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State of Ohio Environmental Protection Agency

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FIL 6446.6

June 5, 1998

RE: DOE FEMP
COMMENTS
USER GUIDELINES

Mr. Johnny Reising
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Dear Mr. Reising:

This letter provides as an attachment Ohio Environmental Protection Agency comments on the User Guidelines, Measurement Strategies, and Operational Factors for deployment of *In -Situ* Gamma Spectrometry at the Fernald Site.

If you have any questions, please contact Tom Ontko or me.

Sincerely,

Tom Ontko

for Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S. EPA
Terry Hagen, FDF
Ruth Vandergrift, ODH
Mark Shupe, HSI- GeoTrans, Inc.
Francie Barker, Tetra Tech EM Inc.
Manager, TPSS/DERR,CO

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Ohio Environmental Protection Agency Comments on the
User Guidelines, Measurements Strategies, and Operational Factors for
Deployment of *In-Situ* Gamma Spectroscopy at the Fernald Site, Revision A

General Comments

1) Commenting Organization: Ohio EPA Commentor: ODH
Section #: Pg #: Line #: Code: general
Comment: For RTRAK, aggregation is necessary to detect hot spots, bound FRL areas, and meet the MDC guidance as suggested by MARSSIM. Suspect areas are then confirmed and delineations refined by HPGe. A more practical approach may be to solely use RTRAK for total activity scans and WAC exceedences, reserving HPGe for hot spots, precertification, and ALARA goals. Certification strategies using minimal HPGe overlap (99.1 % coverage) coupled with discrete sampling seems a logical parallel study which should ultimately provide empirical evidence of equivalency of decisions for in-situ and discrete sampling strategies.

2) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: Pg #: Line #: Code: G
The topographic and environmental effects should be differentiated between those effects that can and cannot be readily eliminated. For example, factors such as high grass, snow cover, standing water, and the presence of surface rubble can be easily handled through appropriate action (e.g., cutting the grass, waiting for snow to melt, allowing the soil to dry, and clearing the rubble). Actual surface topography cannot be readily eliminated (e.g. conical hill, depression, or swale) and, therefore, must be handled using correction factors. The use of such factors should be reserved to correct for actual land surface relief. Correction factors should not be used when adverse site conditions can be easily remedied prior to in-situ gamma measurement.

Specific Comments

3) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.1 Pg #: 2.1-1 Line #: 22-26 Code: C
Comment: The last sentence of this paragraph should be omitted. The use of the term "aggregated measurements" in the overview section should be avoided. Suggest that general terms as to what the RTRAK can "see" be used instead.

4) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Table 2.1-2 Pg #: 2.1-5 Line #: na Code: C
Comment: The data presented thus far on the RTRAK capabilities does not support that the RTRAK can clearly measure ALARA, i.e. 50 ppm, concentrations of total uranium. This reference should be deleted.

5) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Table 3.1-1 Pg #: 3.1-3 Line #: na Code: C

Comment: Since the thallium-208 2.6 Mev gamma is used for RTRAK measurements, it is unclear why it isn't used for HPGe measurements. Ohio EPA understands the calibration problem for using this peak for commercial laboratory analysis, but it is not clear why this peak is not at least qualitatively used to aid in making decisions about contamination at depth or heterogeneity.

6) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.2 Pg #: 3.2-1 Line #: 21 Code: c
Comment: This paragraph is a little unclear about the interference of background levels of Th-232 and Ra-226 on the measurement of uranium. It sounds like when they are close to background, there will be negligible interference with uranium quantification as long as uranium is greater than 120 ppm. At uranium levels close to 50 ppm, background levels of Th-232 and Ra-226 will interfere with uranium quantification in an unpredictable direction. How is this consistent with Table 5.1-3 which lists RTRAK MDCs for total uranium lower than 50 ppm?

7) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 3.3-1 Pg #: none Line #: na Code: C
Comment: It is unclear how this figure illustrates hot spot delineation. Please provide more detail to illustrate the procedure in the text and in the Sitewide Excavation Plan.

8) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 3.3-2 Pg #: none Line #: na Code: C
Comment: If a hot spot is detected by RTRAK, but confirming HPGe measurements are negative, does this mean there is no hot spot? This would appear to be a QA/QC problem with one of the two measurement systems or with the GPS. What measures will be employed to ensure that a hot spot is not overlooked due to this phenomena?

9) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.3 Pg #: 3.3-2 Line #: 4 Code: c
Comment: This sentence is not appropriate. If "many individual measurements" need to be aggregated to detect hot spots, the concept that a hot spot is a relatively small area is lost in the process. We suggest omitting the sentence or re-phrasing it. The last bullet on page 3.3-4 captures the concept and it could be paraphrased here.

10) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.3.5 Pg #: 3.3-4 Line #: 3rd bullet Code: c
Comment: The 30XFRL rule is from a DOE order and it is cited as a "Too be considered" in the Operable Unit 5 Record of Decision. It is not clear why this is being deleted at this time even though there are currently no strategies to detect and remediate these hot spots. A calculation of

the smallest area that a 30X FRL that could be reliably detected by the RTRAK would be helpful in deciding an approach.

11) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.4 Pg #: 3.4-2 Line #: 1-2 Code: C
Comment: The text states that the measurement location will be adjusted in the field using a hand-held instrument. a) What are the minimum specification, i.e. sensitivity, etc, for the hand held instrument? b) Shouldn't the location be determined by the coordinates obtained from the RTRAK GPS? and c) What if the elevated area cannot be identified with the hand-held instrument does not detect an above WAC RTRAK measurement?

12) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 3.4-1 Pg #: Line #: Code:
Comment: It is not clear what this figure is intended to illustrate. The delineated boundary does not appear to be bounded by HPGe measurements that are lower than the WAC. The figure should be modified to be consistent with the WAC delineation strategy in the Sitewide Excavation Plan.

13) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.4.1 Pg #: 3.4-1 Line #: 27 Code: c
Comment: The use of the expression "hot spot" is very confusing in this context. It should not be used to mean "WAC flunker". The term "hot spot" should be used to mean an area of above-FRL soil that remains after excavation and is discovered during the pre-certification phase. The discussion of hot spots here and on page 3.4-2 line 8 is confusing. Hot spots are discovered in the pre-certification phase. WAC flunkers according to the SEP are discovered and delineated prior to excavation. The situation where you are looking for WAC flunkers and hot spots both at the same time is not immediately apparent. (The possibility that WAC flunkers are present in an area that would otherwise meet FRLs is not being considered for the sake of this argument.) These sections should be re-written to more closely reflect the excavation

14) Commenting Organization: Ohio EPA Commentor: ODH
Section #: 3.5 Pg #: Line #: Code: c
Comment: As both the HPGe and RTRAK "see" about 5 inches into the vertical profile, it is not clear in section 3.5 "**Excavation Control For Lifts**" how the remainder of 1 or 3 foot lifts are characterized for WAC exceedences. Additional detail on borings and the use of the new HPGe core counter would help clarify how vertical contamination profiles can be integrated with excavation decisions.

15) Commenting Organization: Ohio EPA Commentor: ODH

Section #: 3.5 Pg #: 3.5.1 Line #: Code: c
Comment: As both the HPGe and RTRAK "see" about 5 inches into the vertical profile, it is not clear how the remainder of 1 or 3 foot lifts are characterized for WAC exceedences. Additional detail on borings and the use of the new HPGe core counter would help clarify how vertical contamination profiles can be integrated with excavation decisions.

16) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.6 Pg #: 3.6-1 Line #: General Code: C
Comment: Ohio EPA is not convinced that the RTRAK can measure total uranium concentrations at the FRL level. Please show how this can be performed, using the MDCs published in this report.

17) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.1 Pg #: 4.1-1 Line #: 30 Code: C
Comment: The discussion of Figure 4.1-2 should include mention of the detector height used. In addition, the detector height should be indicated on Figure 4.1-2.

18) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.3 Pg #: 4.3-1,2 Line #: General Code: C
Comment: The 0.4 meter overlap should be clearly incorporated as the standard for RTRAK measurements. This ensures that no measurements are biased low due the attenuation of photons from the tires of the RTRAK.

19) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Table 4.3-1 Pg #: 4.3-3 Line #: na Code: C
Comment: Please clarify the table. It is unclear what point is attempted to be made from this table.

20) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.5 Pg #: 4.5-3 Line #: none Code: C
Comment: Show how the MDC and standard deviation can be reduced by aggregating measurements. The method appears to use the averaging of *n* discrete measurements which should not reduce the MDC because the count time for that discrete measurement is still 4 seconds.

21) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.5 Pg #: 4.5.3 Line #: none Code: C
Comment: Specify either here or in the guidelines that RTRAK measurements should be performed at 4 seconds, 1 mph.

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22) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.5 Pg #: 4.5-4 Line #: 17 Code: C
Comment: Consistent with the statement on page 4.15-2 (mapping conventions), the referenced text should include a discussion of the sizes of the fields of view resulting from measurement aggregation. The larger the number of aggregated measurements (e.g., 1925 at 2 sec acquisition time for a 7 ppm trigger level), the larger the field of view.

23) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Table 4.5-2 Pg #: 4.5-2 Line #: na Code: C
Comment: Figure 3-11 of the SEP indicates that the RTRAK will be used to identify hot spots at 3 x FRL. Add hot spot triggers for RTRAK.

24) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.6 Pg #: 4.6-1 Line #:1-12 Code: E
Comment: Please clarify this paragraph. It is unclear what point is trying to be made.

25) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.6 Pg #: 4.6-2 Line # :8-9 Code: C
Comment: Specify the hand-held survey meter to be used. Also, Ohio EPA recommends that a NaI 2x2 with rate meter be used for frisking and locating areas of elevated concentrations. This method would then be comparable to the RTRAK.

26) Commenting Organization: Ohio EPA Commentor: ODH
Section #: 4.6 Pg #: Line #: Code: c
Comment: To assist in identifying small areas of WAC exceedence, a uniform depth distribution model is assumed to estimate the % photon fluence to determine action levels for total uranium in Tables 4.6 - 1. This assumption may be valid for airborne deposition areas but is questionable in the production area. What are the contingencies to determine what impact this assumption has on small areal WAC detections in the production area?

27) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.7 Pg #: 4.7-1 Line #:15-16 Code: C
Comment: This sentence states that a measurement with a hand-held survey meter greater than background indicates, among others, that this area is a potential FRL exceedance. A hand-held survey meter cannot differentiate between FRL exceedance and background.

28) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.9 Pg #:4.9-1 Line #: 22-23 Code: C
Comment: The repeated reference to FEMP soil contamination being homogenous with depth

may or may not be true especially in the former production area, waste pits, and southern waste units. What is the effect of heterogenous contamination on the assumptions presented here.

29) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.9 Pg #: 4.9-7 Line #: 8-16 Code: C
Comment: Please specify that grass should be cut to 5 cm as this is clearly the preferred height for measurements. Also, grass taller than 5 cm may make it difficult for field crews to identify loose debris which should be removed prior to measurement.

30) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.9 Pg #:4.9-7 Line #:17-19 Code: C
Comment: The text states that corrections will be made if more than 10% of the fluence is blocked. It is not clear how this correction or at what stage in the data validation process it will be made. This comment is similar to a general comment on this section regarding the details of the data validation process.

31) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.9 Pg #: 4.9-1 Line #: 29 Code: C
Comment: In accordance with the discussions with the study group on March 25, the cut grass should be allowed to dry prior to conducting measurements. Alternatively, the cut grass can be raked away from the measurement area.

32) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.9 Pg #: Line #: Code: general
Comment: The discussion in this Section is very good. Left unsaid is the mechanism by which the cumulative contribution of environmental and topographic effects is assessed and how the decision is made that these effects do not significantly impact the useability of the data. Conceptually, a field notebook could be used to record such things as puddles, objects in the field of view, grass height, etc. During the data validation step, the total effects could be estimated and the data could be accepted, qualified, or rejected as unusable. Please address this issue and in the RtC provide a reference to the SCQ Plan that more definitively describes the data validation process.

33) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.11 Pg #: 4.11-1 Line #: 1st conclusion Code: c
Comment: The discussion in this note is informative but two additional question remains unanswered. If a 10% increase in soil moisture only attenuates gammas by roughly 1%, why are wet weight concentrations as much as 50% higher in dry soils than in wet soils? Secondly, since contaminant concentrations are reported on a dry weight basis, the effect of soil moisture on dry

weight concentrations should be mentioned in the text.

34) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.11 Pg #: 4.11-2 Line #: 14 Code: C
Comment: Troxler moisture measurements are planned for each HPGe measurement location. This guidance should specify a maximum moisture content (based on the Troxler data) above which HPGe and RTRAK are not applicable. A specific cutoff level is necessary so that the in-situ methods are consistently applied across the FEMP. This is another comment on the data validation process.

35) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.11 Pg #: 4.11-2 Line #: 19 Code: C
Comment: The guidance that in-situ measurements can be obtained if standing water occupies less than 10 percent of the field of view directly conflicts the previous sentence stating that no measurements will be taken if standing water is present. In light of the previous comments, no measurements should be taken if this condition exists as measurement under more optimal conditions can frequently be performed by simply delaying the timing of the measurement until conditions are drier.

36) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.12 Pg #:4.12-1 Line #:19-22 Code: C
Comment: Will collimated and uncollimated measurements be performed at every location to identify if shine is present, or will some frequency be proceduralized?

37) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.12 Pg #: 4.12-1 Line #: 6 Code: C
Comment: A map of potential sources of shine at the FEMP should be prepared and included with this users guide.

38) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.12 Pg #: Line #: Code: general
Comment: This discussion of shine is good. However, similar to concerns expressed in a comment on environmental and topographic effects, no details are provided regarding the process whereby the effects of shine are estimated and a decision is made on the useability of the measurement. Please provide a brief explanation of this process and a reference to the SCQ Plan.

39) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.14 Pg #: 4.14-1 Line #:27-29 Code: C
Comment: How does an operator know if the liquid nitrogen has been used up? Is this

information logged in field book or some other QA/QC record?

40) Commenting Organization: Ohio EPA Commentor: ODH
Section #: 4.15.1 Pg #: 4.15-1 Line #: 6 Code: c
Comment: Relative to aggregation of measurements vs. loss of spatial resolution (particularly for uranium), it would be useful to depict the areal size limit / hot spot recognition capacity of RTRAK pictorially to help operators recognize the dimensional limits to hot spot identification.

41) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5.5 Pg #: 5.5 Line #: Code: c
Comment: The Ohio EPA has focused concern on the heterogeneity issue because we have observed HPGe shots being taken in areas where the field of view of the instrument includes areas that should not be averaged together. An example we have mentioned at the in situ gamma methods work group occurred in the stream bed of Paddys Run. Suspected highly contaminated soil from high on the creek bank had collapsed into the stream bed. The HPGe was placed at the one meter height and both collapsed soil and the original stream bed were obviously in the field of view. We maintain that information that results from such a measurement is of very limited value. The measurement result is highly dependent on the unknown ratio of original stream bottom to collapsed berm in the field of view. The value reported for the measurement can vary anywhere in the range of the concentration of pure stream bottom to pure collapsed bank depending on their ratios in the field of view of the detector. The same logic applies to HPGe shots that mix ditches and fields, fields and waste piles, roads and fields, etc.
A section should be added that addresses these concerns.