ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

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Division of Waste Management and Environmental Protection
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U.S. Nuclear Regulatory Commission
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SUBJECT: COMMENTS ON THE U.S. ARMY CORPS OF ENGINEERS' PROPOSED SLDA FSSP REVISIONS FROM THE OCTOBER 21, 2010 MEETING BETWEEN THE NRC, ORISE, USACE, and ANL FOR THE SHALLOW LAND DISPOSAL AREA FINAL STATUS SURVEY PLAN (RFTA NO. 10-005) DCN: 2012-DR-01-0

Dear Ms. Norman:

The Oak Ridge Institute for Science and Education (ORISE) has completed the review of the U.S. Corps of Engineers' proposed response to comments and the corresponding *Shallow Land Disposal Area (SLDA) Site Final Status Survey Plan, November 2010.* You provided these responses in a December 9, 2010 e-mail. The ORISE technical review finds that most responses are adequate to address the original comment. However, a general comment and one significant comment were identified and are enclosed for your consideration.

Please direct any additional questions you may have to me via my information listed below or by contacting Erika Bailey at 865.576.6659.

Sincerely,

Timothy J. Vitkus, CHP
Director of Survey Operations
Independent Environmental
Assessment and Verification

TJV:jc
Enclosure

c: S. Nesmith, NRC/NMSS/TWFN 8A23
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COMMENTS ON THE
U.S. ARMY CORPS OF ENGINEERS' (USACE) RESPONSE TO COMMENTS FOR THE SHALLOW LAND DISPOSAL AREA FINAL STATUS SURVEY PLAN

At the request of the U.S. Nuclear Regulatory Commission (NRC), the Oak Ridge Institute for Science and Education (ORISE) performed a technical review of the USACE's response to NRC comments titled:

Proposed SLDA FSSP Revisions from the October 21, 2010 Meeting between the NRC, ORISE, USACE, and ANL;

and the USACE's revised Final Status Survey Plan (FSSP) titled:

Shallow Land Disposal Area (SLDA) Site Final Status Survey Plan Parks Township, Armstrong County, Pennsylvania. November, 2010.

In general, responses to comments were adequate, with two noted exceptions. These exceptions are discussed below.

General Comment

1. *Response 4, Bullet 3* and *Response 4 Bullets 4 – 6*: It is the reviewer's opinion that the responses noted for the optimistic scan minimum detectable concentration (MDCs) and Class 2 and 3 survey unit composite sample evaluations are very general, and non-committal in nature. That is to say, although the USACE has recognized and understands the NRC concerns identified in the original comments, the response does not provide specific actions that will be taken or specific modifications to the FSSP. Rather, the USACE has committed to further evaluation of these concerns once the plan has been implemented and data are gathered. It is the reviewer's opinion that this item remains open and be subject to in-process evaluations once the FSSP commences to determine how the USACE follows-up on the stated investigative commitments.

   Furthermore, the FSSP most notably the Item #2, page 19 excerpt shown below, is technically incorrect and does not reflect the comment responses. It is not appropriate to use $DCGL_{EMC}$ in the SOR calculations for Class 2 and 3 areas and in particularly background reference area values as stated.

> The mean subsurface background activity concentrations will be used to calculate $DCGL_{emc}$ SOR values from samples collected in the excavation areas (including the overburden and bench/side slope soils). For the surficial composite soil samples collected from the unexcavated Class 2 and Class 3 units, mean surface background values will be used to calculate the SORs. The SOR $DCGL_{emc}$ values must be less than or equal to one for every soil sample. Each soil sample will be required to comply with the 100-m^2 $DCGL_{emc}$ standard.

Specific Comment

1. *Response 1*: The ORISE review has determined that Response 1 is not appropriate. During the October 21, 2010 conference call, it was explained that the investigation level for a composite sample was to be based on the number of increments forming the composite sample and the $DCGL_{EMC}$ for the area represented by the composite. The point is also stressed in

NUREG-1505. In the case of the SLDA, the number of increments is 5 and the area represented by each composite sample is 100 m^2. The USACE's response to comments and FSSP revisions did not satisfy this commitment. Rather, the response was that the action level would be 1/5 of the $DCGL_{EMC}$ for a 20 m^2 area and that if this action level were met, then the $DCGL_{EMC}$ for a 100 m^2 area would also be met.

The text of the response states the following:

> *The table also provides derived investigation levels for Class 1 100 m^2 5-increment systematic composites sample that guarantees that each of the increments could not have exceeded its corresponding $DCGL_{EMC}$ (in other words, if activity concentrations were zero in four of the increments while the fifth carried all of the activity). It is important to note that the resulting investigation levels exceed the 100 m^2 $DCGL_{EMC}$ requirement. Consequently, a systematic composite result below its 100 m^2 $DCGL_{EMC}$ requirement also guarantees that none of the contributing increments will exceed their 20 m^2 $DCGL_{EMC}$ requirement.*

and the Table footnote states:

> [2] *ROC investigations levels are 1/5 of the 20-m^2 $DCGL_{emc}$ activity concentrations.*

The reviewer evaluated this approach, using 1/5 of the 20 m^2 $DCGL_{EMC}$, for two of the radionuclides of concern (ROCs)—Am-241 and Th-232 were the selected ROCs. The result of this evaluation is that the proposed derived investigation levels will not consistently provide a guarantee that the 100 m^2 $DCGL_{EMC}$ will also be met for all radionuclides. Again, the recommendation during the conference call, guidance in NUREG 1505, and other sources clearly state the investigation level should be based on ($DCGL_{EMC\ 100\ m^2}$)/5.

The evaluations for both Am-241 and Th-232 were selected based on DCGL levels and the predominance of these ROCs as reported in the FSSP. For the case of Am-241, the USACE approach held. That is, calculating the various worst case scenarios, if the 20 m^2 $DCGL_{EMC}$ concentration level is not exceeded than all other possible scenarios where the 100 m^2 $DCGL_{EMC}$ could be exceeded would also be identified. However, for Th-232, the approach did not hold. The reviewer interpolated area factors for both ROCs to enable a closer inspection of the approach. For Am-241, calculated composite sample activity concentrations for 20, 40, 60, and 80 m^2 hot spots at the respective $DCGL_{EMC}$ were calculated and compared with the 100 m^2 $DCGL_{EMC}$. In each case, the concentration would be greater than the 420 pCi/g 100 m^2 $DCGL_{EMC}$. The table below shows the results.

Am-241 Investigation Levels				
Area (m^2)	Area Factor	$DCGL_{EMC}$ (pCi/g)	Calculated Composite Activity (pCi/g)	Composite concentration ≤≥ $DCGL_{EMC\ 100\ m^2}$
20	184.7	5,172	5,172 × 0.2 = 1,034	≥ 420
40	63	1,764	1,764 × 0.4 = 705.6	≥ 420
60	33.1	926.8	926.8 × 0.6 = 556.1	≥ 420
80	21.9	613	613 × 0.8 = 490.4	≥ 420
100	15	420	420 × 1 = 420	≥ 420

[1] Based on # of elevated increments at the respective $DCGL_{EMC}$

However, for Th-232, this did hold. For example the 40 m^2 Th-232 interpolated area factor is 5.6.; corresponding to a 40 m^2 $DCGL_{EMC}$ of 1.4 × 5.6 = 7.87 pCi/g. This level represented within a composite (2 increments containing 7.87 pCi/g and the remaining 3 increments with no added Th-232) would be reported as 3.14 pCi/g. A value less than the 100 m^2 $DCGL_{EMC}$ of 5.3 pCi/g. If this were the case, the USACE would conclude the area was acceptable when in reality it may not be. The reviewer is providing this one example only and has not evaluated the remaining hot spot area scenarios and other ROCs.

The above evaluation combined with the original concern with overly optimistic scan MDCs discussed in the general comment suggests that the USACE follow standard composite sample result evaluation guidance.