

March 2, 2006

Ms. Marjorie McLaughlin  
Health Physicist  
U.S. Nuclear Regulatory Commission  
Division of Nuclear Materials Safety  
475 Allendale Road  
King of Prussia, PA 19406-1415

**SUBJECT: DOCUMENT REVIEW— FINAL STATUS SURVEY PLAN,  
SECTION 2 OF THE WHITTAKER CORPORATION WASTE AND  
SLAG STORAGE AREA, REYNOLDS INDUSTRIAL PARK,  
TRANSFER, PENNSYLVANIA (DOCKET NO. 040-07455; RFTA  
06-005)**

Dear Ms. McLaughlin:

The Oak Ridge Institute for Science and Education (ORISE) has reviewed the subject final status survey plan. Comments identified in the plan are enclosed for your consideration.

Please direct any questions to me at 865.241.8893 or Scott Kirk at 865.574.0685.

Sincerely,




Sarah Roberts  
Health Physicist/Project Leader  
Survey Projects

SJR:ar

Enclosure

c: T. McLaughlin, NRC/NMSS/TWFN 7F27  
E. Abelquist, ORISE  
S. Kirk, ORISE  
File/1679

Distribution approval and concurrence:	Initials	Date
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**Comments on the  
Final Status Survey Plan (FSSP)  
Section 2 of the Whittaker Corporation  
Waste and Slag Storage Area  
Transfer, Pennsylvania**

**General Comments**

1. The document lists the radionuclides of concern and associated derived concentration guideline levels (DCGLs) in Table 2-1 on page 7. Based on the DCGLs and without additional supporting documentation, ORISE requests clarification as to whether both natural uranium and processed natural uranium were licensed materials and, therefore, contaminants of concern. A description of the site history and the nature of the source material are not specifically provided in the plan. The document should include a more detailed discussion of the site history and nature of contaminants.
2. The plan does not clearly describe the radioanalytical methods for the soil samples. It is not clear if Th-232 will be used as a surrogate when evaluating soil samples (as is implied in the derivation of a modified DCGL for Th-232+D on page 7), or if the radioanalytical methods will include quantification of all isotopes of concern. The document should include a section that specifically addresses surrogate measurements and the calculations used to reduce data for comparison to the DCGLs (if the use of surrogate measurements are intended). Otherwise, the plan should be revised to appropriately implement the unity rule for demonstrating compliance for multiple radionuclides.

The inclusion of this information in the FSSP is recommended per Section 4.1 of NUREG-1507, Consolidated NMSS Decommissioning Guidance.

3. The plan does not describe an investigation level for scanning, as recommended in Section 5.5.2.6 of the MARSSIM. It is not clear when the surveyor would flag a suspected location of elevated activity. It is also not clear what the follow-up actions would be (e.g., additional excavation, collect judgmental soil sample, etc.). The document should include a discussion of investigation levels and their application. This information is needed to verify that the licensee will adequately assess areas with elevated levels of radioactivity and thus not exceed the permissible dose standard.

The inclusion of this information in the FSSP is recommended per Section 4.4 of NUREG-1507, Consolidated NMSS Decommissioning Guidance.

4. The plan does not describe area factors and elevated measurement comparison (EMC) criteria and their derivation. Therefore it is not clear if the DCGLs apply to individual soil sample results or if averaging criteria will be applied. The document should include a table of area factors for each of the radionuclides of concern and also include a discussion of the application of the EMC.

The inclusion of this information in the FSSP is recommended per Sections 4.1 and 4.4 of NUREG-1507, Consolidated NMSS Decommissioning Guidance.

## Specific Comments

1. Section 1.0, page 5, 4<sup>th</sup> paragraph. This paragraph allows modifications to the Final Status Survey Plan (FSSP) as long as Envirocare procedures are followed. ORISE recommends the licensee commit to specifying what types of modifications are allowed such that the intent of the FSSP is still met. Specific change control criteria are needed to ensure that changes to certain attributes listed in the FSSP (e.g., Type 1 error rate of 5%) that affect the survey design and demonstrating compliance with 10CFR20.1402 receive prior NRC approval.
2. Section 2.0, page 7, 3<sup>rd</sup> paragraph. The following statement should be clarified: "...data also indicates that as the activity level of the material decreases and approaches background levels, the uranium-238 and daughter concentrations approach equilibrium." ORISE suspects that equilibrium is approached because background is being measured (versus contaminant material). As stated, the plan indicates that the level of equilibrium changes as the concentration of the contaminant material changes, which would not be expected. Please also refer to General Comment No. 1.
3. Section 2.0, page 7, last paragraph. It is not clear why a modified DCGL was calculated for Th-232+D. Is the intent to use this isotope as a surrogate for uranium? Please also refer to General Comment No. 2.
4. Section 2.1, page 8, 3<sup>rd</sup> paragraph. The statement "Each of these survey units will receive a 10% walkover survey and discrete sampling" should be changed to "Each of these survey units will receive a minimum 10% walkover survey..." Section 4.2.2 states that 10% to 50% of the Class 2 survey unit will be surveyed.
5. Section 2.2, page 8, last paragraph and Section 2.2, page 9. The statement "... (the most conservative approach since the thorium-232 DCGL is less than the uranium-238+D DCGL)" is incorrect. The scan MDC is dependent on the energy and yield of gamma emissions, among other factors. Therefore, the energy and yield of gamma emissions from Th-232+D and U-238+D is the factor that should be considered when determining which isotope is more appropriate to use as a surrogate for gamma scanning. In order to substantiate the assertion that the thorium-232 is the conservative surrogate for scanning, the document should be revised to include the scan MDCs for both the thorium and uranium (processed natural or natural) and from that information the survey designed to satisfy the most restrictive of the designs. This is necessary to ensure that actual and required scan MDCs will satisfy EMC considerations in Class 1 survey units. Alternatively, the information may be presented to demonstrate that both scan MDCs are less than the respective DCGL<sub>w/s</sub> or another technically defensible approach may be presented.

The inclusion of this information in the FSSP is recommended per Section 4.4 of NUREG-1507, Consolidated NMSS Decommissioning Guidance.

6. Section 2.2, page 9, first paragraph. The term "Minimum Detectable Exposure Rate" is more appropriate than "ScanMDC" to describe the 2.8 µR/h factor.

7. Section 2.2, page 8, and Section 2.3, page 10. The FSSP describes “daily” response checks for portable survey instruments. In accordance with the MARSSIM (page 6-27), ORISE recommends that a response check be performed twice daily when in use – prior to the beginning of the day’s measurements and again following the conclusion of measurements on that same day.
8. Section 3.0, page 11. This paragraph allows modifications to the Data Quality Objectives (DQOs) with approval from the project health physicist and CRSO. ORISE recommends the document be edited to clearly state what types of modifications are allowed such that the intent of the FSSP is still met.
9. Section 4.0, page 12, 2<sup>nd</sup> paragraph. This section states that “The number of sample points and their location in Section 2 survey units were determined using the Spatial Analysis and Assistance (SADA) software..” Section 2.1 (and Appendix B) state that “The number of samples was determined using the MARSSIM protocols.” It is recommended that this be clarified in the FSSP.
10. Section 4.1, Page 13. It is unclear if the grid sections in S2 SU4 were not excavated based on visual indications that there were no significant volumes of buried slag in this area, or if sampling was performed to verify this. Additional information should be provided in the FSSP or otherwise referenced.
11. Section 4.1, page 14, 1<sup>st</sup> paragraph. ORISE recommends that the audible signal be utilized to detect elevated radiation levels.
12. Section 4.2, page 14, 3<sup>rd</sup> paragraph. This section describes an “island” of radioactive slag that was identified in the river by visual inspection when the water levels were low. It is not clear if this “island” was missed during the 1998 scan, which concluded that “no radioactive material was identified.”
13. Section 4.2, page 14, last paragraph. The sediment sample collected from below the “island” of slag was compared to the current release criteria. It is assumed that the “current release criteria” represents the soil DCGLs. ORISE questions if it is appropriate to compare the concentrations of radioactivity in sediment to the soil DCGLs, given that the soil DCGLs were derived based on the industrial exposure scenario.
14. Section 4.2.1, page 15. This section describes scanning that will be performed in water-tight housing to survey the bottom of the river bed. A scan MDC for this scenario is not described in the FSSP.
15. Section 6.3. ORISE recommends that the acceptance criteria for the duplicate and replicate measurements be described in the FSSP or reference provided to a project quality assurance plan that contains this information.
16. Appendix B. It is not clear why the standard deviation for radium-226 is utilized as the standard deviation for uranium-238 (given that the 166.5 DCGL applies to uranium-238 and its short-lived daughters only). A standard deviation specifically for uranium-238 should be used in the third term. Also, the DCGL for uranium-238+D is 9.7 pCi/g (per Table 2-1) versus 9.4 pCi/g.