4-409.14

RESPONSES TO U.S. EPA & OHIO EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR WAC ATTAINMENT SAMPLING OF AREA 7 SOILS (JULY 1998)

1732

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

SEPTEMBER 1998

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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RESPONSES TO U.S. EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR WAC ATTAINMENT SAMPLING OF AREA 7 SOILS

1732

General Comments

1. Commenting Organization: U.S. EPA Commentor: Saric
Section#: Pg.#: Line#: Code:
Original General Comment#
Comment: It appears the sampling procedures will not meet the objective of determining if the WAC has been obtained.
Response: See Comment #4 below.
Action: See Comment #4 below.

2. Commenting Organization: U.S. EPA Commentor: Saric
Section#: Pg.#: Line#: Code:
Original General Comment# 1
Comment: This PSP does not provide information included in other similar soil PSPs regarding how the PSP activities relate to other integrated remedial design packages.
Response: Agree. The PSP will be revised to provide this information.
Action: The relation between this PSP, silo project construction activities, and the integrated remedial design package for Area 7 will be explained in the PSP.

Specific Comments

3. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 1.1 Pg.#: 1 Line#: 8 and 9
Original Specific Comment# 1
Comment: The text provides abbreviated citations of two Fernald Environmental Management Project documents. However, no reference section that fully identifies the documents is included. The documents should be fully identified in the text, a footnote, or a reference section.
Response: Agree.
Action: The documents will be identified in full in Section 1.1 of the PSP and abbreviated thereafter.

4. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 2.1.1 Pg.#: 9 Line#: 23 and 24
Original Specific Comment# 2
Comment: The text states that samples from two randomly selected intervals will be collected from each soil boring in the soil stockpile in Area A for laboratory analysis. However, the purpose of the sampling and analysis detailed in the project specific plan (PSP) is to determine compliance with waste acceptance criteria (WAC), which are "not to exceed" limits. The PSP should be revised to make the samples selected for analysis those most likely to exhibit activities that exceed the WAC. That is, the samples from the intervals with the highest total counts (as determined using the procedure described in Section 2.2.3) should be selected for laboratory analysis. The text should be revised accordingly.
Response: Agree. However, if all soil intervals are the same (i.e., background), then random intervals will be selected for analysis.

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Action: For Area A and Area E soil stockpiles, the PSP will be revised to select the two intervals having the highest beta-gamma screening result for collection and laboratory analysis. If all field screening results are equal (i.e., background), then only the random intervals stated in Table B-1 of Appendix B will be collected for analysis. If additional soil intervals in Area A and E stockpiles exhibit above- background radioactivity, then these soil intervals will be collected and placed in archive storage for future analysis if necessary.

5. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 2.1.4 Pg.#: 11 Line#: 19 to 21
Original Specific Comment# 3
Comment: The text states that Area D consists of three areas, and then names four areas. The text should be revised to be accurate and consistent.
Response: Agree.
Action: The text will be corrected to state that Area D consists of four areas.

6. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 2.1.5 Pg.#: 12 Line#: 18 and 19
Original Specific Comment# 4
Comment: The text states that random samples will be collected from each soil boring in the soil stockpiles in Area E. Therefore, Original Specific Comment 2 applies here and should be addressed.
Response: Agree.
Action: See Comment #4.

7. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 2.2.3 Pg.#: 15 Line#: Not Applicable (NA)
Original Specific Comment# 5
Comment: This section discusses screening of subsurface soil and collection of high-biased samples in addition to the planned samples. As indicated in Original Specific Comment 2, where sampling intervals have not been selected in advance, samples from the intervals with the highest activities should be selected for analysis, even if a given activity does not exceed the action level for total activity stated in Section 2.2.3. Such samples will be biased high with regard to their uranium concentrations, which is appropriate for "not to exceed" criteria such as the WAC. If the distribution of technetium 99 is the same as the distribution of uranium, the selected samples will also be biased high with regard to their technetium 99 concentrations. If the distributions are not the same, the samples selected will be "random" with regard to technetium 99. If multiple high-activity intervals are encountered, additional samples should be collected, but the samples selected for laboratory analysis should be from the intervals exhibiting the highest activities, regardless of the activity levels.
Response: Agree. However, if all soil intervals are the same (i.e., background), then random intervals will be selected for analysis.
Action: See Comment #4.

8. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3.0 Pg.#: 18 Line#: NA
Original Specific Comment# 6
Comment: This section discusses use of real-time instruments in Area 7. These instruments will probably encounter interference from shine as a result of the presence of radium 226 and its daughters. Recent work at Soil Pile 5 provided data that were used to develop an

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approach for identifying and dealing with shine from uranium. No such data exist for shine from radium 226, although radium 226 shine affects the uranium measurements of real-time instruments that use sodium iodide detectors. The sampling described in the PSP will provide an opportunity to fill this data gap. When real-time uranium data are collected, the accompanying radium data should be carefully checked for indications of shine. In addition, at least some of the surface soil samples should be analyzed for radium 226 to help distinguish shine from local contamination. The text should be revised accordingly.

Response: A Variance document is attached which describes a "shine" test which was conducted in the vicinity of the silos. Although evaluation of the data is not complete, the test will allow the effect of "shine" on the HPGe and the RTRAK/RSS to be determined. DOE does not believe that collection of radium-226 samples to assess local contamination is necessary; the largest contributor to shine in the vicinity of the silos is collided photon flux (i.e., the scattered gamma rays that typically make up spectra background). The analysis of physical samples will not provide meaningful information on collided gamma photons.

Action: None. If evaluation of the "shine" test data indicates that real-time methods cannot be used in specific areas, then surface soil samples will be collected at the affected locations to determine WAC attainment.

9. Commenting Organization: U.S. EPA Commentor: Saric
Appendix#: D Pg.#: NA Line#: NA
Original Comment# 7

Comment: Appendix D is entitled "SP-5 Analytical Data Summary." The title should be changed to "Historical Data Summary for Area 7 Soils in the Silos Project Area."

Response: Agree.

Action: Change title of Appendix D accordingly.

10. Commenting Organization: OEPA Commentor: OFFO
Section#: General Comments Pg.#: Line#: Code: C
Original Comment# 1
Comment: This PSP is not consistent with the SEP or WAC Attainment Plan for the OSDF regarding constituents sampled for in Area 7 soil piles. Please refer to the SEP, Section 4.3.3, page 4-27, Task-2 and the WAC Plan, Section 4.3.3, page 4-51 regarding sampling piles of unknown origin.
Response: The total volume of stockpiled soil in Area E is approximately 150 cubic yards, the majority of which is originated from the Haul Road excavation in 1997. In addition to total uranium and technetium-99, the stockpile will also be sampled for lead and chromium. This short list of the 18 WAC Constituents of Concern (COCs) is justified due to the remote possibility of the unknown portion of this soil originating from an area outside of the Area 7 remediation area boundary.
Action: Lead and chromium will be added to the PSP for all Area E soil stockpile sample analysis.

11. Commenting Organization: OEPA Commentor: OFFO
Section#: General Comment Pg.#: Line#: Code: C
Original Comment# 2
Comment: Ohio EPA believes DOE is underestimating the amount of debris that will be encountered in this area during construction. The PSP and Design should consider the impacts on construction activities and how will it impact sampling conducted with the Geoprobe®.
Response: If debris is encountered during sampling activities, the sample interval will be collected above or below the debris (dependent on the penetrability and nature of the debris) or the sample location will be relocated in proximity to the original location for subsequent sample collection attempts. The number of relocations and attempts will be determined on a case by case basis dependent on the sampling area. Section 2.2.3 states that "any concrete and debris will be removed prior to radiological screening". Since screening is being performed on all samples collected, this implies that all debris will be removed from samples collected and submitted to the laboratory.
Action: None.

12. Commenting Organization: OEPA Commentor: OFFO
Section#: 1.1 Pg.#: 2 Line#: 7 Code: C
Original Comment# 3
Comment: The K-65 trench is mentioned here and throughout the document. Please label the trench on Figure 2-1.
Response: Agree.
Action: The K-65 trench will be identified on Figure 2-1.

13. Commenting Organization: OEPA Commentor: OFFO
Section#: 1.2.1 Pg.#: 3 Line#: 3 & 4 Code: C
Original Comment# 4
Comment: It is unacceptable to Ohio EPA to regrade Area A stockpile before sampling. Regrading an area before sampling has not been common practice in the past and Ohio EPA believes it is an inappropriate sampling technique.

Response: After evaluating the costs associated with reconfiguring the soil pile and field testing manual sampling techniques, DOE plans to collect soil from the soil pile in its current configuration. At each of the eight sampling locations, collection of cores through the entire height of the pile will be attempted. (See USEPA comment #4).

Action: The PSP will be revised to remove the stockpile reconfiguration references.

14. Commenting Organization: OEPA Commentor: OFFO
Section#: 1.2.3 Pg.#: 3 Line#: 17 & 18 Code: C
Original Comment# 5

Comment: This paragraph states that the Silos Project is planning to construct office trailers, a warehouse, etc. in Area C. In addition, this area will be WAC characterized through sampling efforts. However, it does not clearly discuss when or in what order these activities will occur. Please clarify.

Response: Construction activities that involve removal of soil or placement of base materials in Area C will not commence until the WAC decision for the soil in this area is finalized. The construction activities in this area are currently planned for 2000.

Action: The planned date for construction in this area will be included in the PSP text.

15. Commenting Organization: OEPA Commentor: OFFO
Section#: 1.2.6 Pg.#: 4 Line#: 17-22 Code: C
Original Comment# 6

Comment: When Area F was regraded with soil from the new drainage ditch and the storm water retention basin, was this soil clean? Also, where on-site is the ditch and retention basin located?

Response: The new drainage ditch and retention basin referred to in Section 1.2.6 is located in the southeastern portion of the Silos Project area. These two features will be identified on Figure 2-1.

Historical surface soil data from the area that was excavated in 1996 for the drainage ditch and retention basin indicate that total uranium and technetium-99 are at or near background levels. Eight surface soil samples collected from the area range from 11 to 63.5 mg/kg for total uranium. Five surface soil samples collected for technetium-99 range from 1.0 to 2.2 pCi/g. This data is summarized in the Operable Unit 5 Remedial Investigation report.

Action: These two drainage features will be identified on Figure 2-1.

16. Commenting Organization: OEPA Commentor: OFFO
Section#: 1.4 Pg.#: 7 Line#: 19-21 Code: C
Original Comment# 7

Comment: This first sentence states that real-time measurements will be used to *supplement* physical sample results. The next sentence states that it will be used *in lieu of* physical surface samples for total uranium. Please clarify.

Response: The real-time measurements will be utilized for the WAC attainment determination on the soil surface where high background or gravel cover does not preclude the measurements. In this case, real-time data will be utilized in lieu of physical samples collected from surface soils. The text will be revised to clarify the issue.

Action: The text will be revised to clarify the issue.

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17. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1 Pg.#: 9 Line#: 3 Code: C
Original Comment# 8
Comment: If real-time instruments detect total uranium above the trigger levels, then physical sample(s) should be collected to determine the extent of contamination both vertically and horizontally. Please correct.
Response: If real-time instruments detect total uranium above the trigger levels, then the HPGe will be used to determine the horizontal extent of surface contamination as outlined in Section 3.4 (Evaluation of Above-WAC Surface Soil) of the User Guidelines, Measurement Strategies, And Operational Factors for Deployment of *In-Situ* Gamma Spectrometry at the Fernald Site (DOE 1998). Physical sampling will be employed to delineate the vertical extent of contamination.
Action: The PSP will be revised to expand on the horizontal and vertical delineation of above-WAC soils for total uranium.

18. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1 Pg.#: 9 Line#: 1 Code: C
Original Comment# 9
Comment: Section 2.4.3 does not exist. Please correct.
Response: The section reference was misidentified as 2.4.3. The correct section reference should be 2.2.3.
Action: The text will be corrected.

19. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1 Pg.#: 9 Line#: 15 Code: C
Original Comment# 10
Comment: This section states that all samples collected will be analyzed for total uranium, while lines 7 - 9 say that this is not the case. Please clarify.
Response: Surface samples are listed in Appendix B for each sample location. However, if real-time measurements are successful in areas that are not covered by gravel, etc., then the specified surface samples will not be collected and analyzed.
Action: The statement (lines 7-9) will be revised for clarification.

20. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1.2 Pg.#: 10 Line#: 9 Code: C
Original Comment# 11
Comment: This line states that samples will be collected to the planned cut depth. Does this cut depth take into consideration the tolerance in the design? If not, samples need to be collected to the maximum depth of that tolerance, i.e., cut depth = three feet, equipment tolerance = one foot, equaling a total of four feet of soil possibly disturbed. Samples in this area need to go to a depth of four feet.
Response: DOE is of the opinion that the bottom sample depth in a given soil cut area should correspond with the total planned cut depth without regard to equipment tolerance. This is based on: 1) soil excavated from depths below the design depth does not present a significant above-WAC soil risk due to the normally decreasing contaminant concentrations with depth in the excavation areas, and 2) there is no incentive for the excavation contractor, working under a fixed-cost contract, to over-excavate soil only to backfill more than the design plans specify. For the deep borehole locations (where building foundations are planned), the PSP currently specifies that samples will be collected one foot deeper (to five feet) than the planned foundation excavation depths

(four feet). During field sampling, if radiological field screening indicates above-background levels at the bottom depth of any borehole, then additional samples will be collected below this point.

Action: Revise the PSP (Section 2.2.3) to include a contingency to collect deeper samples than planned if radiological field screening indicates that levels are above background in the last interval of the borehole.

21. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1.2 Pg.#: 10 Line#: 12-14 Code: C
Original Comment# 12

Comment: Lines 12-14 states that for *undisturbed* soil areas surface samples will be collected. Ohio EPA finds it hard to believe that there are locations within Area 7 that are undisturbed. DOE should provide a justification for the assumption that undisturbed areas exist or treat all areas as disturbed.

Response: DOE will revise the PSP to collect selected sample intervals equivalent to the planned total excavation depth for the planned Infrastructure Road (Area B) as all other areas are being treated. The primary focus of this sampling program is to determine the WAC status of soil that will be excavated during the infrastructure development. Soil below these limits would not be characterized for WAC attainment until the Silos Project processing facilities are dismantled following completion of safe shutdown activities. WAC attainment sampling of soils below the current excavation limits will occur in conjunction with predesign investigations or precertification investigations prior to the submittal of the Area 7 IRDP in March of 2008.

Action: The PSP (Section 2.1.2) and Table B-1 will be revised to include at-depth sampling intervals at all sample locations in Area B to correspond to the planned depth of excavation at each sample point, regardless of whether the area is considered disturbed or undisturbed.

22. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1.2 Pg.#: 11 Line#: 1-2 Code: C
Original Comment# 13

Comment: Please specify which three of the four sampling locations west of Silos 1 and 2 will be analyzed for total lead and chromium.

Response: These locations will be identified in the text as it is currently presented in Table B-1 of Appendix B. To identify the locations on Figure 2-1, the figure will be revised to include sample location identifiers.

Action: Include locations A7-B19, A7-B20, A7-B21, A7-B22, A7-B23, and A7-B24 in the text of Section 2.1.2 to identify the locations of Area B designated for lead and chromium analysis. Revise Figure 2-1 to include sample location identifiers.

23. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1.2 Pg.#: 11 Line#: 1-2 Code: C
Original Comment# 14

Comment: This section states that the sampling locations will be based upon the construction *cut or fill*. However, after reviewing Figure 2-1 and the Silos Infrastructure Design Plans, the current sampling grid does not emphasize the *cut* areas over *fill* areas. Ohio EPA believes more sampling locations are needed in the cut areas.

Response: The planned cut and fill locations are illustrated in the Silo Infrastructure Road (Profile and Plan) design drawings 91X-6100-G-02210 through 91X-6100-G-02217. Due to the complexity of illustrating the cut/fill depths, it is not feasible to include this information on the WAC Attainment Sampling Locations figure (Figure 2-1) in the PSP. DOE

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believes that the specified number of samples collected from the planned cut areas is sufficient to confidently characterize the soils for the WAC. The PSP includes approximately 111 samples to be collected from the designed cut areas within Area B alone. The volume of excavated soil from the cut areas is estimated to be 7,320 cubic yards. For comparison purposes, the sample density for the planned Infrastructure Road is one sample per 66 cubic yards of soil versus one sample per 346 cubic yards for the SP-5 soil stockpile.

Action: None.

24. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.1.4 Pg.#: 11 Line#: 31 Code: C
Original Comment# 15
Comment: Please explain why sampling intervals are being skipped, i.e., 0.5' 1.0'?
Response: The selected sampling depth intervals were designed to provide an adequate profile of total uranium and technetium-99 concentrations with depth without the excessive analytical costs of sampling every six-inch interval. Based on process knowledge, the Area D soils have not undergone large scale excavation or soil redistribution activities. Therefore, a strategy of more samples near the surface and fewer samples near the bottom of the planned excavation depth will provide adequate characterization of the soil. Furthermore, the entire soil core interval will be surveyed in the field using a portable beta/gamma meter and probe to identify soil having the potential to exceed the WAC for total uranium. (See Section 2.2.3 of PSP.)
Action: None

25. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.2 Pg.#: 13 Line#: 27 Code: C
Original Comment# 16
Comment: As mentioned in a previous comment, it is unacceptable to Ohio EPA to regrade or reconfigure Area a stockpile before sampling. Regrading an area before sampling has not been common practice in the past and Ohio EPA believes it is an inappropriate sampling technique.
Response: See Comment #13 Response.
Action: See Comment #13 Action.

26. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.2 Pg.#: 13-14 Line#: 31-2 Code: C
Original Comment# 17
Comment: If these three attempts at attaining a soil boring are unsuccessful, will the whole sample location be scrapped? With the distance between the sample locations being 40 feet (according to Figure 2-1) the OEPA feels that more attempts at a further radius would be proper to characterize the pile.
Response: Agree.
Action: In addition to the two additional attempts within a one-foot radius of the original point, other locations on the pile will be evaluated if necessary and additional boreholes will be attempted. The text will be revised to address these additional borehole attempts.

27. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.2.3 Pg.#: 15 Line#: 12 Code: C
Original Comment# 18
Comment: Ohio EPA believes that the beta/gamma reading of 100 cpm for the action level should be used in Area 7 as it was in A2P1.

Response: Since the User Guidelines, Measurement Strategies, And Operational Factors for Deployment of *In-Situ* Gamma Spectrometry at the Fernald Site (DOE 1998) has been approved by the USEPA and OEPA, DOE has revised the PSP to utilize the field screening beta-gamma action level of 450 corrected counts per minute (ccpm) as outlined in Section 4.7 of the aforementioned document. As described in this document, the action level was established after evaluating the field screening results and laboratory analysis results of the same material from 260 samples collected from the Area 2/Phase I investigation. The evaluation revealed that a ccpm reading of <450 obtained using a Geiger-Mueller (GM) probe and rate meter indicates that uranium concentrations are below WAC concern.

Action: The PSP text field screening action level will be revised from 200 ccpm to 450 ccpm to follow the guidance document.

28. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.2.4/Table 2-1 Pg.#: 16 Line#: Code: C
Original Comment# 19
Comment: Is the second analyte listed in Table 2-1 Tc-99?
Response: Yes.
Action: None.

29. Commenting Organization: OEPA Commentor: OFFO
Section#: 2.3 Pg.#: 17 Line#: 12 Code: C
Original Comment# 20
Comment: This line should read 1.0-1.5 feet, not 1.0-15 feet. Please correct.
Response: Agree.
Action: The PSP will be corrected to read 1.0-1.5 feet.

30. Commenting Organization: OEPA Commentor: OFFO
Section#: 3.0 Pg.#: 18 Line#: Code: C
Original Comment# 21
Comment: In order to be consistent with the SEP and the WAC Attainment Plan, real-time measurements should be taken prior to physical sampling.
Response: In areas that are suitable for *in situ* gamma measurements, physical sampling will be performed after the gamma measurements. However, in areas that are covered by gravel or asphalt and therefore not planned for gamma measurements, physical sampling may proceed simultaneous with real-time work being performed in other areas.
Action: The PSP text will be revised to clarify this issue.

31. Commenting Organization: OEPA Commentor: OFFO
Section#: 3.5 Pg.#: 21 Line#: 6 Code: C
Original Comment# 22
Comment: This line contains an extra period. Please correct.
Response: Agree.
Action: The extra period will be deleted.

32. Commenting Organization: OEPA Commentor: OFFO
Section#: 3.5 Pg.#: 21 Line#: 17 Code: C
Original Comment# 23
Comment: This line states that a 0-6 inch core will be collected for percent moisture analysis. The Real-time Users Guides states that a 4-inch core is proper for this analysis. Please revise.

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Response: Agree.
Action: The PSP text will be revised to require a 4-inch core for moisture analysis if necessary.

33. Commenting Organization: OEPA Commentor: OFFO
Section#: Table B-1/Figure 2-1 Pg.#: Line#: Code: C
Original Comment# 24
Comment: Sampling identification numbers should be placed at the sample locations on Figure 2-1. Please correct.
Response: Agree.
Action: Figure 2-1 will be revised to include the sample location identifiers. Individual samples planned for collection at each point is presented in Table B-1, Appendix B.

34. Commenting Organization: OEPA Commentor: OFFO
Section#: Figure 2-1 Pg.#: Line#: Code: C
Original Comment# 25
Comment: Sample locations should be added to the area of the culvert west of Silo 2 in Area B. As it stands, there are no sampling points in that area. Please add.
Response: A sampling point will be added to this culvert area to be located on the outer edge of the planned Infrastructure Road. The sample location will be placed as close as allowable to the culvert pipe or at a location having the highest potential for contamination due to storm water runoff prior to the installation of storm water controls. This area is planned to be cut to a maximum of one foot with much of the area remaining at the same elevation for road base construction.
Action: The sampling location will be added to the PSP text, Table B-1, and Figure 2-1. The sampling depth intervals will be 0-0.5 feet and 0.5-1.0 feet. The WAC analytes will be total uranium, technetium-99, lead and chromium.

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VARIANCE / FIELD CHANGE NOTICE

V/50.03.40.03-19

WBS NO.: 50.03.40.03 Project Document #20701-001

Page 1 of 2

PROJECT TITLE: Comparability Study, Part B. Rev. 0

Date: 8/31/98

VARIANCE / FIELD CHANGE NOTICE (Include justification):

1732

Justification

RTRAK/RSS and HPGe in-situ gamma spectrometry work is planned for early FY99 to identify surface soils containing above-WAC concentrations of total uranium in the Area 7 Silos Project Area. To ensure usable data is obtainable, a "shine" test will be conducted prior to WAC data collection. The proximity of the silos to the areas under investigation are a concern due to the possible effects of "shine" on the data. The concern with shine is threefold:

a. Uncollided gamma photon fluence significantly increases background in the low energy (<100 keV) portion of the gamma spectrum, thereby masking low energy gamma photons emitted by uranium-238

b. Gamma photons emitted by radioactive progeny of thorium-232 in Silo 3 may possibly result in anomalously high concentrations of thorium-232

c. Gamma photons emitted from radium-226 radioactive daughters may result in anomalously high concentrations of radium-226. While high concentrations of radium-226 and thorium-232 are not of concern relative to WAC exceedances *per se*, they do affect the determination of total uranium by RTRAK/RSS. This is because the RTRAK/RSS calibration equations for total uranium contain correction terms for interferences from radium-226 and thorium-232. High concentrations of shine from radium-226 daughters could cause erroneously high concentrations of total uranium to be determined, while high concentrations of shine from thorium-232 could cause low concentrations of total uranium to be determined.

This variance describes a study to ascertain the possible effects of shine on HPGe and RTRAK/RSS data. The study follows the guidance provided in Section 4.12 (Shine) of the document entitled "User Guidelines, Measurement Strategies, and Operational Factors for Deployment of *In-situ* Gamma spectrometry at the Fernald site"

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Field Change Notice

The following measurements should be performed prior to making any of the in-situ gamma spectrometry measurements to be used for WAC decisions.

1. Six HPGe measurements will be made at increasing distance from Silo 1. The first measurement will be made at the base of the berm of Silo 1, while the other five

(continued on following page.....)

REQUESTED BY: Chris Sutton DATE: 8/31/98

X IF REQD	VARIANCE/FAN APPROVAL	DATE	X IF REQD	VARIANCE/FAN APPROVAL	DATE
X	QUALITY ASSURANCE	9-1-98	X	PROJECT MANAGER	9/1/98
	DATA QUALITY MANAGEMENT		X	Real-time Program Mgr.	9/1/98
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:

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Continued from preceding page.....

Measurements will be made at 50 ft intervals extending in a line due east of Silo 1 into Area F. If possible, the measurements should be performed as two sets of three measurements, with each set of three measurements being performed simultaneously. The measurements should be made at a 1.0 ft detector height with a 15 minute data acquisition time. The measurements should be made in the early afternoon to avoid possible high concentrations of radon accumulating near the ground surface in the morning. One duplicate measurement will be collected.

2. Immediately following the two sets of measurements, the RSS should be walked along a profile from the base of the berm for Silo 1 through the locations of each of the HPGe measurement points. This will allow possible shine effects on sodium iodide data to be tied to HPGe measurements at the same detector height. RSS measurements should be taken using a 4 second data acquisition time with a 1.0 mph forward speed.

3. Four HPGe measurements will be made at increasing distance from Silo 3. The first measurement will be made 10 ft. from the base of Silo 3, while the remaining three will be made at 50 ft intervals extending in a line going northeast of the first measurement. If possible, the measurements should be performed as two sets of two measurements. The measurements should be made at a 1.0 ft detector height with a 15 minute data acquisition time. The measurements should be made in the afternoon. One duplicate measurement will be collected.

4. Immediately following the four HPGe measurements, the RSS should be walked along a profile extending 10 ft from the base of Silo 3 through the locations of each of the HPGe measurements. This will allow possible shine effects on sodium iodide data to be tied to HPGe measurements at the same detector height. RSS measurements should be taken using a 4 second data acquisition time with a 1.0 mph forward speed.

The above studies will allow the following types of information to be delineated:

a. Whether or not a trend of decreasing uranium concentration with increasing distance from the silos is present
b. How fast the uncollided photon fluence contribution to background falls off as a function of distance from the silos.
c. Whether or not a trend of decreasing radium-226 concentration as a function of distance from the silos is evident, and whether or not possible high radium-226 concentration affect sodium iodide detector data.
d. Whether or not thorium-232 shine exists relative to silo 3, and whether or not such shine affects sodium iodide detector data.

<u>HPGe and RSS Measurement Locations</u>

HPGe measurement identifications for this study will be as follows: A7-S-XG-D, where A7 = Area 7; S = Shine Test; X = sequential gamma measurement numbers; G = Gamma; and D = Duplicate (if applicable). RSS shine study measurements will be as follows: A7-S-next sequential batch number.

Sample IDs and coordinates are given below.

Silo 1	Northing	Easting
A7-S-1G	480341.26	1347132.27
A7-S-2G	480431.26	1347182.27
A7-S-2G-D	480431.26	1347182.27
A7-S-3G	480431.26	1347232.27
A7-S-4G	480431.26	1347282.27
A7-S-5G	480431.26	1347332.27
A7-S-6G	480431.26	1347382.27
A7-S-next sequential batch number		

Silo 3		
A7-S-7G	480793.26	1347062.47
A7-S-8G	480829.57	1347097.66
A7-S-9G	480864.28	1347132.97
A7-S-9G-D	480864.28	1347132.97
A7-S-10G	480900.03	1347168.47
A7-S-next sequential batch number		

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