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

153-60A-GAM-00031
SL-1405

REPLY TO
ATTENTION OF

April 30, 1998

Formerly Utilized Sites Remedial Action Program Project Office

Mr. Scott F. Honig
Missouri Dept. of Natural Resources
P. O. Box 176
Jefferson City, MO 65102-0176

SUBJECT: ST. LOUIS AIRPORT SITE - WEST END REMEDIAL ACTION SUMMARY REPORT COMMENTS

Dear Mr. Honig:

The purpose of this letter is to respond to comments provided by the Federal Facilities Section of the Missouri Department of Natural Resources (MDNR) after review of the Draft St. Louis Airport Site (SLAPS) West End Remedial Action Summary Report (January 30, 1998).

Responses to comments communicated in the MDNR letter of March 30, 1998, are provided below:

1) Document doesn't include detailed post remedial maps, e.g., show final condition of site.

An as-built drawing will be included in the Calendar Year (CY) 1997 Post Remedial Action Report (PRAR).

2) Document doesn't include a chronological time line of events. The time line should include unusual events, e.g., work stoppage, finding of drums, etc.

MDNR and DGLS were on site during the West End remedial action. The regulatory agencies were also contacted if any notable occurrences were encountered. The regulatory agencies were also kept informed of our progress by the weekly regulatory reports and the bi-weekly telephone conferences. Unusual events which have a significant impact on the post-RA status of SLAPS will be noted in the CY 1997 PRAR.

3) The document provides results from organic sampling with field screening equipment but doesn't state why monitoring was done.

This sampling was conducted to ensure worker safety and is standard procedure for all Bechtel excavation operations. A brief discussion of the rationale behind the organic sampling in the field will be provided in the CY 1997 PRAR.

4) Report doesn't include sampling results from Coldwater Creek, i.e., before, during, and after. Bechtel indicated that this sampling would be done.

The pre-RA surface water samples, as well as those collected during the remediation, were collected and analyzed for the radiological constituents of concern. These results will be included in the PRAR. The post-RA surface water samples from Coldwater Creek are scheduled to be taken during the next Environmental Surveillance of SLAPS. These results will be forwarded via the routine quarterly report.

5) Why aren't other radionuclides listed as constituents of concern in Section 3.1 "Pre-Remediation Activities"? Why aren't the results from these pre-remediation activities not (sic) included in this report?

The constituents of concern were documented in the SLAPS West End EE/CA (DOE/OR/21950-1026, 9/97) and Section 3.1 is consistent with that document.

6) Why was the compaction level changed from 95% to 90%?

The evaluation of percent compaction was utilized as a means for determining when permeability of the compacted clay was most probably within the acceptable range. Early in the restoration of Area 1, it was realized that a compaction of 90% yielded acceptable permeability rates. The change in target compaction levels was agreed to by DGLS prior to implementation in subsequently backfilled areas.

7) Why was the soil (Clay backfill material) not tested for other contaminates?

Historically, FUSRAP has tested the backfill only for the COCs, i.e., radiological parameters only.

8) Table 3-2, "Field density and Moisture Content Test Results," doesn't include area 1 results?

Applicable field density and moisture content test results for Area 1 will be included in a table in the CY 1997 PRAR.

9) What is status of groundwater well abandonment in the west end area?

The abandonment of the two groundwater monitoring wells at the West End remedial action area will be conducted during the first full week of April, weather permitting. This activity is being coordinated with DGLS. The PRAR will document the final condition of wells that were impacted (abandoned) as a result of the remediation.

10) Uranium results were not listed on figure 5-2?

Figure 5-2 will be expanded to three figures, one showing the analytical results for each radionuclide of concern, U-238 , Th-230, and Ra-226. These three figures will be included in the CY 97 PRAR.

11) Didn't air monitoring show an exceedance of the DAC at Eva Loadout Station? Because of this, workers that unloaded the trucks were placed on respirators. Why was this not stated in the report? Expect to see events that changed work procedures in this report.

No air sample results exceeded the DAC at the site. The maximum DAC result was 2.41E-12 uCi/ml which represents about 80% of the DAC. Bechtel FUSRAP procedures call for respiratory protection to be utilized at 50% of the DAC. Respirators were used at the Eva Loadout Station in a conservative manner.

12) What does "OV" mean? (Air monitoring data sheets, direct readings).

Organic Vapor.

13) Were samples run through a gas chromatography unit? If yes, then why were samples run and what were the sample results? What reference chemicals where (sic) used in the unit?

A GC was not utilized for this work. The field instruments used were an OVM 580B (organic vapor) and a MSA Passport (O2, combustible gas monitor).

14) Was the chemical data in this report validated by someone else then (sic) the laboratory?

The chemical data from Areas 4, 5, and 6 has been validated by BNI. The analyses were conducted by RECRA LabNET, the FUSRAP contracted lab. The chemical data from Areas 1, 2, and 3 were verified but not validated per BNI protocol. Maxim Labs Inc., an MDNR contracted lab, was contacted to obtain the necessary back-up information to perform the complete validation per BNI protocol, but is no longer in the environmental testing business and has not supplied any additional information.

15) Section 5.2, page 17, suggests that post-remedial action soil sample results indicate that radionuclide concentration from the southeast corner of Area 1 are above soil guidelines and that sample results show Areas 2 through 6 meet soil guidelines. However, the post-remedial action sample results presented in Appendix C, page 1, indicate that 14 of the 25 sampling locations exhibit radionuclide concentrations whose sum-of-the-ratios, are greater than 1 and therefore, exceed the soil guidelines established by DOE. (Figure 5-2 illustrates the sampling locations). Locations where sample results show the sum-of-the ratios to be greater than 1 are found in Areas 1, 2, 3, 4, 5, and 6.

Are Areas 2 through 6 not subject to future remediation efforts? Why were these areas not remediated during the Phase 1A excavation? Please explain and clarify.

Providing sample calculations (sum-of-the-ratios) would be beneficial in the review of the post-remedial action soil sample results.

A review of Appendix C revealed that the surface criterion of 5 pCi/g was used in the denominator for the thorium and radium concentrations in the sum-of-the-ratios (SOR) calculations rather than the applicable subsurface criterion of 15 pCi/g. When the proper

criterion is used, all of the samples from Areas 2-6 pass the SOR test. Thus, no additional remediation of Areas 2 - 6 is necessary. A corrected copy of the table is attached. This table will also be included in the CY 1997 PRAR. A sample SOR calculation is included as well.

This Interim Remedial Action project has been a successful collaborative effort between FUSRAP and the MDNR. We look forward to continuing our successful relationship during future remediation activities at SLAPS.

Please contact Mr. Michael Feldmann at (314) 524-6821 with any questions or comments regarding these responses to your questions.

Sincerely,

R. L. Mullins, Jr., Ph.D., PE, AICP
FUSRAP Program Manager

Enclosure

cc: D. Wall, EPA Region 7

Sum-Of-The-Ratio Calculation
Revised West End Radionuclide Concentration Results

PURPOSE:

To determine if post-remedial action soil samples collected from the bottom of the SLAPS West End excavation pass the sum-of-the-ratios calculation.

ASSUMPTIONS:

1) The background values for St. Louis soil are (BNI 1993):

Uranium-238:	1.1 pCi/g
Thorium-230:	1.3 pCi/g
Thorium-232:	1.0 pCi/g
Radium-226:	0.9 pCi/g
Radium-228:	1.0 pCi/g

2) The excavation at the SLAPS West End was several feet deep. Therefore the following subsurface soil criteria would apply (DOE Order 5400.5):

Uranium-238:	50 pCi/g
Thorium-230:	15 pCi/g
Thorium-232:	15 pCi/g
Radium-226:	15 pCi/g
Radium-228:	15 pCi/g

REFERENCES:

1) DOE Order 5400.5

2) BNI, 1993. Baseline Risk Assessment, DOE/OR/23701-41.1, November.

CALCULATION:

For sample ID 153-RS-003-97:

Uranium-238:	1.28 pCi/g including background	or 1.28 - 1.1 =	0.18 pCi/g	excluding background
Thorium-230:	7.88 pCi/g including background	or 7.88 - 1.3 =	6.58 pCi/g	excluding background
Thorium-232:	1.02 pCi/g including background	or 1.02 - 1.0 =	0.02 pCi/g	excluding background
Radium-226:	0.84 pCi/g including background	or 0.84 - 0.9 =	-0.06 pCi/g	excluding background
Radium-228:	1.01 pCi/g including background	or 1.01 - 1.0 =	0.01 pCi/g	excluding background

The sum-of-the-ratios using uranium-238, the greater of thorium-230 and radium-226, and the greater of thorium-232 and radium-228: $0.18/50 + 6.58/15 + 0.02/15 = 0.4436$

CONCLUSION:

The sum-of-the-ratios calculation for sample ID 153-RS-003-97 is less than 1. Therefore, the soil sample passes the sum-of-the-ratios test and does not exceed the DOE guidelines for subsurface soil.

The sum-of-the-ratios calculation for the SLAPS West End post-remedial action soil samples is attached as an Excel spreadsheet.

Sample Location	Radionuclide Concentration (pCi/g): Results Include Background								
	Th-230	Th-232	Ra-226	Ra-228	U-235	U-238	Pa-231	Ac-227	*Sum of Ratios
SLP346	1109.90±117.80	1.84±0.2	22.31±1.09	1.84±0.2	4.33±0.68	33.13±4.31	21.02±2.28	18.80±1.02	2.12
SLP347	185.60±32.87	1.16±0.52	3.65±0.24	0.98±0.15	1.93±0.44	8.53±2.73	2.96±0.68	3.65±0.34	12.45
SLP348	129.30±23.54	1.33±0.58	2.36±0.17	0.97±0.13	0.95±0.27	7.38±2.14	1.67±0.97	2.22±0.25	8.68
153-RS-003-97	7.88±1.83	1.02±0.44	0.84±0.06	1.01±0.10	0.25±0.14	1.28±0.79	0.13±0.52	0.15±0.13	0.444
153-RS-004-97	7.50±1.84	1.44±0.57	0.81±0.08	1.08±0.13	0.17±0.17	0.92±0.58	-.011±.67	0.39±0.15	0.443
153-RS-005-97	4.92±1.56	1.42±0.72	0.72±0.06	0.94±0.10	0.10±0.10	1.36±0.70	0.53±0.48	0.20±0.13	0.275
153-RS-007-97	9.40±3.13	1.003±0.73	0.80±0.07	0.93±0.11	0.18±0.13	1.49±0.51	0.64±0.59	1.63±0.24	0.548
153-RS-010-97	2.23±0.75	1.21±0.52	0.78±0.06	1.03±0.11	0.25±0.12	3.28±0.92	0.28±0.50	0.12±0.12	0.12
153-RS-016-97	2.25±0.86	1.59±0.71	0.75±0.07	1.05±0.11	0.31±0.13	3.69±1.07	0.52±0.55	0.18±0.13	0.154
153-RS-017-97	3.16±1.09	1.31±0.64	0.80±0.07	1.10±0.12	0.14±0.17	2.32±1.17	0.48±0.69	0.13±0.16	0.167
153-RS-024-97	15.31±3.54	0.72±0.40	0.93±0.07	0.70±0.08	0.19±0.12	2.96±0.90	0.21±0.52	0.37±0.11	0.971
153-RS-025-97	11.60±2.12	0.87±0.33	1.07±0.08	0.89±0.11	0.29±0.16	2.43±0.97	0.74±0.78	0.50±0.12	0.713
153-RS-034-97	14.42±2.81	0.97±0.38	0.83±0.08	0.31±0.12	0.26±0.16	1.47±0.58	1.42±0.76	0.31±0.12	0.882
153-RS-037-97	1.71±0.56	1.37±0.49	0.87±0.08	1.01±0.14	0.19±0.16	2.02±0.69	1.03±0.80	0.51±0.17	0.07
153-RS-038-97	14.42±2.63	0.97±0.36	1.37±0.10	1.02±0.12	0.44±0.24	3.10±0.71	1.50±0.89	0.63±0.14	0.916
153-RS-039-97	11.64±2.09	1.07±0.36	1.29±0.10	1.04±0.12	0.49±0.21	3.21±1.14	0.86±0.72	0.60±0.14	0.736
153-RS-040-97	9.52±1.80	0.88±0.33	1.09±0.08	0.98±0.12	0.12±0.17	2.15±0.92	0.58±0.63	0.09±0.14	0.569
153-RS-044-97	2.03±0.66	1.09±0.45	0.84±0.08	0.97±0.17	0.27±0.19	3.02±0.85	1.24±1.08	0.41±0.16	0.093
153-RS-045-97	2.50±0.85	1.40±0.59	0.83±0.07	1.07±0.11	0.00±0.11	1.14±0.82	-0.06±0.55	0.13±0.18	0.107
153-RS-046-97	1.63±0.64	0.83±0.42	0.82±0.08	0.92±0.19	0.15±0.13	2.56±0.76	1.30±0.78	0.19±0.16	0.051
153-RS-047-97	1.97±0.61	1.06±0.42	1.04±0.08	0.95±0.11	0.24±.011	4.99±1.21	0.19±0.57	0.09±0.12	0.126
153-RS-050-97	7.77±2.37	1.83±0.84	1.70±0.11	1.07±0.12	0.24±0.16	2.48±1.11	0.44±0.62	0.17±0.14	0.514
153-RS-052-97	11.58±3.16	1.35±0.67	1.10±0.08	1.00±0.11	0.20±0.13	1.72±1.15	0.58±0.59	0.22±0.10	0.721
153-RS-053-97	1.11±0.58	1.48±0.69	0.88±0.07	1.13±0.12	0.23±0.11	2.64±1.01	0.30±0.42	0.19±0.12	0.063
153-RS-062-97	1.66±.57	1.02±0.42	0.77±0.07	1.15±0.14	0.02±0.17	1.62±0.70	1.81±0.97	0.98±0.74	0.044
Background	1.3±0.4	1.0±0.5	0.9±0.4	-	0.1±0.1	1.1±0.2	-	-	NA

* For the sum-of-ratios method, the above-background concentration of each of the radioisolopes (radium-226 or thorium-230, whichever is greater; thorium-232 or radium-228, whichever is greater; and total uranium) is divided by its respective criterion, and the ratios are summed. If the result is greater than 1, the mixture of radionuclides fails the sum-of-ratios test and is considered to exceed the soil guidelines.

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