Therefore, we have some serious concerns about Fansteel's capability to adequately manage and perform the radiological aspects of the proposed remedial assessment work. Fansteel should confirm that it will be properly staffed, supported, and equipped to carry out these responsibilities.
- We are also concerned about the lack of convincing reasons in the work plan for the decisions concerning groundwater monitoring wells and the apparent nonrepresentativeness of some of the existing sampling locations.
- Fansteel and Earth Sciences also need to demonstrate in their work plan that they are familiar with the data quantity and quality requirements of the NRC and the U. S. Environmental Protection Agency (EPA) for remedial assessment and decommissioning activities. They should then describe in the work plan their approaches and strategies for meeting these requirements for collecting the remedial assessment data.

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Mr. John J. Hunter

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Our detailed comments are enclosed. If you have any questions about these comments, please contact Dr. Tin Mo of my staff at (301) 492-0570. We will be happy to approve a revised work plan in which Fansteel resolves satisfactorily these issues and concerns which the NRC staff has raised.

Sincerely,

**Original Signed by**

Charles J. Haughney, Chief  
Fuel Cycle Safety Branch  
Division of Industrial and  
Medical Nuclear Safety

Enclosure:  
As stated

cc: P. Taylor, Earth Sciences Consultants, Inc.  
J. Harrick, Earth Sciences Consultants, Inc.  
B. Driscoll, EPA RVI  
D. McHard, Oklahoma State Department of Health

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NRC COMMENTS ON THE JUNE 1990 REMEDIAL ASSESSMENT WORK PLAN  
FOR THE FANSTEEL METALS FACILITY AT MUSKOGEE, OKLAHOMA

Page 1-2 A planned maintenance program may be needed for all new monitoring wells that could be based on pH data supplemented with other specific chemical data. The main text (page 1-2) mentions hydrofluoric acid as having been used extensively for ore and slag digestion. Also, in the main text (page 1-3) the existence of acid ponds and alkaline ponds is mentioned. Appendix A (page A-4) lists four types of acids produced by the facility and many lime and other alkaline chemicals.

The incrustation of well screen openings from alkaline deposits is possible. The acids can lead to deteriorations that perforate sections of a well screen or corrode the casing itself. If chemical data indicates highly acidic conditions, a plan such as inspecting the casing integrity with a down hole video camera might be appropriate. The means for detecting these problems is a necessary part of the "Work Plan" documentation for remediating the Fansteel site.

Page 1-4 Study area IV is suspected to contain buried storage drums. The contents of the suspected storage drums are unknown. No groundwater monitoring wells are around this area. Page 4-1 confirms that test pits will be excavated into area IV and this can cause rupture and spillage from drums. Further, potential groundwater contamination could have occurred from a sump spill in the southwestern corner of area IV. Additional down gradient wells appear advisable.

Page 1-5 The discussion of the Pond 3 release might suggest that the pond had been intact until June 18, 1989. However, the docket file indicates that Pond 3 had been leaking for years. The revised work plan should reconcile this inconsistency.

The work plan also does not mention the fact, as related to us during our May 15, 1990, visit, that the June 18, 1989, release caused portions of the french drain adjacent to Pond 3 to collapse. The revised work plan should acknowledge and confirm this fact.

Paragraph 2 states: "On June 18, 1989, a supernatant discharge from Pond 3 occurred from the wet well (collection sump) and the french drain system adjacent to the subject pond and several seeps near the south-western corner of Pond 3 (Figure 3)." The cause of the discharge should be given in this summary report and the observed impacts should be described in the revised work plan.

- Page 3-2 Section 3.1.3 states that groundwater contamination due to seepage from Ponds 6, 7, 8, and 9 are environmental concerns, but this section goes on to state that little threat to groundwater is posed by the materials in these ponds. The difference in these two conclusions needs an explanation.
- Page 3-6 Groundwater contamination caused by seepage from Pond 3 is identified as an environmental concern on page 3-6, paragraph 3. However, page 2-4, paragraph 1, indicates that pond 3 should have little effect on the groundwater table because it has been drained. Page A-5, lists several issues of environmental concern for soil and groundwater contamination and issues 2, 3, 4, 10, and 11 apply to Pond 3 (and other areas). The basis for having or not having environmental concerns about Pond 3 needs to be better explained.
- Page 3-14 The work plan states that background samples will be collected to the west of the site in upwind areas but does not indicate knowledge of historical wind patterns. The revised work plan should use figures to describe both the specific sampling locations and the knowledge of historical wind patterns that support the choice of these locations.
- Page 4-1 The first paragraph states that four deep wells will be drilled. (Also see Section A.1.3.2.1 on page A-6.) Figure 12 shows three of these along the river and one upgradient on the west side of the site. Perhaps a fifth well should be drilled north of the Chem "C" building, west of Pond 2, and southeast of Pond 3.
- Page 4-2 The plan should be more specific as to how the three soil samples from each boring will be selected for analysis. It appears that the samples will be selected mainly on the basis of organic content. Considering that some of the major contaminants on this site are radiological, the soil screening criteria should be amended to include screening with a sensitive radiation survey device such as a microR meter.

Page 4-3

Paragraph 2 discusses core sampling of the shale bedrock. The diameter of the samples, an explanation of what testing will be done on the samples, and how long the core will be retained and at what location is information that should be provided.

This plan proposes the use of stainless steel well screens and casings, versus PVC, in some study areas because of its relative immunity to Methyl Isobutyl Ketone (MIBK) degradation. There has been evidence presented in recent literature<sup>1</sup> arguing against the use of stainless steel casing in potentially corrosive environments because of the effect that the environment may have on the stainless steel casing and the effect the stainless steel casing may have on ground water metals analysis. The applicant might consider constructing all the wells with Polyvinyl Chloride (PVC) in order to eliminate the difference in data quality expected when sampling wells with different casing materials. In order to establish that stainless steel casing is truly needed at this site, the work plan should contain a summary of the exact nature of the MIBK-PVC interaction that requires the use of stainless steel casing and screen in some wells. The summary should also include a discussion on whether any MIBK free product has ever been observed in the existing wells and what MIBK concentrations are needed to degrade PVC.

Page 4-4

Paragraph 4 discusses monitoring wells that will be abandoned, the basis given is lack of information on installation procedures and Quality Assurance/Quality Control (QA/QC) methods for the wells. Eight of the existing wells are to be abandoned out of about 24, but no information is given on why these eight wells were chosen. The problems causing one third of the wells to be abandoned could affect the remaining 16 wells.

One potential concern about all the existing monitoring wells are the impacts of surface flooding. Due to the possibility of inadequate well construction (page 4-4, paragraph 4), there could be pathways to the hydrologic zones targeted by the proposed new monitoring wells. Page 1-2 gives a clear indication of flooding events as follows: "Frequent severe thunderstorms and the influence of subtropical air masses often cause unusual precipitation producing large quantities of runoff." The surface water from the rainfall, flowing down between the ground and old well casings could either dilute the chemistry of the well or add surface constituents and could obscure the results of sampling.

<sup>1</sup>Parker, L.V., Hewitt, A.D. and Jenkins, T.F.  
1990. Influence of Casing Materials on Trace-Level  
Chemicals in Well Water. Ground Water Monitoring  
Review, Vol. X, No. 2.

Depending on condition and location, the benefits of using existing wells for water levels may be offset by the need for good water quality data gained by abandoning more wells. The criteria and locations for the eight wells requiring abandonment needs to be included in this summary report as they form the basis for evaluating this important aspect of the remedial plan. Also, it is important to provide information about the 16 monitoring wells not currently selected for abandonment.

Page 4-5 Section 4.1.4 describes a plan for locating and removing buried drums but does not mention how the excavated material will be stored or disposed. This section of the revised work plan should discuss how the excavated material will be stored or disposed of.

Page 4-6 Section 4.1.6 describes the sampling of settling ponds for collecting waste residue samples and refers erroneously to Figure 5. The waste residue sampling locations are actually given in Figure 12. Figure 12 shows only two sampling locations each in Pond 3 and in closed Pond 2. Given that Ponds 2 and 3 are major locations of licensed material, it seems that they should be sampled more representatively than what has been proposed in this work plan.

The revised work plan should refer to the correct Figure number for waste residue sample locations and should explain why the proposed approach of a very limited number of sampling locations is adequate for remedial assessment. Otherwise, it should follow the guidance for representative sampling provided in NUREG/CR 2082. (See reference #2 cited in comment on Page A-4 below.)

Page 4-10 Section 4.2.6 states that background samples will be collected at several locations. The background conditions for this site may not be representatively characterized by just a few sample locations as proposed in this work plan. (Also see Table 2.) The revised work plan should consider the guidance in NUREG/CR-2082 to ensure representative characterization of background conditions. (See reference #2 cited in comment on Page A-4 below.)

Section 4.2.6 also mentions the use of river bank groundwater seeps for background purposes. We presume that seeps used for background will be both upstream and upgradient.

Rainfall events and seasonal patterns or accidental discharges can cause a seep or spring to discharge. Page 4-10, paragraph 1, has a plan for a single reconnaissance of the river bank to locate any groundwater seeps that may be present. Also, page A-22, paragraph 4, states if there are seeps along the river bank they will be sampled at some time when they are adequately discharging. However, with a single reconnaissance, seeps that are not discharging much at that time could be overlooked.

Page 4-14 Section 4.3 discusses the plans for laboratory analysis of the environmental samples.

This section states that samples will be analyzed for gross alpha and gross beta radioactivity. If the gross alpha or gross beta analysis on the soil and water samples produce a reading above a certain action level, those samples should be analyzed for specific radioactive isotopes in the uranium and thorium series. Suggested action levels for gross alpha are 5 pCi/g above background in soil and 15 pCi/l total in water; for gross beta suggested action levels are 15 pCi/g above background in soil and 50 pCi/l total in water. These action levels are related to the standards for radioactivity in community water systems found in EPA regulations 40 CFR parts 141.15 and 141.26, and in EPA's soil clean-up criteria specified in 40 CFR Part 192.

Nitrate should be added to the list of chemical analyses because nitric acid and ammonia, which oxidizes to nitrate, have been used onsite. Tin should be added to the list of metal analyses because slag from tin smelting has been stored onsite.

Also identify and provide the selection criteria for the 30% of groundwater samples that will be tested for Target Compound List parameters, and the 20% of soil samples which will be tested for Toxicity Characteristic Leaching Procedure parameters.

Page 7-1 Section 7.0 states that fieldwork will be accomplished in nine weeks. Can such a site be characterized representatively in such a short time? Might not the groundwater vary in concentration of constituents, height, flow rate, and flow direction during the year?

Table 1 Table 1 which presents the information on the dimensions and construction of the settling ponds on the site includes the existing Pond 3 but does not include the old Ponds 3 and 4, which underlie it. The revised work plan should explain why the information on the old Ponds 3 and 4 are excluded from Table 1.

A Appendix A Potentially contaminated well purge water and soil from drilling should be containerized. An explanation of what will be done with this material should have been provided or referenced in the quality assurance project plan.

Usually well casings and screens are steam cleaned before installation. If that will not be done at this site please provide an explanation, otherwise this task should be included in the quality assurance project plan.

Page A-4 The last sentence of section A.1.2.1 stated: "This QAPP will, therefore, be concerned with the data quality requirements of the NRC as well as the U.S. Environmental Protection Agency (USEPA)." The revised work plan needs to be more specific and should discuss its approach for meeting these requirements as described in the following documents:

1. The American Society of Mechanical Engineers, Quality Assurance Program Requirements for Nuclear Facilities, ASME, NQA-1 (1989).
2. Holoway, et al., Monitoring for Compliance with Decommissioning Termination Criteria, NUREG/CR-2082 (1981).
3. Health Physics Society Committee Report HPSR-1, Upgrading Environmental Radiation Data, EPA 520/1-80-012 (1980).

Page A-6 Section A.1.3.1 states that the assessment will "determine the extent of radiochemical contamination in buildings, structures, soil, subsurface materials, groundwater, and waste materials." However, nowhere in the work plan does it appear that radionuclides of uranium, thorium, and daughters will be determined quantitatively. The remedial assessment needs to gather information about the location, nature, and quantity of radionuclides that must be removed in remediating the site. Therefore, the revised work plan should describe how the radionuclides of uranium, thorium, and their daughters will be determined quantitatively in various samples and at different site locations.

Page A-7 The first sentence states that "instrumental measurements for organic vapor and radioactivity will be conducted on the materials brought to the surface during installation of the wells." The revised work plan should indicate how these measurements will be made or how the data will be used. Also, a review of Sections A.1.3.2.7 (page A-8) and A.4.3.6 (page A-41) indicates that the remedial assessment will involve very little radiation measurement. If possible, the revised work plan should explain why this approach of very limited radiation measurements is adequate for remedial assessment. Otherwise, it should modify the radiation measurement approach to be consistent with the guidance in NUREG/CR-2082. (See reference #2 cited in comment on Page A-4 above.)



- Page A-9 Section A.1.3.2.10 states that five air monitoring stations will be set up on the site. We could not locate the stations in the figures, nor could we find site wind pattern data in the work plan. So we were unable to determine whether such air sampling would provide meaningful data about airborne releases and exposures during the remedial assessment. The revised work plan should provide the locations of the air sampling stations in the figures and the site wind pattern data to enable us to determine the adequacy of the air sampling program for radiological protection during the remedial assessment.
- Page A-12 Section A.3.1.1 states that Pond 3 will be sampled on a 50-foot grid, but Figure 12 shows only two sampling locations in Pond 3. The revised work plan should reconcile this apparent inconsistency by consideration of the guidance on representative sampling provided in NUREG/CR-2082 (See reference #2 cited in comment on Page A-4 above.)
- Page A-14 Section A.3.1.2 states, "A portion of the samples will also be assayed for the amount of uranium and thorium present." The revised work plan should describe what portion, which samples, and how they will be analyzed to ensure representativeness of sampling.
- Section A.3.1.3 refers to "NRC standards for release for unrestricted use." The revised work plan should describe these standards and explain the approach to meet these standards "at an acceptable level of confidence."
- Page A-16 Section A.3.1.3.6 states detection limits for uranium and thorium in terms of parts per billion and for surface contamination in terms of counts per minute. The revised work plan should also state these detection limits for uranium and thorium in units of radioactivity since the NRC clean-up criteria are in units of radioactivity. The NRC clean-up criteria may be found in the Branch Technical Position dated October 23, 1981 (46 FR 52061) and the document entitled, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated August 1987.
- Page A-18 Paragraph 4 contains the statement, "...data points are chosen in an attempt to intercept exceptional nonrepresentative conditions..." From an inspection of the map of proposed soil sample locations it appears that some of the soil sample locations have been selected without regard to where "exceptional conditions" might exist. For example, "exceptional conditions" might occur in surface drainage features or where buried pipes or tanks exist. Each soil sample location should be numbered and a short explanation provided of why each soil sample or group of soil samples is located where it is.

In paragraph 5, the following statement is made: "...standard operating procedures have been developed to guide all sampling activities as well as preservation, transportation, and documentation. Representativeness is insured in the laboratory operations by the strict adherence to the published methods..." The reference to publications is extremely broad and needs to be much more specific.

- Page A-19 Groundwater monitoring well installation will be audited, according to paragraph 2. Details about the audit are not included, and it is unclear whether only field documentation will be audited or actual well installation. A schedule for audits is not expected at this time but it is reasonable to give general information about the timing of the audits. For example, will the audits be done at the completion of the whole project as an overview or section by section. A purpose of audits that should be considered is to correct any deficiencies that may be found before a whole system, in this case monitoring wells, is affected.
- Page A-30 The bottom of page A-30 and top of page A-31 verify the importance of seeps and springs for chemical sampling. A location map showing all seeps and springs for the site and nearby vicinity, with plans to update it at appropriate intervals, is necessary. Also, please note that a map showing surface water sampling locations is needed.
- Page B-1 Section B.1.0 states that the Health and Safety Plan was prepared in accordance with OSHA regulations. That may be true regarding nonradiological hazards, but radiological safety is the responsibility of Fansteel in accordance with 10 CFR 19, 20, etc.
- Page B-13 Section B.5.0 also should refer to 10 CFR 19 training, for which Fansteel is responsible.
- Page B-18 Section B.8.1 states that alpha sensitive instruments will be used during field operations. Beta-gamma instruments should also be used.
- Page B-20 Section B.8.3 states, "Thermoluminescent dosimeters will be used since they will respond to alpha-particle exposure." This is a misstatement which should be corrected in the revised work plan. It appears that Earth Sciences does not realize that thermoluminescent dosimeters are designed to be used for measuring beta and gamma radiation exposures and not for measuring alpha radiation exposures. For this reason, Fansteel should assure NRC that appropriate health physics expertise will be applied for radiological protection during remedial assessment work.