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**DISAPPROVAL OF BACKGROUND SAMPLING
PLAN**

12/23/91

**USEPA/DOE-FO
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LETTER**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

2608

DEC 23 1991

REPLY TO THE ATTENTION OF:

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

HRE-8J

RE: Disapproval of Background
Sampling Plan

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Background Sampling Plan submitted by the United States Department of Energy to meet both the requirements of the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

U.S. EPA hereby disapproves the Plan pending incorporation of the attached comments.

Please contact me at (312/FTS) 886-0992 if you have any questions.

Sincerely,

James A. Saric
Remedial Project Manager

Enclosure

cc: Graham Mitchell, OEPA-SWDO
Pat Whitfield, U.S. DOE-HDQ

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ATTACHMENT A

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
BACKGROUND SAMPLING PLAN
REVIEW COMMENTS

GENERAL COMMENTS

1. The Background Sampling Plan focuses primarily on surface soil and to a limited extent on subsurface soil. However, ground water, surface water, sediments, and air should also be sampled to establish background levels of contaminants in all media at the Fernald Environmental Management Project (FEMP) site.
2. The quality of the maps included in the Background Sampling Plan should be improved. Each map should include a legend, and important features such as roads, streams, and the boundary of the production area should be clearly identified.

SPECIFIC COMMENTS

1. Page 6, Third Paragraph, Last Sentence: This sentence states that the prevailing winds are generally from the west, which reduces the possibility of airborne contamination of the proposed sampling areas by FEMP operations. However, the wind rose diagram for a height of 10 meters shown in Attachment 8 indicates that the prevailing winds are from the northeast and east-northeast 20 percent of the time, and from the south-southwest and southwest 22 percent of the time with the remainder being all other directions. The winds from the south-southwest could have transported contaminants from FEMP's production facility to proposed sampling location number 4. The winds from the northeast and east-northeast could have transported contaminants from FEMP's production facility to proposed sampling locations numbers 1 and 5. Therefore, these locations should be re-evaluated as proposed background sampling locations.
2. Page 8, Third Paragraph: List of equipment and supplies required for collection of soil samples: This list should include sample coolers required to maintain collected samples at 4°C.
3. Page 9, Second Paragraph, First Sentence: Subsurface soil should be sampled at more frequent and regular intervals than those proposed in this sentence. The plan proposes to collect one sample from each lithologic zone between 3 and 20 feet below the land surface. This implies that only one sample may be taken over a 17 foot interval. Geochemical variation may be present within the same lithologic unit and should be included in determining background concentrations. Therefore, it is recommended that samples at regular five foot intervals be collected if any lithologic unit is more than 5 feet thick.
4. Page 9, Second Paragraph, First Sentence: Subsurface soil samples should also be collected from below the water table. It is also important to accurately define background conditions of the saturated

zone upgradient of the facility. Background concentrations of total organic carbon and cation exchange capacity are important in contaminant transport modelling and should be considered to be added to the sampling plan.

The subject document has been reviewed for radiation issues and the following comments are made:

Section 2.2, para. 2 (page 6), sentence 3—It is stated that the proposed background sample locations are northwest and west of the Fernald Environmental Management Project (FEMP) production site. Attachment 6, a map indicating the proposed background sample locations, shows the locations being southwest and west of the FEMP production site, a contradiction to the text statement. It is highly questionable that these areas are "not likely" to have been contaminated from surface runoff or airborne contaminant from the FEMP. Clarification is needed to explain this inconsistency.

Section 2.2, para. 2 (page 6), last sentence—The Wind Rose diagrams of the FEMP in 1989 of Attachment 8 are cited. In selecting locations for background sampling to minimize the possibility of airborne contamination by the FEMP(FMPC) operations, it appears that those locations should lie northwesterly of the FEMP production site as stated in the text. Most of the locations indicated in Attachment 6 are southwest of the FEMP production site and seem much more likely to have been subjected to airborne contamination. Further, locations should be sought that have been truly undisturbed by airborne contamination rather than "minimizing the possibility of past contamination" alone. Locations that have remained covered since 1951, such as the underside of old barn slabs and older buildings, should be utilized for background measurements.

Section 2.2, para. 3 (page 6), sentence 1—It is stated that "the predominant use of the areas proposed for background sampling is agricultural." If these areas were farmed using phosphate fertilizers, a material containing elevated levels of naturally-occurring radioactivity, then the samples may not accurately depict background for radionuclides. The plan must address this possibility and assure sampling in areas undisturbed and uncontaminated from local plant operations or local practices.

Section 3.2, para. 3 (page 9), sentence 4—It is stated that "radionuclide analyses will only be conducted for the 0 to 6 inch soil samples." Radionuclide analyses must be conducted for all samples to provide a basis for background comparison to previous and future samples taken at the FEMP.

Section 3.2, para. 1 (page 9)--Three sample locations providing twelve sampling points are not adequate for proper statistical analysis to determine background concentrations. Moreover, averaging across varying strata should not be permitted; it obscures stratigraphic variation and introduces bias in a computation of average background and standard deviation since different soil strata may have differing natural background levels. More sample locations are necessary with the mean and standard deviation of each constituent concentration calculated for comparable depths or lithologic zones/strata. In the Uranium Mill Tailings Remedial Action Project in Grand Junction, Colorado, conducted by DOE, the inclusion protocol for contaminated vicinity properties contains the following statement,

"Background levels will be calculated from measurements made at a minimum of 30 representative locations within the region surrounding a designated processing site, taking into account any subregions where unusually high or low background levels may exist. Such measurements will not be made in the vicinity of known radioactive contamination. From these data, a mean background level and a standard deviation of the mean are calculated for use in establishing action levels for both indoor and outdoor on-site surveys within the region."

("Summary Protocol, UMRAP Vicinity Properties, Identification-Characterization-Inclusion," U.S. DOE, September 1983)

Section 6.2.3, para. 1 (page 27)--In reference to Table 1 (Analytical Parameters and Methods), the statistical analyses for radionuclides should include a complete gamma spectroscopic analysis rather than gross alpha and gross beta testing alone. Gross alpha and beta testing would appear to have limited usefulness since radionuclide identification at background levels rather than gross screening is what is sought.

Section 6.2.3, para. 2 (page 27), sentence 2--It is stated that "if the distribution of analytical data is not statistically normal, a method will be identified and used to normalize the background for statistical comparisons." The normalization method should be defined such that a lower, more conservative background level is utilized.