Radiochemical Data Validation Checklist
Schofield Barracks

Project: 07-3080.04
LAB ID: SC&A
Reviewer: Bachir Badaoui
Date: 12/14/2007

Work Order: 7922
Analysis Type: Gamma Spec

Sample	Matrix	Collection Date	Date Received	Preparation Date	Hold Times Met? (Y, N< or N/A)	Analysis Date	Hold Times Met? (Y, N< or N/A)
SB-CZ-SS-2155-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/4/2007	N/A
SB-CZ-SS-2156-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/4/2007	N/A
SB-CZ-SS-2157-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/4/2007	N/A
SB-CZ-SS-2158-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/4/2007	N/A
SB-CZ-SS-2159-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2160-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2161-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2162-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2163-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2164-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2165-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2166-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2167-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A
SB-CZ-SS-2168-SD	Soil	9/24/2007	9/27/2007	10/3/2007	N/A	11/5/2007	N/A

Radiochemical Data Validation Checklist
Schofield Barracks

Validation Item	Acceptable (YES)	Not Acceptable (NO)	Not Applicable (N/A)
Sample Chain of Custody Review			
Are there printed names and signatures present in the Relinquished By and Received By Blocks?		X Comment 1	
Does the COC date match the Relinquished By date?	X		
Is the Received By date consistent with sample custody transfer (Relinquished By)?	X		
Have all the samples listed on the Chain of Custody have been analyzed? (Verify this by checking that the Memo and/or case narratives are consistent with the COC. - Actinides Pu & U, and Gamma Isotopes w/Ra-226)	X		
Were the sample(s) preserved appropriately?			X
Are all the samples included in the analytical report are listed correctly on the Chain of Custody?	X		
Are the analytes reported consistent with the project requirements? (See Attached Sheet)	X		
Comments: 1. Printed name not present in received by block. No data were qualified as a result of this omission.			
Sample Receipt Checklist Review			
Did the laboratory complete the Sample Receiving Checklist?	X		
Are all receipt inspection items marked “Yes”? (If “No” are they not acceptable).	X		
Comments:			
Case Narrative/Analytical Report			
Does the Case Narrative report submitted by the laboratory indicate any problems with the analysis or other factors which could impact the validity of the sample analysis?	X		
Does the Analytical report agree with the analyte list specified for the project?	X		
Validation Item	**Acceptable**	**Not Acceptable**	**Not Applicable**
Are results that are flagged by laboratory necessary and complete, and are understandable comments provided?	X		

Are the reporting units are correct and consistent? (pCi/g)	X		
Comments:			
Laboratory Quality Control Sample Review			
Did the laboratory properly complete all required laboratory quality control samples at required frequencies? LCS - 1 per matrix and one per batch or 1/20 samples whichever is more frequent Matrix Spike – 1 per matrix and one per batch or 1/20 samples whichever is more frequent Duplicates - 1 per matrix and one per batch or 1/20 samples whichever is more frequent Blanks - 1 per matrix and one per batch or 1/20 samples whichever is more frequent	X Comment 2		
Are the laboratory quality control sample results acceptable (solids)? LCS - 30% -69% estimated (J); >130% estimated (J); <30% unusable (R) Matrix Spike – 20% -70% estimated (J); >130% estimated (J); <20% unusable (R) Duplicates - Duplicates – Normalized Absolute Difference (NAD)>1.96 estimated (J) Blanks – see section 4.3 of McAFB-048		X Comments 3 and 4	
Comments: 2. Matrix Spikes are not necessary for gamma spec analysis. LCS and NAD results are all acceptable. 3. The gamma LCS, duplicate analyses, and tracer recoveries indicate acceptable data quality, so the data will not be qualified despite the lack of a matrix spike. 4. The detection limit of 0.5 pCi/g for Th-234 was not met for some samples, but the activities of those samples exceeded the reported MDC, so no qualifiers have been applied.			
Other Evaluation Factors			
If a result has an uncertainty greater than the result, is the uncertainty less than the required detection limit?	X		
Are the sample hold times acceptable? (Six months or less for all Rad except ^{3}H, which is three months or less)			X
Are total propagated uncertainty (TPU) values provided for all results?			
Validation Item	**Acceptable**	**Not Acceptable**	**Not Applicable**
Are the aliquot sizes appropriate – (1 g minimum for dry solids)	X		
Are soil sample results reported on a dry-weight basis? (See Case Narrative)	X		

Comments:

Gamma Spectrometry			
Calibrations			
Are efficiency calibrations performed within the previous 12 months for the applicable geometry?		X Comment 5	
Are energy calibrations performed within the previous quarter?		X Comment 6	
Were current NIST traceable (or equivalent) standards used for the efficiency calibrations?		X Comment 5	
Is Peak resolution vs. energy calibration established within the last quarter?		X Comment 6	
Were the Efficiency, energy, and peak resolution checks performed daily and within acceptance criteria?	X		
Were instrument backgrounds determined quarterly and checked at least weekly?	X Comment 7		
Were routine instrument checks (energy, efficiency, resolution, and background) recorded and evaluated against control limits?	X		
Does the efficiency curve show the characteristic form?	X		
Verify 10% of calibration calculations. Do calculated individual peak efficiency values agree with laboratory values to within 5%	X		
Were the instrument dead times during calibration < 10%?	X		
Do the energy ranges of the efficiency calibrations span the range of gamma energies used in the analysis of samples?	X Comment 5		
Are the counting uncertainties for the individual peaks used in the efficiency calibration < 5%?	X		

Comments:

5. Detector Gamma 1 was last calibrated on March 23, 2006. The calibration source used for the calibration of detectors Gamma 2 and 3 was greater than 1 year old and had exceeded its expiration date. This leads to unreliable efficiencies for Hg-203 and Y-88, with energies at 166 keV, 898 keV, and 1836 keV, respectively. For Gamma 2, no Hg-203 result was reported and for Gamma 3, the uncertainty of the Hg-203 peak exceeded 33%. The gamma results for all samples will be qualified J.
6. Energy and FWHM calibrations were not performed within the last quarter for detectors Gamma 1, 2, and 3. Because the daily checks are acceptable, the results will not be qualified.
7. Backgrounds were determined monthly and checked daily. No qualifications are required.

Validation Item	Acceptable	Not Acceptable	Not Applicable
Sample Analysis			
Were the samples analyzed on a calibrated detector?	X		
Does the geometry used for the analysis of samples match the calibration geometry?	X		
Were required detection limits achieved? (see ""QA/QC Plan" Table 2.2)	X		
Does the sample matrix/density match the matrix/density of the		X	

calibration standard?		Comment 8	
Were instrument dead times during sample analysis< 10%	X		
Were target radionuclide energies within 2 keV of the observed peaks?	X		
Are peaks of interest for target radionuclides free of interferences from other peaks?	X		
Was the1460 keV peak from K-40 present in soil samples?	X		
Was the 511 keV pair annihilation peak present in soil samples?	X		
For samples being analyzed for Ra-226 using the gamma peaks from progeny, was an in-growth period of not less than 20 days allowed between sample preparation and counting?			X
Were tentatively identified peaks evaluated and quantified?	X		
Are the analysis reports free of transcription errors and anomalies?	X		

Comments:

8. The calibration standard contained 640g of sand in a 400 ml container. The sample weights ranged between 398 and 555 grams in 400 ml containers. Because the samples have a lower density than the standard, the gammas in the samples will experience less absorption in the sample matrix than in the standards. This would tend to result in an overestimation of the sample activity. All gamma results will be qualified as J+.

Radiochemical Data Validation Checklist
Schofield Barracks

Validation Item	Acceptable	Not Acceptable	Not Applicable
Alpha Spectrometry			
Calibrations			
Were efficiency calibrations performed within the previous 12 months for the applicable geometry?			X
Were energy calibrations performed within the previous quarter?			X
Were current NIST traceable (or equivalent) standards used for the efficiency calibrations?			X
Were efficiency and energy checks performed daily and within acceptance criteria?			X
Were instrument backgrounds determined quarterly and checked at least weekly?			X
Were routine instrument checks (energy, efficiency, resolution, and background) recorded and evaluated against control limits?			X
Do the energy ranges of the efficiency calibrations span the range of alpha energies used in the analysis of samples? (For a 4-6 MeV energy range, a single peak efficiency is acceptable)			X
Sample Analysis			
Were samples analyzed on a calibrated detector			X
Did the sample geometry (i.e., plated or precipitate) used for the analysis of samples match the calibration geometry			X
Were required detection limits achieved? (see ""QA/QC Plan" Table 2.2)			X
Perform manual calculations of 10% of sample concentrations. Do calculated values agree with laboratory reported values to within 5%?			X
Are the energies of the observed peaks of interest within 40 keV of the energy of the radionuclides of interest?			X
Are peaks of interest free of interferences from other peaks?			X
Are tracer yields acceptable? Maximum 10% uncertainty at 95% CL; 50% - 130% acceptable; >130% estimated(J); 20% -50% estimated (J); <20% - unusable (R)			
Are the analysis reports free of transcription errors and anomalies?			X
Comments:			