



January 14, 2011

Mr. Dominick Orlando
 Materials Decommissioning Branch
 Division of Waste Management and Environmental Protection
 Office of Nuclear Materials Safety and Safeguard
 Two White Flint North
 11545 Rockville Pike
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Dear Mr. Orlando:

This letter, sent on behalf of the U.S. Army (Dr. David Goldblum), responds to concerns raised by the U.S. Nuclear Regulatory Commission (NRC) Technical Staff during the 21 and 25 January 2010 teleconferences regarding the site-specific partition coefficient (K_d) study. The teleconferences included members of NRC Technical Staff and staff from Science Applications International Corporation (SAIC), the Army's contractor. Specifically, NRC raised the following concerns:

- Representativeness of rainwater to be used in the K_d study for subsurface soil samples (below 1 or 2 feet) as differences are expected in pH and alkalinity levels in rainwater at or near ground surface versus rainwater that has mixed with subsurface minerals with depth over time;
- Potential degradation that could have occurred since the time when the first 24 soil samples for the K_d study were collected in October 2008 with potential variation occurring in pH, organic carbon, or total organic carbon; and
- Potential losses of uranium adhering to filter container walls during the K_d study

This letter summarizes the steps the Army has taken to address these concerns. In addition, this letter includes a summary of key decisions made over the last 2 years that have impacted the site-specific K_d study. This letter also lists all of the samples the Army proposes to include in the testing. As it is imperative to begin the study in the immediate future to maintain the overall schedule for the submittal of the Decommissioning Plan in accordance with Army License SUB-1435 amendment 13, the Army plans to commence the site-specific K_d tests in February 2011 unless notified otherwise by NRC.

1. Background

As described in Field Sampling Plan (FSP) [Addendums 7 and 8], the Army will conduct 30 K_d tests as part of an overall site-specific K_d study using soil collected from the Jefferson Proving Ground (JPG). The Army will use TestAmerica's Standard Operating Procedure (SOP) No. ST-IP-0018 for the testing in the study. TestAmerica's SOP is based on American Society for Testing and Materials (ASTM) D4319-93, *Standard Test Method for Distribution Ratios by the Short-Term Batch Method*, which was withdrawn without explanation or replacement. The test method is a measurement technique to determine the distribution ratio (R_d) or degree of partitioning between liquids and solids, under a certain set of laboratory conditions, for the species of interest. R_d is used to estimate the value of K_d for given underground geochemical conditions based on knowledge and understanding of important site-specific factors. The measured R_d values will be evaluated statistically and using geochemical speciation modeling to define the K_d values, which will be used in RESRAD-OFFSITE and other fate and transport modeling codes.

Subsequent to the submittal of FSP Addendum 7 in October 2008, the Army and NRC have discussed the site-specific R_d study on several occasions and have documented the results of these discussions in various letters and in FSP Addendum 8:

FSME21

- 6 November 2008 – letter transmitted the proposed SOP and described some site-specific and uranium-specific analysis parameters that will be used by TestAmerica, Inc. (Earth City, MO) in the R_d tests for NRC's review and approval.
- 23 July 2009 – letter addressed the following two questions about the site-specific R_d tests: (1) how will the Army ensure that solubility limits, if exceeded, will not contribute to an overestimation of sorption, and (2) which samples will be selected for the R_d study and what is the basis for their selection?
- 27 August 2009 – during the annual status meeting, discussed the need to collect samples from the glacial till stratigraphic layer, which resulted in submitting FSP Addendum 8 in October 2009 and collecting six additional samples in December 2009 for site-specific R_d tests.
- 21 September 2009 – letter corrected the list of samples submitted in August 2009 letter.
- 16 October 2009 – letter addressed a question concerning the spatial distribution of proposed sampling locations where soil was collected to conduct the site-specific testing and included figures showing the locations where the proposed samples were collected.

Following the submittal of the 16 October 2009 letter, the Army and NRC discussed the R_d testing during teleconferences on 19 November 2009, 21 January 2010, and 25 January 2010. During these teleconferences, NRC clarified their concerns about the potential use of samples with excessively high uranium activity in the R_d testing. While NRC felt that it is desirable to evaluate sorption for a broad span of detected uranium activities, they remained concerned that exceeding solubility limits in the tests could overestimate sorption and, thus, underestimate residual radiation dose. The solution is to include some, but limit the number of, samples that exceeded previously documented testing limits (160 pCi/g), which is discussed in further detail in the 6 November 2008 letter. A second component of the solution is for the Army to provide additional supporting data from the laboratory tests (e.g., uranium concentrations in aqueous solution over time) and to consider the solubility limits that may be ascertained as a boundary between adsorption/desorption when developing K_d values for modeling from R_d values resulting from the laboratory study.

The issues noted above for rainwater representativeness, sample degradation, and uranium adsorption to laboratory glassware also were discussed during these teleconferences. Ancillary laboratory tests were conducted in spring and summer 2010 for the rainwater representativeness and sample degradation concerns and are discussed in the following sections. A laboratory test will be performed after the completion of the R_d tests to evaluate uranium adsorption to laboratory glassware and the results will be included in future correspondence.

It should be noted that a sufficient volume of rainwater was not available to conduct the planned R_d study and these ancillary laboratory tests related to NRC's concerns. Thus, additional rainwater was collected in February 2010 to replace the supply collected in October 2008. The rainwater collected in February 2010 was analyzed for water quality parameters, was used for the rainwater representativeness and sample degradation testing, and will be used for all site-specific R_d tests.

2. Rainwater Representativeness Testing

NRC was concerned about the representativeness of rainwater to be used in the site-specific R_d study for subsurface soil samples. In particular, NRC was concerned about the differences between pH and alkalinity levels in rainwater at or near ground surface versus rainwater that had mixed with subsurface minerals with depth over time. These concerns are founded in the importance of pH on the migration of uranium through soil and water. However, it should be noted that NRC was not concerned with the use of rainwater as the leachant for the R_d study for surface and near surface soil samples because the majority of penetrators primarily reside and residual soil contamination remains at ground surface.

To address this concern, the Army selected 10 subsurface soil samples including one duplicate (see Table 1) for the laboratory to mix with rainwater and measure pH and alkalinity periodically over the course of 2 days. pH levels in the leachant were measured using U.S. Environmental Protection Agency (EPA) method SW 9040C. Alkalinity was measured in the leachant using EPA drinking water method E310.1.

Table 1. Samples Selected for Rainwater Representativeness Testing (Alkalinity and pH)

Site ID	Field Sample Number	Depth (feet Below Land Surface)(BLS)	Collection Date
JP-KAC-008	SAIC04	2-4	28-Oct-2008
JP-KAC-010	SAIC04	2-4	23-Oct-2008
JP-KCR-002	SAIC04	2-2.5	27-Oct-2008
JP-KCR-010	SAIC04	2-4	23-Oct-2008
JP-KGR-001	SAIC03	1-2	26-Oct-2008
JP-KGR-004	SAIC04	2-4	21-Oct-2008
JP-KAC-013	SAIC01	10-16	11-Dec-2009
JP-KCR-012	SAIC01	8-14	11-Dec-2009
JP-KGR-005	SAIC01	6-10	10-Dec-2009

For each soil sample, the laboratory prepared soil/water mixtures to enable sampling of each slurry and analysis of samples for pH and alkalinity in the supernatant at seven pre-determined time intervals. The first supernatant sample was collected and analyzed immediately after mixing (0 hours) and then supernatant samples were collected and analyzed after 4 hours, 8 hours, 12 hours, 24 hours, 36 hours, and 48 hours after mixing. The following procedures were used to prepare and complete the leaching tests:

1. Sample and leachant were placed into containers in a 1:4 ratio (i.e., 20 grams of sample and 80 mL of leachant). Separate containers were used for each time period (i.e., 0 hours, 4 hours, 8 hours, 12 hours, 24 hours, 36 hours and 48 hours).
2. Each slurry was shaken for 15 minutes at each time period. The sediment was allowed to settle out and filtered before taking the supernatant for analysis for each time period. The supernatant sample was analyzed for alkalinity and pH.
3. The remaining slurries were shaken for 15 minutes approximately 1 hour before each time period specified above. The sediment was allowed to settle out and was filtered before analyzing the supernatant for each corresponding time period for alkalinity and pH.

Alkalinity results shown in Table 2 include 77 tests [11 measurements taken immediately after mixing (0 hours) then after 4 hours, 8 hours, 12 hours, 24 hours, 36 hours, and 48 hours after mixing]. As shown in Table 2, alkalinity levels for all seven times in six samples were not detected at or above the 50 mg/l reporting limit:

- JP-KAC-008/SAIC04,
- JP-KAC-010/SAIC04,
- JP-KCR-002/SAIC04,
- JP-KCR-010 /SAIC04,
- JP-KGR-004/SAIC04, and
- JP-WK-002/SAIC01.

These samples are designated by the "U" flag (not detected at or above the stated limit) and "B" flag (estimated result below reporting limit). The "J" flag is used because the reported concentration is estimated either because it is reported below the reporting limit (designated by the "B" flag) or because

alkalinity was present in the associated method blank. Alkalinity is the ability of water to accept protons, so it is present in natural water and its presence in method blanks is not considered contamination.

Table 2. Total Alkalinity Results for Rainwater Representativeness Testing

Site ID / Field Sample Number	Total Alkalinity (mg/L)						
	0 hours	4 hours	8 hours	12 hours	24 hours	36 hours	48 hours
<i>Avonsburg/Cobbsfork</i>							
JP-KAC-008 / SAIC04	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U
JP-KAC-010 / SAIC04	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U	1.6 B J	6.4 B J
JP-KAC-010 -DUP/ SAIC04	4 B J	28.5 J	10.8 B J	13.2 J	12.5 U	3.6 B J	2.8 B J
JP-KAC-013 / SAIC01	32 J	37.5 J	34 J	54 J	34 J	48 J	150.25 J
<i>Cincinnati/Rossmoyne</i>							
JP-KCR-002 / SAIC04	12.5 U	12.5 U	12.5 U	12.5 U	4 B J	12.5 U	12.5 U
JP-KCR-010 / SAIC04	5.6 B J	3.2 B J	3.6 B J	2.4 B J	3.6 B J	7.2 B J	3.6 B J
JP-KCR-012 / SAIC01	28 J	46.5 J	33 J	48 J	36 J	42 J	50 J
<i>Grayford/Ryker</i>							
JP-KGR-001 / SAIC03	20.4 J	17.6 J	17.6 J	35.25 J	27.25 J	42 J	39.5 J
JP-KGR-004 / SAIC04	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U	12.5 U
JP-KGR-005 / SAIC01	30.5 J	29 J	30 J	36 J	33.5 J	44 J	44 J
<i>Rainwater</i>							
JP-WK-002 / SAIC01	1.15 B	1.15 B	1.15 B	1.15 B	1.15 B	1.15 B	1.15 B
B = estimated result below reporting limit							
DUP = duplicate sample							
J = the associated method blank contains alkalinity at a reportable level							
U = not detected at or above the stated limit							

The average alkalinity across all testing times for the remaining four samples includes 55.6 mg/kg (JP-KAC-013/SAIC01), 40.5 mg/kg (JP-KCR-012 /SAIC01), 28.5 mg/kg (JP-KGR-001/SAIC03) and 35.3 mg/kg (JP-KGR-005/SAIC01). The average alkalinity level for JP-KAC-013/SAIC01 appears to be skewed by the final measurement taken at 48 hours (150 mg/kg). Eliminating the elevated 48-hour test result, the average alkalinity across all testing times in JP-KAC-013/SAIC01 falls to 39.9 mg/kg. The alkalinity test results plotted against time, while excluding the elevated 48-hour result for JP-KAC-013/SAIC01, are shown in Figure 1. In the four samples where alkalinity was measured above the reporting limit, the sample results fluctuate along a steadily increasing trend. While it does not appear that the alkalinity levels peaked within the 48-hour testing window, it should be noted that the laboratory R_d tests will last up to 45 days, which far exceeds the 14-day period recommended in the ASTM method. For each soil sample, the laboratory will prepare soil/water mixtures to enable sampling of each mixture for uranium analysis of the supernatant at predetermined time intervals (i.e., 3, 7, 10, 14, 21, 28, 35 and 45 days). The 45-day test period is believed to be sufficient to allow steady-state concentrations in the supernatant to be observed with the achievement of steady state anticipated about mid-way through the test period based on previous batch testing studies conducted by TestAmerica.

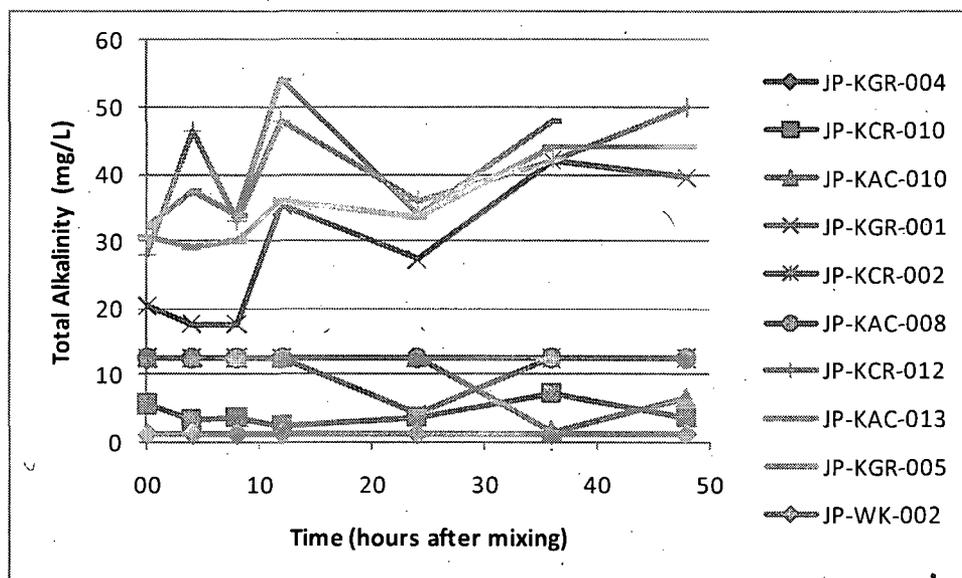


Figure 1. Total Alkalinity Results versus Time for Rainwater Representativeness Testing Excluding Results for JP-KAC-013/SAIC01 at 48 Hours

The alkalinities measured during the rainwater representativeness testing fall within the range of measurements observed during the site characterization in surface water and groundwater samples as shown in Table 3. The average alkalinity levels measured in samples collected during the site characterization were 104.8 mg/L in surface water, 341.5 mg/L in overburden groundwater samples, 297.1 mg/L in shallow bedrock samples and 330.5 mg/L in deep bedrock samples. If the increasing trends shown in Figure 2 are sustained, the alkalinity levels should intersect with average alkalinity levels measured in samples collected during the site characterization (approximately 300 mg/L) in 12 to 29 days (based on linear regression modeling). Therefore, the 45-day test period should be sufficient to reach steady-state conditions in the R_d study.

Table 3. Total Alkalinity Results for Quarterly Sampling

Unit	Minimum Alkalinity (mg/L)	Average Alkalinity (mg/L)	Maximum Alkalinity (mg/L)	Sample Locations
Surface Water	1	104.8	210	JP-W-01 through JP-W-28
Groundwater – Overburden	2	341.5	650	JPG-DU-030, JPG-DU-040, JPG-DU-060, JPG-DU-090, JPG-DU-100, MW-6, MW-10, MW-RS-1, MW-RS-3, MW-RS-4, MW-RS-5, MW-RS-6, MW-RS-7 and MW-RS-8
Groundwater – Shallow Bedrock	120	297.1	510	JPG-DU-011, JPG-DU-021, JPG-DU-031, JPG-DU-041, JPG-DU-051, JPG-DU-061, JPG-DU-071, JPG-DU-081, JPG-DU-091, JPG-DU-10D, MW-1, MW-2, MW-3, MW-5, MW-7, MW-8, MW-9, MW-11 and MW-RS-2
Groundwater – Deep Bedrock	35	330.5	1,200	JPG-DU-01D, JPG-DU-02D, JPG-DU-04D, JPG-DU-05D, JPG-DU-06D, JPG-DU-07D, JPG-DU-08D and JPG-DU-09D

Average results for samples collected in April 2008, August 2008, October 2008, and February 2009.

The 77 pH measurements taken [11 each immediately after mixing (0 hours) then after 4 hours, 8 hours, 12 hours, 24 hours, 36 hours and 48 hours] after mixing are shown in Table 4 and Figure 2. While there is some variability in the measurements, there is less fluctuation than is observed in the alkalinity data as demonstrated by relatively low standard deviation values (i.e., all but one standard deviation is

less than or equal to 0.2). A single pH measurement in the 24-hour analysis for JP-KCR-002/SAIC04 spiked from a level of approximately 4.5 pH units to 6.2 then returned in the next two measurements to the pre-spike levels. The reverse situation occurred in JP-KAC-010/SAIC04 where pH levels of approximately 5.3 pH units fell sharply to 4.2 then returned in the next measurements to pH values of 5.3 and 5.2.

Table 4. pH Results for Rainwater Representativeness Testing

Site ID / FSN	pH (pH units)							Average	Std. Dev.
	0 hours	4 hours	8 hours	12 hours	24 hours	36 hours	48 hours		
JP-KGR-004 / SAIC04	4.7	4.6	4.6	4.5	4.7	4.5	4.5	4.6	0.09
JP-KCR-010 / SAIC04	5.9	5.8	5.7	5.8	6.0	5.5	5.7	5.8	0.2
JP-KAC-010 / SAIC04	5.4	5.2	5.4	5.2	4.2	5.3	5.2	5.1	0.4
JP-KAC-010-DUP / SAIC04	6.3	6.4	6.2	6.4	5.4	5.4	5.3	5.9	0.5
JP-KGR-001 / SAIC03	7.6	7.6	7.5	8.0	7.5	7.9	7.6	7.7	0.2
JP-KCR-002 / SAIC04	4.5	4.6	4.5	4.5	6.2	4.7	4.5	4.8	0.6
JP-KAC-008 / SAIC04	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	0
JP-KCR-012 / SAIC01	8.0	8.1	8.0	8.1	7.9	8.1	8.0	8.0	0.08
JP-KAC-013 / SAIC01	8.2	8.3	8.3	8.3	8.1	8.3	8.2	8.2	0.08
JP-KGR-005 / SAIC01	8.4	7.6	7.8	7.8	7.6	7.8	7.8	7.8	0.3
JP-WK-002 / SAIC01	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	0

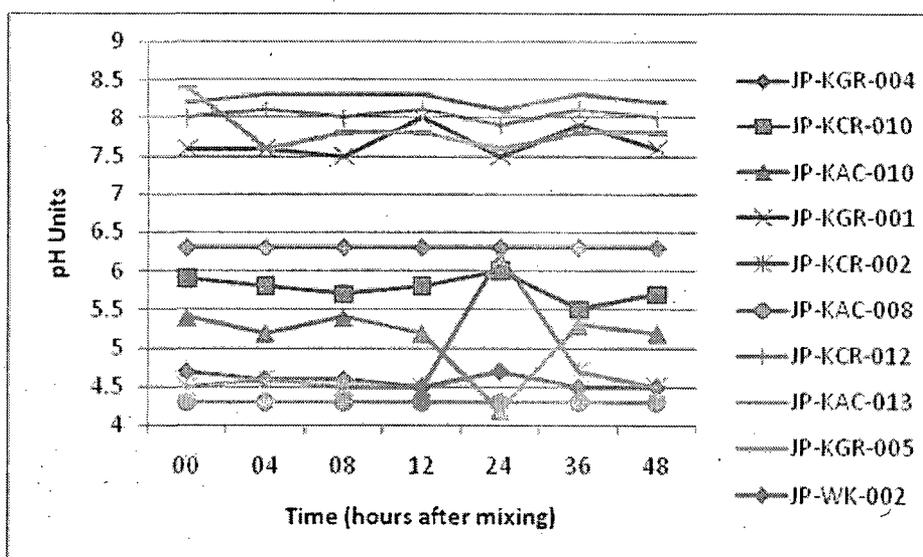


Figure 2. pH Results versus Time for Rainwater Representativeness Testing

These results suggest that pH levels recovered immediately after mixing, reached steady state fairly rapidly after mixing, and steady state was maintained over test period. In addition, pH (and conductivity) levels will be measured on the days when the supernatant is collected from the laboratory glassware in which the R_d tests are conducted. Therefore, we believe that rainwater should be sufficiently representative for R_d testing solution and the 45-day test period is sufficient to allow steady-state concentrations in the supernatant to be observed.

3. Sample Degradation Testing

NRC raised concerns about possible degradation that may have occurred since the time the first 24 soil samples were collected in October 2008. They were particularly concerned about potential

changes in pH, total carbon (TC) and total organic carbon (TOC). To allay their concerns, the Army reanalyzed 6 samples plus one duplicate as shown in Table 5 using the same analytical testing procedures used for previous analyses. These six samples from the 32 samples that were originally analyzed represent a 20 percent sample of the data set. pH levels in soil were measured using ASTM method D4972-01/EPA method SW 9045D, TC was measured in soil using EPA method SW 9060A, and TOC was measured in soil using EPA methods SW 9060A and E415.1.

Table 5. Samples Selected for Sample Degradation Testing (pH, TC, and TOC)

Site ID	Field Sample Number	Depth (feet BLS)	Collection Date
JP-KAC-005	SAIC01	0-0.5	28-Oct-2008
JP-KAC-008	SAIC04	2-4	28-Oct-2008
JP-KCR-003	SAIC01	0-0.5	27-Oct-2008
JP-KCR-007	SAIC01	0-0.25	28-Oct-2008
JP-KGR-001	SAIC01	0-0.5	26-Oct-2008
JP-KGR-002	SAIC01	0-0.5	26-Oct-2008

As shown in Table 6, the pH levels measured in the six soil samples in October 2008 varied from 4.9 to 7.5 pH units and averaged 6.0. When the samples were re-analyzed in August 2010, the pH levels in these same samples varied from 4.0 to 7.0 pH units and averaged 5.1. The pH levels fell by an average of 0.9 pH units between the between October 2008 and August 2010 with a minimum delta of 0.3 and a maximum delta of 1.7.

Table 6. Comparison in pH Testing Results

Site ID/FSN	pH (October 2008)	pH (August 2010)	Delta
JP-PNAC-005 / SAIC01	5.1	4.4	0.7
JP-PNAC-008 / SAIC04	4.9	4.0	0.9
JP-PNCR-003 / SAIC01	6.0	5.0	1.0
JP-PNCR-007 / SAIC01	5.0	4.7	0.3
JP-PNGR-001 / SAIC01	7.5	7.0	0.5
JP-PNGR-002 / SAIC01	7.3	5.6	1.7

A pair-wise t-test was used to compare the means of the October 2008 and August 2010 data sets to determine if the difference between the observations in the two data sets is significant. The resulting p-value (0.01) indicates that the differences between the means for pH in the 2008 data (5.97) and 2010 data (5.11) are significant at an alpha level of 0.05. Although the same analytical methods were used in October 2008 and August 2010, some of the differences could be attributable to different laboratories used to analyze the samples. It was not possible to eliminate potential interlaboratory differences by using the same laboratory for both analyses because the laboratory used for the October 2008 analyses (GPL Laboratories, LLC) was not in business in August 2010. However, the differences in results do not appear to be a concern for the following reasons:

- All quality control (QC) criteria were met and both laboratories used valid analytical methods.
- According to EPA Method SW-846 9040C, the method performance indicated a standard deviation of up to 0.2 pH units for 44 analysts analyzing synthetic water samples containing exact increments of hydrogen-hydroxyl ions. This was done for a synthetic water sample, which should be very homogeneous. Thus, the same variation is to be expected in heterogenous samples.
- Although uranium chemistry and transport in the environment is sensitive to pH, the changes did not alter the overall range of pH values observed in all the pH sample results, so the changes in pH have not altered the various uranium species of concern.

As shown in Table 7, the TC levels measured in the six soil samples analyzed in October 2008 varied from 2,100 to 44,100 mg/kg and averaged 22,937 mg/kg. When the samples were re-analyzed in August 2010, the results for these same samples varied from 2,420 to 60,100 mg/kg and averaged 26,040 mg/kg. The TC levels increased by an average of 3,103 mg/kg between the October 2008 and August 2010 tests with a minimum delta of 320 and a maximum delta of 16,000 mg/kg. The TOC levels measured in these six soil samples in October 2008 varied from 1,030 to 24,000 mg/kg and averaged 10,088 mg/kg. When the samples were re-analyzed in August 2010, the results for these same samples varied from 2,100 to 40,600 mg/kg and averaged 17,268 mg/kg. The TOC levels increased by an average of 7,180 mg/kg between the October 2008 and August 2010 tests with a minimum delta of 970 and a maximum delta of 16,600 mg/kg.

Table 7. Comparison in pH Testing Results

Site ID/FSN	TC (October 2008) (mg/kg)	TC (August 2010) (mg/kg)	Delta (mg/kg)	TOC (October 2008) (mg/kg)	TOC (August 2010) (mg/kg)	Delta (mg/kg)
JP-PNAC-005 / SAIC01	26,400	33,600	-7,200	14,800	18,100	-3,300
JP-PNAC-008 / SAIC04	2,100	2,420	-320	1,130	2,100	-970
JP-PNCR-003 / SAIC01	20,500	24,500	-4,000	9,770	16,800	-7,030
JP-PNCR-007 / SAIC01	2,520	6,620	-4,100	1,030	4,710	-3,680
JP-PNGR-001 / SAIC01	44,100	60,100	-16,000	24,000	40,600	-16,600
JP-PNGR-002 / SAIC01	42,000	29,000	13,000	9,870	21,300	-11,430

A pair-wise t-test was conducted for the TC and TOC data. The resulting p-value (0.46) indicates that the differences between the means for TC in the 2008 data (22,937 mg/kg) and 2010 data (26,040 mg/kg) are not significant at an alpha level of 0.05. However, the resulting p-value (0.031) indicates that the differences between the means for TOC in the 2008 data (10,100 mg/kg) and 2010 data (17,268 mg/kg) are significant at an alpha level of 0.05. As was the case for the pH results, different laboratories completed the analyses, so some of the differences could be attributable to the different laboratories used to analyze the samples and the differences in results do not appear to be a concern for the following reasons:

- All QC criteria were met and both laboratories used valid analytical methods.
- The soil samples were heterogeneous matrices likely characterized by large variations in TC and TOC concentrations, particularly when small volumes of soil and water were used as in these tests.
- TC and TOC levels actually increased, which is the opposite result that would have been expected should organic degradation or decay have occurred since the samples were collected.

These results suggest that pH levels systematically fell while TC and TOC concentrations systematically rose, which is the opposite result that would have been expected if organic degradation or decay had occurred. For this reason and for others outlined above, we believe that the samples collected in 2008 R_d testing have not shown degradation that necessitates re-collection and the R_d testing should commence as soon as possible.

4. Glassware Absorption Testing

NRC was concerned about the potential losses of uranium adsorbed to glassware, particularly on filter container walls. It is not practical to test this circumstance until the tests have concluded since the objective is to characterize the entire amount of uranium that may have adhered to glassware through the full duration of the test. Some information about uranium losses may be inferred from laboratory control samples (LCSs) that must be analyzed during the R_d study anyway. To augment information that might be inferred from the LCSs, the laboratory will fill the glassware used during the R_d study with dilute nitric acid after the tests have been terminated, allow the uranium in the glassware to dissolve overnight, and analyze the acid rinseate for total and isotopic uranium using alpha spectroscopy (ASTM-D3972-90M).

The Army has assumed that it will be sufficient to analyze glassware from three of the samples (30 total R_d tests amounts to ten percent) in which the acid rinsate is analyzed in all eight of the pre-determined time intervals (3, 7, 10, 14, 21, 28, 35 and 45 days), which results in 24 total analyses. A matrix spike (MS) and matrix spike duplicate (MSD) also will be analyzed with the 24 analyses. The results will be reported to NRC along with the results from the R_d study and during the development of the K_d values to be used in fate and transport and RESRAD modeling.

5. Summary

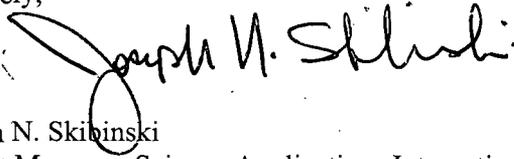
In summary, this letter summarizes the steps the Army has taken to address concerns discussed over the past 2 years for the site-specific K_d study that is summarized in Table 9. It is imperative that the Army begin the study in the immediate future to maintain the overall schedule for the submittal of the Decommissioning Plan in accordance with Army License SUB-1435 amendment 13. Therefore, the Army plans to commence the site-specific K_d tests in February 2011 unless notified otherwise by NRC.

Table 9. Proposed Sample Listing for Adsorption and Desorption Testing

Soil Types	Sorption	Site ID / Depth BLS (feet)	Concentration (pCi/g)
Avonsburg/Cobbsfork	Desorption	JP-PNAC-005 / 0-0.5	460 +/- 64.4
Avonsburg/Cobbsfork	Desorption	JP-PNAC-005 / 0.5-1.	295 +/- 58.9
Avonsburg/Cobbsfork	Desorption	JP-PNAC-005 / 1-2	15.4 +/- 13.3
Avonsburg/Cobbsfork	Desorption	JP-PNAC-005 / 2-4	51.7 +/- 8.19
Avonsburg/Cobbsfork	Desorption	JP-PNAC-006 / 0.15-0.5	29,117 +/- 141
Avonsburg/Cobbsfork	Desorption	JP-PNAC-006 / 2-4	74.5 +/- 8.33
Avonsburg/Cobbsfork	Desorption	JP-PNAC-007 / 1-2	160 +/- 9.91
Avonsburg/Cobbsfork	Desorption	JP-PNAC-007 / 2-4	127 +/- 13.3
Avonsburg/Cobbsfork	Adsorption	JP-SAC-008 / 0-0.5	1.59 +/- 0.362
Avonsburg/Cobbsfork	Adsorption	JP-SAC-001 / 2.0-4.0	1.53 +/- 0.343
Cincinnati/Rossmoyne	Desorption	JP-PNCR-002 / 0-0.5	6,437 +/- 68.0
Cincinnati/Rossmoyne	Desorption	JP-PNCR-002 / 1-2	85.0 +/- 8.97
Cincinnati/Rossmoyne	Desorption	JP-PNCR-002 / 2-2.5	153 +/- 12.9
Cincinnati/Rossmoyne	Desorption	JP-PNCR-005 / 0.5-1	591 +/- 23.0
Cincinnati/Rossmoyne	Desorption	JP-PNCR-005 / 1-2	129 +/- 17.5
Cincinnati/Rossmoyne	Desorption	JP-PNCR-008 / 0-0.25	12,396 +/- 96.9
Cincinnati/Rossmoyne	Desorption	JP-PNCR-008 / 0.25-0.75	5,094 +/- 59.0
Cincinnati/Rossmoyne	Desorption	JP-PNCR-008 / 0.75-1.25	531 +/- 22.4
Cincinnati/Rossmoyne	Adsorption	JP-SCR-004 / 0-0.5	1.55 +/- 0.350
Cincinnati/Rossmoyne	Adsorption	JP-SCR-005 / 2.0-4.0	1.83 +/- 0.412
Grayford/Ryker	Desorption	JP-PNGR-001 / 0-0.5	4,181 +/- 72.8
Grayford/Ryker	Desorption	JP-PNGR-001 / 1-2	71.6 +/- 10.4
Grayford/Ryker	Adsorption	JP-SGR-008 / 0-0.5	1.39 +/- 0.314
Grayford/Ryker	Adsorption	JP-SGR-007 / 2.0-4.0	1.93 +/- 0.429
Pre-Wisconsinan Till	Adsorption	JP-KAC-011 / 10-16	1.96 +/- 0.359
Pre-Wisconsinan Till	Adsorption	JP-KAC-012 / 10-18	2.16 +/- 0.400
Pre-Wisconsinan Till	Adsorption	JP-KAC-013 / 10-16	1.64 +/- 0.310
Pre-Wisconsinan Till	Adsorption	JP-KCR-011 / 10-16	3.48 +/- 0.520
Pre-Wisconsinan Till	Adsorption	JP-KCR-012 / 8-14	0.920 +/- 0.220
Pre-Wisconsinan Till	Adsorption	JP-KGR-005 / 6-10	1.87 +/- 0.350

If you have any questions, please contact Dr. David Goldblum, U.S. Army at (703) 545-2456,
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Sincerely,

A handwritten signature in black ink that reads "Joseph N. Skibinski". The signature is written in a cursive style with a large, looping initial "J".

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