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USEPA REVIEW OF K-65 SILOS INTERIM STABILIZATION PROJECT

10-19-87

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

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REPLY TO THE ATTENTION OF:
5RA-14

19 OCT 1987

Mr. James Reafsnyder
Site Manager, Feed Materials Production Center
U.S. Department of Energy
P.O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Reafsnyder:

The Region V Office of the U.S. Environmental Protection Agency (USEPA) has reviewed the K-65 Silos Interim Stabilization Project for the Feed Materials Production Center (FMPC) in Fernald, Ohio. The proposed foaming project will act as an interim action plan to control radon emissions and reduce the likelihood of structural failure in the K-65 silos at the site. The project involves the treatment of the radon gas contained within the void space of the K-65 silos followed by the filling of the air space with composite foam materials. While we generally feel that the project has been well developed, we would like to offer the following comments and concerns:

1. In reference to the proposed strategy for reduction of radon levels in the silos prior to the foaming operations, we have one serious concern. We feel that the reliance on a continuous radon monitor as the sole means of measurement of process inlet and outlet radon concentrations is likely to result in inaccuracies in measurement at best, and in high count failure and loss of monitoring capability at worst. This concern is based on the fact that monitors such as the Eberline RGM-2 may exhibit high count failure messages at radon concentrations as low as 10^6 picocuries per liter (pCi/l), while radon concentrations to be encountered in this project may lie in the range 10^6 - 10^8 pCi/l. We realize that it may be possible to employ a continuous radon monitor through the use of some sort of dilution sampling scheme, however, we recommend that some other scheme be used (for example, gamma analysis of grab samples). Another concern with the use of a continuous radon monitor, even if the count rate capability is present, lies in the fact that the output signal of the scintillation cell in such a monitor may be as much as 50% attributable to plated radon daughters. To use such a device to measure changes in radon concentration accurately from 10^8 to 10^6 pCi/l may require a four to six hour delay for decay of plateout. For this range of radon levels, it seems to us that other monitoring methods may be more practical, and at least should be available as backup in the event of a high count failure.

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2. Based upon the parameters provided to the USEPA by the Department of Energy (DOE) staff at the technical briefing on the proposed K-65 interim stabilization project held at the USEPA Region V Office on September 9, 1987, the strategy to apply layers of foam media between the residues and the dome in order to completely fill the void space seems likely to provide adequate support for the silos domes and should lessen the likelihood and consequences of a structural failure. Based upon the urgency of the current situation, we concur with the proposed strategy.

3. The use of high density elastomeric polymer for the initial layer covering the residues is likely to reduce radon emissions from the silos if the material is applied to uniform thickness, and if the plan for applying a caulking bead around the perimeter is followed carefully. This procedure will be necessary to perform in order to avoid a radon pathway through a cold joint, shrinkage seam, or void in the elastomeric layer. This observation is based upon research in mitigation of radon sources in homes.

4. With regard to the application of the rigid and flexible urethane foam layers, we are concerned with the proposed scheme of leaving the applicator hose imbedded in the foam. Since it is possible that radon may cross or circumvent the primary barrier, we strongly discourage leaving any pathways in the media which may permit rapid transport. We feel that the integrity of all foam layers is necessary to provide a margin of safety.

5. Although we feel that the immediate objectives of providing structural support and reducing radon emissions will be attained for some interim period, we are concerned that the strategy of using foam materials may create an impediment to the final remedial action. It has been our experience in working with radon barriers in homes that a strictly passive radon barrier is generally not completely effective in stopping radon migration, although it may change the rate at which this migration occurs. It is also likely that rigid and flexible urethane foams will permit radon diffusion and lead to radon and radon decay product build up within the foam. It is likely that a new steady state situation will develop after some time in which significant radon is in solid state solution within the foam. Depending on the quantity of radon in the foam, the problems which may arise include:

a. significant radiation levels from the former void space.
b. additional solid radioactive waste will need to be disposed of in the final remedial action.
c. the foam will present a significant exposure hazard to workers involved in final remediation.

6. Comments were specifically requested regarding the gas sampling procedure to be used to determine the radon concentrations in each silo. The procedure, as described in the enclosure provided to us on October 14, 1987, appears to be designed to obtain a representative sample of the silo atmosphere without release to the environment, and with regard to worker exposure. As such, the method appears sound. We would strongly advise that neoprene rubber tubing be used in place of Tygon tubing in sampling lines. Radon has been found to be highly soluble in polyethylene, and if Tygon is used, there will be cross contamination of the second sample.

It is our overall view that the objectives of structural support and reduction in radon emissions are likely to result from the proposed interim strategies. However, we feel that this temporary solution may interfere to some degree with the final resolution of the K-65 silo problem. It is not our desire to see this temporary solution become a de facto permanent solution. A full review of feasible solutions must be made and the best alternative selected through the Remedial Investigation/Feasibility Study process.

Thank you for the opportunity to review the proposed plan. If you have any questions concerning our comments, please contact Mr. William Franz, Chief, Environmental Review Branch at (312) 886-7500 or (FTS) 886-7500.

Sincerely yours,

Robert Springer for

Valdas V. Adamkus
Regional Administrator