



DEPARTMENT OF THE ARMY  
ST. LOUIS DISTRICT, CORPS OF ENGINEERS  
9170 LATTY AVENUE  
BERKELEY, MISSOURI 63134

July 21, 1999

REPLY TO  
ATTENTION OF:

Formerly Utilized Sites Remedial Action Program Project Office

Mr. Robert Geller  
Missouri Dept. of Natural Resources  
P. O. Box 176  
Jefferson City, MO 65102

**SUBJECT: RADIOLOGICAL FINAL STATUS SURVEY PLAN FOR THE ST.  
LOUIS AIRPORT SITE (SLAPS)**

Dear Mr. Geller:

Enclosed is the response to your comments on the subject survey plan attached at Enclosure 1. Please contact Mr. Dennis Chambers at (314) 524-3329 if you have any questions with regard to this plan.

Sincerely,

A handwritten signature in cursive script, reading "Sharon R. Cotner".

Sharon R. Cotner  
FUSRAP Program Manager

1 Encl

CC: Mr. Dan Wall, U. S. EPA

**COMMENTS AND RESPONSES FOR THE  
RADIOLOGICAL FINAL STATUS SURVEY PLAN FOR ST. LOUIS AIRPORT SITE  
ST. LOUIS, MISSOURI (May 1999 Regulatory Review Draft)**

Comments received from FFS			
Comment No.	pp/S/M	Comment	Response
1	General	The process outlined in the Radiological Final Status Survey Plan for the St. Louis Airport Site document looks to follow the process set out in the Multi-agency Radiation and Site Investigation Manual (EPA 402-R-97-016, December 1997) for designing and carrying out a final status survey for a specific survey unit at SLAPS.	Noted.
2	Page 22, Table 5-3	Table Heading, "Expected Number of Survey Units" should be "Expected Number of Chemical Samples."	The text will be revised as suggested.
3	Page 23	<p>I calculated the area factor for multiple radionuclides using the equation and values on page 23. I could not get the same answer that was reported. I know the difference is not solely do to rounding.</p> $A_m (\text{Th-230 MDC} = 1122) = 1.01$ <p>The calculations within the document should be consistent and reproducible. The first equation on page 23 uses 2,120 pCi/g for the MDC<sub>i</sub> for Th-230 but the second equation as shown above uses 1,122 pCi/g for Th-230. I plugged in 2,120 pCi/g to find out if that would get the same answer as stated on page 23. Which value is correct for the MDC for Th-230?</p> $A_m (\text{Th-230 MDC} = 2120) = 1.02$ <p>Can some one explain where the 19.6 value came from which is used in the equation on page 23? Table 5-2 on page 19 lists the scan MDC for Natural-U as 40 pCi/g. Attachment 1 also lists the scan MDC for Natural-U as 40.4 pCi/g. I plugged that 40.4 pCi/g into the equation to see if I could come up with 1.09. As you can see I could not come up with the same value after several attempts.</p> $A_m (\text{Th-230 MDC} = 1122, \text{U MDC} = 40) = 1.06$ <p>The calculations within the document should be consistent and reproducible.</p>	<p>The calculation appears to be in error. The answer will be changed from 1.09 to 1.01, as suggested.</p> <p>The correct value is 1,122 pCi/g. 2,120 pCi/g is the old value from NUREG-1507. Site-specific scan sensitivities were developed.</p> <p>The database contains U-238 concentrations and not total uranium. Therefore, 40 pCi/g of total uranium value is adjusted to get the U-238 fraction: <math>(40 \text{ pCi/g}) / (2.046) = 19.6 \text{ pCi/g U-238}</math>. The text will be modified to clarify.</p> <p>Agreed. Your first calculation is correct.</p>

**COMMENTS AND RESPONSES FOR THE  
RADIOLOGICAL FINAL STATUS SURVEY PLAN FOR ST. LOUIS AIRPORT SITE  
ST. LOUIS, MISSOURI (May 1999 Regulatory Review Draft) (continued)**

Comments received from FFS			
Comment No.	pp/§/¶	Comment	Response
4	Page 21	The DCGL used in the $D_{total}$ equation for Th-230, Ra-226, and U-238 where the following 16.67 pCi/g, 16.21 pCi/g and 51.23 pCi/g. These values included the values listed in table 4-1 plus background. The cleanup levels for Th-230, Ra-226, and U-238 were 15 pCi/g, 15 pCi/g and 50 pCi/g respectively. The background levels were then 1.67 pCi/g for Th-230, 1.21 pCi/g for Ra-226 and 1.23 pCi/g for U-238. These values are different from the background values I received for North County from the USACE. I received background values on March 1, 1999 for North County in electronic format. Those values were 2.89 (avg. 1.66) pCi/g for Th-230, 1.55 (avg. 1.05) pCi/g for Ra-226 and 2.02 (avg. 1.18) pCi/g for U-238. Please provide a list of background values to be used for North County in either a separate document or within the SLAPS investigation report.	<p>Additional background samples were added to the data set taking the total from 50 to 74 samples. Average values for the next draft of this document will include 1.05 pCi/g for Ra-226, 1.66 pCi/g for Th-230, and 1.18 pCi/g for U-238 to reflect the addition of the new samples. There is now a total of 37 surface samples and 37 subsurface samples. The average concentrations for surface samples are 0.96 pCi/g for Ra-226, 1.49 pCi/g for Th-230, and 1.08 pCi/g for U-238. The average concentrations for subsurface samples are 1.15 pCi/g for Ra-226, 1.83 pCi/g for Th-230, and 1.27 pCi/g for U-238.</p> <p>Note that the UTL-95 concentrations for soils of all depths are 1.55 pCi/g for Ra-226, 2.89 pCi/g for Th-230 and 2.02 pCi/g for U-238. The UTL-95 concentrations for surface soils are 1.27 pCi/g for Ra-226, 2.17 pCi/g for Th-230 and 1.51 pCi/g for U-238. The UTL-95 concentrations for subsurface soils are 1.55 pCi/g for Ra-226, 2.89 pCi/g for Th-230 and 2.02 pCi/g for U-238.</p> <p>Note also that <math>D_{total}</math> is the gross Th-230 limit using the stated concentration ratios. The final version of this document will use the net <math>D_{total}</math> value (independent of background).</p>
5	Page 9	Samples will be analyzed for potential metal contaminants since these are the only chemicals identified as potential COCs within IA-1 through IA-7. The SLAPS EE/CA page 4-23 indicates that chemicals and metals would be remediated consistent with industrial cleanup screening levels for potential contaminants of concern above environmental background levels. Please identify the document, which identifies only metals as COCs. The final SLAPS investigation report along with the PAM document have not been issued by the USACE or review by FFS. As indicated on page 5 the following question must be answered before the USACE can close out the survey unit and that is "Do chemical COCs meet CERCLA target risk range criteria?" A list of Potential COCs from SLAPS SAP (Final USACE/OR/DACA62-1045; Table 1-5) includes antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, Nitrate, Selenium, Silver, Thallium, Vanadium, Zinc, Toluene, Trichloroethene, Dichloromethane, trans-1,2-Dichloroethene, Heptachlor, and Polychlorinated Biphenyls.	The text will be modified to state that the PAM, although currently in draft form, is used to identify chemical contaminants at SLAPS. The PAM uses the latest slope factors and characterization data, and is the best tool for identifying non-radiological contaminants.

**COMMENTS AND RESPONSES FOR THE  
RADIOLOGICAL FINAL STATUS SURVEY PLAN FOR ST. LOUIS AIRPORT SITE  
ST. LOUIS, MISSOURI (May 1999 Regulatory Review Draft) (continued)**

Comments received from FFS			
Comment No.	pp/§/¶	Comment	Response
6	Page 21	What about Th-232 and Ra-228? Sum of Ratio on page 5 includes Th-232 and Ra-228 so why are they not included in the MARSSIM process, e.g., DCGL or area factor calculations.	Although Th-232 and Ra-228 have not been found to be contaminants of concern, equations will reflect the potential contributions from the Th-232 series radionuclides. Results will likely not change
7	Page 6	Radon Assessment was received and reviewed by FFS. The recommendation of the authors of the assessment indicated that monitoring could be done to verify the modeling results. The Stone & Webster Site Safety and Health Plan, page 8-2, Section 8.1.3; perimeter air monitoring for radon would be done. "Passive detectors will be used at perimeter stations for long-term radon monitoring and real time monitoring will be employed for radon event characterization." Page 8-3 same document "Radon monitoring will be conducted during excavation of areas containing soil that is suspected of containing radon and whenever abnormalities suggest the presence of radon. Monitoring for radon will be performed in two ways. First, a real-time instrument will be used to detect the presence of radon at the potential source or work area." Has Stone & Webster reviewed the radon assessment? What changes to Stone & Webster Site Safety and Health plan has been made for radon monitoring? Even though monitoring for radon would be extremely conservative based on the information in the radon assessment report but to be able to "document through monitoring" any and all workers and public exposures associated with this project is appropriate. Does the radon assessment report meet the requirements of 40 CFR Part 192, and 10 CFR Part 20?	Beyond the scope of this document.
8	Page 21	Please explain why Th-230 was chosen as the surrogate for the IA-7 DCGL and Area factor calculations as indicated on page 21. Surrogate measurements are normal done when there are more than one radionuclide present in soil but one is easier to measure than the others. An example of this is if Co-60 and Fe-55 are present in the soil Co-60 gamma rays are easier to measure so that would be your surrogate. One requirement is that they have a consistent ratio. I would think that either U-238 or Ra-226 would be easier to measure than Th-230.	While uranium and radium are easier to scan, Th-230 is the dominant radionuclide in terms of concentration. The equations used to derive area factors do include contributions from Ra-226 and U-238. It is simply easier to track one radionuclide. As an example, the stated Th-230 scan sensitivity is 1,122 pCi/g. If the area factor was derived using Th-230 alone, significantly different results would be produced. Area factor calculations are clearly dominated by radionuclides with higher energy gamma radiation such as Ra-226.

The following section/text will be added to support the subsurface sampling campaign:

#### 4.3.3 Subsurface Samples – Radiological COCs

The remediation contractor will use a precision excavation approach to remove impacted material above site criteria. Excavation will stop when surveys performed by the remediation contractor indicate that the bottom of the excavation surface meets criteria. A review of site data will then be performed to compare the excavation depth with historical data. If historical data suggest that above criteria material may lie below the excavation surface, subsurface soil samples will be collected in the region of interest. These subsurface samples will be collected at 46 cm (18 inch) depth intervals until the depth of the elevated historical data point is reached or until the depth of contamination is identified. Subsurface sample density will be similar to that of surface sampling. If subsurface contamination is identified, further characterization and/or remediation will be conducted prior to completion of the final status survey.

# Cataloging Form

{Technical/Project Managers fill in C through G, K through Q. RM completes other fields}

A. Document ID Number: Assigned by database 701

B. Further Information Required?: ☐

C. Operable Unit (Choose One):

USACE ☐  
St. Louis Sites ☐  
Downtown ☐  
North County ☒  
Madison Sites ☐  
Inaccessible Areas ☐  
PRP ☐  
Oversight Committee ☐

D. Site (Optional):

SLDS VPs ☐  
Mallinckrodt ☐  
SLAPS ☒  
SLAPS VPs ☐  
CWC ☐  
HISS ☐  
Madison ☐

E. Area (Optional): \_\_\_\_\_

F. Primary Document Type (Choose One):

Site Management Records ☐  
Removal Response ☐  
Remedial Investigation ☐  
Feasibility Study ☐  
Record of Decision ☐  
Remedial Design ☐

Remedial Action ☒  
Public Affairs/Community Relations ☐  
Congressional Relations ☐  
Freedom of Information Act ☐  
Real Estate ☐  
Project Management ☐

G. Secondary Document Type (see back of form): Correspondence

H. Bechtel Number: \_\_\_\_\_

I. SAIC Number: \_\_\_\_\_

J. MARKS Number (Choose One): FN: 1110-1-8100e ☐ FN: 1110-1-8100f ☐ FN: 1110-1-8100g ☐

K. Subject/Title: Response to mDNR Comments on the Radiological Final Status Survey Plan for St. Louis Airport Site (SLAPS)

L. Author: Sharon Cotner

M. Author's Company: PM-R

N. Recipient(s): Robert Geller

O. Recipient(s) Company: mDNR

P. Version (Choose One): Draft ☐

Final ☒

Q. Date: 7/21/99

R. Include in the ARF? ☐

S. Include in the AR? ☐

T. Filed as Confidential/Privileged? ☐

U. Document Format (Choose one):

Paper ☒  
Electronic ☐

Photographic ☐  
Audio-visual ☐

Cartographic/Oversize ☐  
Microform ☐

V. Filed in AR Volume Number: \_\_\_\_\_

W. Physical Location (Choose One):

Central Files ☒  
Records Holding Area ☐

Microfilm Vendor ☐  
Department of Energy ☐

In ARF ☐  
In AR ☐

X. Associated with Document(s): \_\_\_\_\_

## *Secondary Document Types*

- ☐ Amendments to Record of Decision (ROD)
- ☐ Anomaly Review Board Documents (Management Plan, Correspondence, Standard Operating Procedures, Findings)
- ☐ Applicable or Relevant and Appropriate Requirements (ARAR) Determinations
- ☐ Archives Search Reports (ASR)
- ☐ Briefing Papers
- ☐ Chain of Custody Forms
- ☐ Community Relations Plan
- ☐ Correspondence
- ☐ Daily Operations Summary/Situation Reports
- ☐ Engineering Evaluation and Cost Analysis (EE/CA) Action Memo
- ☐ Engineering Evaluation and Cost Analysis (EE/CA) Approval Memorandum
- ☐ Engineering Evaluation and Cost Analysis (EE/CA)
- ☐ Explanation of Significant Differences
- ☐ Fact Sheets/Newsletters
- ☐ Feasibility Study (FS) Reports
- ☐ Federal, State, Local Tech. Records
- ☐ Final Approved Findings and Determinations
- ☐ Final Remedial Design Documents
- ☐ Freedom of Information (FOIA) Requests
- ☐ Freedom of Information (FOIA) Responses
- ☐ Health and Endangerment Assessments
- ☐ Interagency Agreements/Memoranda
- ☐ Interim Deliverables
- ☐ Inventory Project Report (INPR) Risk Assessment Code (RAC)
- ☐ Invoices/Contractor Payments/Cost Reports
- ☐ Land Grants/Deeds
- ☐ Mailing Lists
- ☐ News Clippings and Press Releases
- ☐ No Further Action Docs (NOFA)
- ☐ On-Scene Coordinator Reports
- ☐ Proposed Plans for Remedial Action
- ☐ Public Meeting Minutes/Transcripts
- ☐ Public Notices
- ☐ Public notices, Comments Received, Responses to the Comments
- ☐ Published Hearings
- ☐ Record of Decision (ROD)
- ☐ Reference Documents
- ☐ Remedial Action Documents
- ☐ Remedial Investigation (RI) Reports
- ☐ Removal Response Reports (Emergency Evacuation Orders)
- ☐ Rights of Entry Documents
- ☐ Sampling/Analysis Data and Plans
- ☐ Scopes of Work/Contractual Documents
- ☐ Site Descriptions and Chronologies
- ☐ Site Inspection Documents
- ☐ Site Photographs and Maps
- ☐ Testimonies
- ☐ Title Search Documents
- ☐ Work Logs
- ☐ Work Plans and Progress Reports
- ☐ Work Plans/Site Safety and Health Plans and Progress Reports
- ☐ Work Register and Logs