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To:	Gary Stegner	From:	Gerald L. Gels
Company:	U.S. Dept. of Energy	Company:	Prof. Radiological Service
Department:	Public Information	Telephone:	[redacted]
Telephone:	(513) 648-3153	FAX:	(513) 661-8654
FAX:	(513) 648-3073		

Date: 05-18-00 Time: 02:20 am Pages (incl. Cover): 2

Gary:

Attached are my comments for the Proposed Plan for Silos 1 & 2 Remedial Actions.

Jerry

Gerald L. Gels
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Comments on Revised Feasibility Study/Proposed Plan for Silos 1 & 2 Remedial Actions

SPECIFIC COMMENT: In the "Revised Proposed Plan for Remedial Actions at Silos 1 and 2," March 2000, the Comparative Analysis Summary, Figure 7.2-1, contains two (of the 7 evaluated) parameters that seem, on the surface at least, to have a bias toward chemical stabilization. The category of "Long-Term Effectiveness and Permanence" is rated as "neutral." And the category of "Short-Term Effectiveness" is rated as favoring chemical stabilization.

In the "Long-Term" category, considering the long half-life of the ^{226}Ra (1600 years), vitrification seems to be clearly favored. The immobilization of the radioactive constituents, particularly ^{226}Ra and ^{222}Rn, seems to definitely favor the vitrification option. In the "thousands of years" time frame, glass material should experience very little degradation, while the same cannot be said for cement products.

In the category of "Short-Term Effectiveness," the rating favors chemical stabilization, presumably due to the shorter projected time schedule for chemical stabilization. The radon release from either process will be very close to 100%. Note that the recommended method of removal of radon from drinking water supplies is aeration. While the vitrification alternative will result in a longer-term period of (potential) radon release, the lower amount of material handled per day should result in a lower daily dose to workers and nearby residents. Because of the reduced effectiveness for radon retention, the chemical stabilization alternative would not be favored in the short term, as the processing is carried out. This category seems to slightly favor vitrification or, at a minimum, be rated neutral.

GENERAL COMMENT: While the preceding specific comments may seem to favor the vitrification alternative, the philosophy of remedial actions for the K-65 residues should be examined. Up to 80% of the ^{226}Ra available for scientific and/or medical use in this country is contained in the two K-65 Silos. Vitrification would tie up those radium atoms in a glass matrix from which they would be very difficult to retrieve. While separation and concentration of the radium (approximately 4000 curies, equal to about 10 pounds of ^{226}Ra) from the bulk of the residues would be a difficult and expensive technological task, it is not at all beyond present day capabilities. The advantages of this approach are enormous, and certainly worthy of consideration. First, the radium would be available for use into the future. From a potential medical perspective alone, this 10 lb. of material could become an invaluable resource in the near future – a resource that we currently have no alternative for. Vitrification (or chemical stabilization, to a lesser extent) would make that material much more difficult to access. Second, the most radiologically dangerous nuclide in the K-65 Silos is ^{226}Ra. Concentrating and removing this radionuclide from the remaining residues will allow the disposal of those materials with much less concern for the release and possible pathway to the population for ^{226}Ra which has a very long biological and radiological half-life along with emission of alpha particle radiation. It could also possibly allow for recovery of the gold from the residues in a relatively uncontaminated state. Third, the removal of ^{226}Ra would take a large fraction of the gamma ray emitting radionuclides with it (^{214}Bi and ^{214}Pb). These gamma-emitting nuclides are the immediate progeny of ^{226}Ra and ^{222}Rn, and have relatively very short half-lives. So, all three of the major hazards in the K-65 Silos are associated with the 10 lb. of ^{226}Ra distributed through the contents of Silos 1 and 2. The possible intake of ^{226}Ra (with its extremely low Annual Limit), the direct radiation from radium and its short-lived progeny, and the seemingly uncontrollable release of ^{222}Rn will all be removed from the remaining residues and will be concentrated (and will thus be controllable) with the 10 lb. of ^{226}Ra.

GENERAL COMMENT: The remediation of the K-65 Silos, by whatever method is selected, needs to include environmental health physics analysis focusing on all the K-65 radionuclides, but particularly on ^{226}Ra and releases of ^{222}Rn. Current real-time radon data from FEMP and Ohio EPA indicate that off-site radon concentrations – at the west fence of the FEMP and at Crosby School, 2 miles away – are significantly greater than background. These concentrations have yet to be acknowledged as being different than natural background, although September 1999 outdoor concentrations at a distance of 2 miles from the K-65 Silos averaged 1.3 pCi/L, with many individual hour-long averages at concentrations equal to or greater than 3 pCi/L. The level of 3 pCi/L is ten times higher than the average background radon concentration expected for this part of the country, and the average for the month is more than four times the expected background concentration. The failure to recognize and address this issue indicates the possibility that proposed radon control measures for Silos 1 – 3 removal and Accelerated Waste Retrieval may need re-evaluation by experts in those areas. To date, neither the Critical Analysis Team (CAT) nor Fernald engineers have demonstrated sensitivity to these issues.

Gerald L. Gels, CHP
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