November 15, 2002

To: Tom Fredrichs

From: Jen Mayer and Don Hammer, ICF Consulting

Subject: NRC Task Order 006, Subtask 4: Restricted Release Cost Estimate/Industrial Use Scenario Cost Estimate for Fansteel Incorporated, Muskogee, Oklahoma

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Under Subtask 4 of Task Order 6, contract number NRC-02-00-001, NRC requested that a independent cost estimate be developed for Fansteel Incorporated's (Fansteel) facility in Muskogee, Oklahoma. However, after the Task Order was issued, Fansteel informed NRC that they were not able to identify a third party to maintain the site under the restricted release conditions, and had withdrawn their unrestricted release cost estimate. NRC then informed ICF that it was interested in developing an industrial use unrestricted release cost estimate, which would assume that the site could be released under the unrestricted release scenario if it were used for industrial use. Such an industrial use scenario assumes that the land is not developed for residential use and that as such, the groundwater is not used as a source of drinking water.

NRC asked ICF to develop generic derived concentration guideline levels (DCGLs) for the site using RESRAD, assuming that the groundwater pathway was "turned off." ICF has calculated these DCGLs for six isotopes of concern, as presented in Table 1.

The unrestricted release limit for soils (and pond residues) is 10 pCi/g total of natural uranium and thorium (as described in Fansteel's license SMB-911) . That is, if the sum of the six isotopes exceeds 10 pCi/g, that area would require remediation before the site could be released. The DCGLs presented in Table 1 are in some cases much more conservative and in other cases much less conservative than the license limit, because a sum of fractions approach is used for the DCGLs. If background concentrations are not subtracted from the measured analytical results, of the 54 soil samples analyzed for specific isotopes, 31 exceed the license limit of 10 pCi/g total uranium and thorium, and 45 exceed the sum of fractions for the DCGLs. If the background levels are evenly apportioned between the three isotopes, 25 samples exceed

the license limit of 10 pCi/g and 26 samples exceed the DCGL sum of fractions limit of 1.[1] As can be inferred from these numbers, the industrial use scenario will require at least as much excavation and disposal of soil as the 'normal' unrestricted release scenario. We have not conducted a similar analysis for pond residues for two reasons: 1) only one isotope of thorium was measured in the pond residues and 2) ponds 2 and 3 have high enough concentrations of uranium that they will need to be excavated regardless of thorium content. We expect that if the other isotopes of thorium were measured in ponds 5-9, these ponds would also require excavation and disposal.

Because the industrial use scenario does not change the amount of soil that needs to be excavated, NRC and ICF have agreed that developing a full blown cost model for the industrial use scenario is not warranted.

Table 1.
DCGLs Calculated using Industrial Use Assumptions

| Isotope | DCGL |
|---|---|
| U-234 | 1100 pCi/g |
| U-235 | 44 pCi/g |
| U-238 | 195 pCi/g |
| Th 228 | 4 pCi/g |
| Th 230 | 20 pCi/g |
| Th 232 | 2.1pCi/g |

[1] Because background levels were not measured for individual isotopes and instead were presented as natural uranium and natural thorium, we assumed that the background levels of 1.08 for natural uranium should be evenly apportioned between the three uranium isotopes and the background level of 3.3 for natural thorium should be evenly apportioned between the three thorium isotopes.