

Laboratory Footnotes and Qualifiers

Footnote

- A. Insufficient uranium present in the sample to determine an assay.
- B. Maximum assay was used to calculate the MDA for total uranium activities.
- C. Normal assay was used to calculate the MDA for total uranium activities.
- D. The relative bias for the LCS is greater than 25%.
- E. Gross activities are a calculated value. Gamma activity is converted to the corresponding gross alpha/beta measurement.
- F. Insufficient sample available/provided for gross beta analysis.
- G. TIMS assay used to calculate total uranium activity.
- H. No nuclide meet criteria for gross gamma.
- I. The MDA of all principle nuclide not identified and nuclide identified were summed to provide max, reportable activity
- J. No analysis result available. Sample signal too weak.
- K. No analysis result available. Total U below reporting limit.
- L. No minor isotope determination available. Signal strength insufficient.
- M. Result is biased high and MDA is biased low due to interfering lines and/or increases in BKG due to sample activity.
- N. Measured U-235 act/mass was below MDA therefore all other cal. U isotopes & U-total will be rpt as below their resp. MDAs.
- O. Gross Gamma has no output error.
- P. The max plant assay was assumed since the calculated assay was not within the range of the plant cascade assays.
- Q. Mass of U-235 is \leq MDM, thus mass of total U/U isotopes won't be reported. Total U/U isotopes will be $<$ their MDAs
Asbestos – Not Detected
- R. Cs-134 activity will be understated due to the short half-life and will exclude any previous site induced Cs-134.
- S. Gross gamma is a Cs-137 equivalence. Activity assumes branch yield and det eff of Cs-137 for all line in spectrum.
- T. Analyte is a common volatile laboratory contaminant
- T1. Sample analysis is below LCR for concent., however above report. limit for assay.
- T1Z1. Samp analysis below LCR concent., above report. limit assay/.05wt% = or > 2 sigma?
- V. Method 5030A (Purge & Trap)
- W. Analyte is present at the LCR.
- X. See comments for explanation
- Y. U/U-234 act are estimated. Assay used was determined by gamma. U/U-234 results can't be used for any NCS/NMC&A purposes. - Uranium
- Z. Std Dev is calculated based on controls (SRM) prepared and analyzed with each sample batch. SRM is ~0.711 wt% U-235.
- Z1. This 0.05 wt% value equal to or > 2 sigma for controls associated w/data.

Inorganic Qualifiers

- * Duplicate analysis not within control limits.
- + Method of standard additions (MSA) correlation coefficient less than 0.995.
- A Indicates that a TIC is suspected aldol-condensation product.
- B Applies when the analyte is found in the associated blank
- D All compounds identified in the analysis at the secondary dilution factor.
- E Result estimated due to interferences.
- J Indicates an estimated value
- M Duplicate injection precision not met.
- N Sample spike recovery not within control limits.
- Q No analytical result available or not required because total analyses $<$ PQL.
- R QC indicates that data are not usable. Resampling and re-analysis are necessary for verification.
- S Result determined by method of standard additions (MSA).
- U Analyte analyzed for but not detected at or below the lowest concentration reported.
- W Post-digestion spike recovery out of control limits.
- X Other specific flags and footnotes may be required to properly define the results.

Organic Qualifiers

- A Tentatively identified compound (TIC) is suspected aldol-condensation product.
- B Compound found in blank as well as sample.
- C Compound presence confirmed by GC/MS (GC/MS flag).
- D Compounds identified in an analysis at a secondary dilution filter.
- E Result exceeds calibration range (GC/MS flag).
- J Indicates an estimated value.
- N Presumption evidence of a compound GC/MS flag).
- P Difference between results from two GC columns unacceptable.
- U Compound analyzed for but not detected at or below the lowest concentration reported.
- X Other specific flags and footnotes may be required to properly define the results.
- Y MS, MSD recovery and/or RPD failed acceptance criteria.
- Z (Reserved by CLP for a laboratory-defined organic date qualifier.)

Rad Qualifiers

- A Analyzed but not detected at the analyte quantitation limit.
- B Method blank not statistically different from sample at 95% level of confidence.
- D Sample is statistically different from duplicate at 95% level of confidence.

- J Indicates an estimated value.
- L Expected and measured value for LCS is statistically different at 95% level of confidence.
- M Expected and measured value for MS is statistically different at 95% level of confidence.
- R QC indicates that data are not usable. Resampling and reanalysis are necessary for verification.
- T Tracer recovery is \leq 30% or \geq 105%.
- U Value reported is $<$ the MDA and/or $<$ 2 sigma TPE.
- X Other specific flags and footnotes may be required to properly define the results.

PEMS/OREIS CODES

Media Codes

AA	Ambient Air
AG	Soil Gas
AQ	Air Quality Control Matrix
AS	Asphalt
BA	Biota, Whole Animal
CL	Ceiling Material
CO	Coolant (liquid)
CW	Wood
DC	Drill Cuttings
EA	Effluent Air
EF	Biota, Excreta (feces)
EG	Eggs
FL	Flooring Material
FR	Filter Residue
FT	Filter
GR	Grout
GS	Green Salt
GV	Gravel
HW	Heating Water
IS	Insulation
LD	Drilling Fluid
LE	Liquid Emulsion
LF	Floating/Free Product on Groundwater Table
LO	Oil, All Types (Transformer, Waste, Motor, Mineral)
LT	Liquid from tank
LV	Liquid From Vadose Zone
LZ	Liquid Waste
MC	Metal Coupons
MK	Milk
MS	Metal Shavings
NA	Not Available
NW	Non-Water Liquid
PC	Precipitation
PN	Paint
PW	Porewater
QA	Aquatic Animal
QB	Aquatic Bird
QC	Aquatic (Some combination of at least 2) of bird, plant, animal; Excludes benthic organism
QN	Benthic Organism
QP	Aquatic Plant
RF	Roofing Material
RS	Residue (not associated with filters)
SC	Cement
DIL	Laboratory dilution
SE	Sediment (associated with surface water)
SF	Filter Sandpack
SL	Sludge
SN	Supernatant
SO	Soil
SP	Floor Sweepings
SQ	Soil/Solid Quality Control Matrix
SS	Scrapings
SW	Swab or Wipe
SZ	Solid Waste
TA	Animal Tissue
TB	Terrestrial Bird
TC	Terrestrial (Some combination at least 2) of bird, plant, or animal.
TP	Plant Tissue
TQ	Tissue Quality Control Matrix
TW	Treated Water
WC	Wall corings
WD	Well Development Water
WE	Estuary
WG	Groundwater

WH	Equipment Wash Water, i.e., Water used for Washing
WL	Water that has leached through waste
WP	Drinking Water
WQ	Water Quality Control Matrix
WS	Surface Water
WV	Water From Vadose Zone
WW	Waste Water
WZ	Special Water Quality Control Matrix
YC	Yellow Cake

Smp Method Codes

?	Other, defined in COMMENTS column
CMPI	Individual Constituent of a Composite
CSF	Continuous Sample Flow
ES	Estimate
FPC	Flow Proportional Composite
GR	Grab
INDV	Individual
NA	Not Applicable
SC	Spatial Composite
SPLT	Split
TC	Temporal Composite

Sample Type Codes

?	Other, defined in COMMENTS column
DI	Deionized Water used for preparing blanks, etc.
DIL	Laboratory dilution
FB	Field Blank
FR	Field Replicate (Code used for Field Duplicate)
FTB	Filter Blank
PRBL	Preservative blank
RB	Refrigerator blank
REG	Regular
REG2	Regular sample, secondary analysis
REP	Replicate
REP1	Replicate 1
REP2	Replicate 2
REP3	Replicate 3
REP4	Replicate 4
RI	QC Equipment Rinseate/Decon
TB	Trip Blank
TLC	Toxicity Laboratory Control Sample

Verification Codes

?	Other, defined in COMMENTS column
A	Result exceeds maximum permit limit
B	Result exceeds background criteria
H	Protocol deviation
I	Result exceeds established criteria
N	No verification information available
S	Result exceeds statistical controls based on historical data
T	Holding time exceeded for this analysis
X	Result exceeds permit limits

Validation Codes

=	Validated result, which is detected and unqualified
?	Other, defined in COMMENTS column
D	Analyte, compound or nuclide detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."

PEMS/OREIS CODES

R	Result rejected by validator.		
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.	BH-TEMP	biased high due to a temperature exceedance.
X	Not validated; Refer to the RSLTQUAL field for more information	BL-ABSORB	Result biased high due to a temperature exceedance.
			Result may be biased low due to the amount of absorbent material that was added during sampling in order to homogenize sample.
Assessment Codes			
?	Other, defined in COMMENTS column.	BL-AIR	Biased low due to air rotary drilling method.
ASRECD	Lab reported result on an as-received basis. This needs to be considered when reviewing the data.	BL-AIR,&	Biased low due to air rotary drilling method. See comments for additional assessment qualifiers.
BH-CONT	Result may be biased high due to contamination of the sample from the field or laboratory.	BL-HS	Biased low due to headspace in sample container.
BH-CONT, NOVAL	Result may be biased high due to contamination of the sample from the field or laboratory; Validation requested but qualifier not provided due to missing Form I.	BL-HS, BL-TEMP	Biased low due to headspace in sample container & result biased low due to a temperature exceedance.
BH-ER	Result may be biased high; chemical detected in associated equipment rinseate.	BL-LAB	Result may be biased low; compound is a known or probable lab contaminant.
BH-FB	Result may be biased high; chemical detected in associated field blank.	BL-LABPR	Result may be biased low due to laboratory process.
BH-FB BH-RI	Result may be biased high; chemical detected in associated field blank and Result may be biased high, chemical detected in associated equipment rinseate.	BL-PRES	Result may be biased low due to improper preservative added.
BH-FB BH-TB	Result may be biased high; chemical detected in associated field blank and result may be biased high; chemical detected in associated trip blank.	BL-PRES, ?	Result may be biased low due to improper preservative added., Other defined in COMMENTS column.
BH-FB, ?	Result may be biased high; chemical detected in associated field blank & Other, defined in COMMENTS column.	BL-PURGE	Result may be biased low; sample may be diluted with drilling fluid due to the insufficient purging prior to sampling.
BH-FB,&	Result may be biased high; chemical detected in associate field blank. See comments for additional assessment qualifiers.	BL-PURGE,&	Result may be biased low; sample may be diluted with drilling fluid due to insufficient purging prior to sampling. See comments for additional assessment qualifiers.
BH-LAB	Result may be biased high; compound is a known or probable lab contaminant.	BL-SAMP	Result may be biased low due to sample collection problems.
BH-LAB R	Result may be biased high; compound is a known or probable lab contaminant; Result unusable.	BL-QC	Result may be biased low based upon lab QC (i.e. surrogate, MS/MSD, etc.)
BH-LABPR	Result biased high due to laboratory process.	BL-T	Result may be biased low; sample holding time exceeded.
BH-PURGE	Result may be biased high; sample may be diluted with drilling fluid due to insufficient purging prior to sampling.	BL-T, BL-QC	Result may be biased low; sample holding time exceeded and result may be biased low based upon lab QC (i.e. surrogate, MS/MSD, etc.)
BH-QC	Result may be biased high based upon lab QC (i.e. surrogate, MS/MSD, etc.).	BL-T,J	Result may be biased low; sample holding time exceeded, estimated.
BH-RB	Result may be biased high; chemical detected in associated refrigerator blank.	BL-TEMP	Result may be biased low due to temperature exceedance.
BH-RI	Result may be biased high, chemical detected in associated equipment rinseate.	BL-TEMP, BL-PRES	Result biased low due to a temperature exceedance, Result may be biased low due to improper preservative added.
BH-RI, BL-T	Result may be biased high, chemical detected in associated equipment rinsate and Result may be biased low; sample holding time exceeded.	BL-TEMP, J	Result biased low due to a temperature exceedance, estimated.
BH-SOLID	Result biased high due to sampling containing a large amount of solids.	BL-TEMP, NOVAL	Result biased low due to a temperature exceedance, Validation requested but qualifier not provided due to missing Form I.
BH-SS	Results may be biased high; sample may contain particles of the acetate sampling sleeve.	BL-TEMP, U	Result biased low due to a temperature exceedance, not detected.
BH-TB	Result may be biased high, chemical detected in associated trip blank.	BL-TEMP, U, BH-QC	Result biased high due to a temperature exceedance, Not detected, may be biased high based upon lab QC.
BH-TB, BL-TEMP	Result may be biased high, chemical detected in associated trip blank, result	CCCSEXP	Continuous Calibration Check Standard Expired
		DIL	Result is obtained from dilution

PEMS/OREIS CODES

Assessment Codes (cont.)

DIS-EDDF1	Discrepancies between the EDD and the Form 1. Form 1s are generated by instrument software that automatically reports all detected compounds. It is the lab's policy to not report quantities below LCRs within their EDD format. Both sets of data are correct. However, the EDD format data, which feeds OREIS, will be used for reporting.	LAB-PREP	Prep method used by the lab valid but not proceduralized.
		LCSEXP	LCS Expired
		LCSNA	Laboratory control sample not analyzed.
		LCSNI	LCS Not Independent
		MDA-METHOD	The recalculated MDA is considered a method-wide MDA. Batch specific MDAs were not calculated.
		MDA-RECALC	The original MDA of 21.4 pCi/L was calculated incorrectly and was recalculated during the Field Laboratory evaluation. The recalculated MDA is 24.7 pCi/L.
DR	Discrepancy between summary data report and raw data.	MDL-RL	Analyte detected between the lab's reporting limit and method detection limit. See comments for additional information.
DRY	Result reported on a dry weight basis.	MSMSDEXP	Matrix Spike/Matrix Spike Duplicate Standard Expired.
FDUP-OUT	Field duplicate exceeds the RPD criterion.	N/A	Not Applicable.
ICPTIMS-ER	ICP-MS and TIMS error for the concentration of Uranium-235 is less than the 285 pCi/g level at one standard deviation.	NOVAL	Validation requested but qualifier not provided due to missing Form I.
ICSEXP	Initial Calibration Standard Expired.	NOVAL-FLAB	Validation targeted for this project but not required for field laboratory data.
IN-LAB	Result should be considered information only. Compound is a known or probable lab contaminant.	NR	Assessment question not resolved.
IN-LAB,&	Result should be considered information only. Compound is a known or probable lab contaminant. See comments for additional assessment qualifiers	PENP	PE Sample Not Performed.
IN-LABQC	Result should be considered information only. Quality control requirements of the laboratory method were not met.	QUAL	This data should be considered qualitative due to the sampling process, the variability in the medium sampled or issues with the analytical process.
IN-METH	Result should be considered information only. Lab utilized a modified method.	R	Result unusable.
J	Result estimated	R-C	Result questionable, credibility at issue.
KYRHTAB-50	Kentucky Radiation Health and Toxic Agents Branch (KYRHTAB) has performed an independent data evaluation (not to be confused with data verification and validation) and the rad error accounts for greater than 50% of the results.	R-C, ?	Result questionable, credibility at issue, other defined in COMMENTS column.
KYRHTAB-ER	Kentucky Radiation Health and Toxic Agents Branch (KYRHTAB) has performed an independent data evaluation (not to be confused with data verification and validation) and the data presents error problems (ie., no counting uncertainty or zero counting uncertainty).	R-C, BH-RI	Result questionable, credibility at issue. Result may be biased high, chemical detected in associated equipment rinseate.
KYRHTAB-LT	Kentucky Radiation Health and Toxic Agents Branch (KYRHTAB) has performed an independent data evaluation (not to be confused with data verification and validation) and the results are less than (LT) the maximum detectable activity (MDA) or detection limit and should not be plotted.	R-C, &	Result questionable, credibility at issue. See comments for additional assessment qualifiers.
KYRHTAB-NE	Kentucky Radiation Health and Toxic Agents Branch (KYRHTAB) has performed an independent data evaluation (not to be confused with data verification and validation) and the rad error exhibits a negative value, which is a statistical outlier.	R-DUPVAR	Result questionable, measured variability of the field duplicate is outside PARCC parameter expectations, therefore population estimates of variability may be off by several orders of magnitude.
KYRHTAB-OK	Kentucky Radiation Health and Toxic Agents Branch (KYRHTAB) has performed an independent data evaluation (not to be confused with data verification and validation) and the data is acceptable for use.	R-H	Result unusable due to historical trending (i.e., other).
		R-HSS	Rejected due to high suspended solids content.
		R-MTRX	Result rejected due to matrix interference.
		R-NORAD	Result unusable; Uranium-235 portion of calculation is below reliable detection limits.
		R-NORAD,&	Result unusable; Uranium-235 portion of calculation is below reliable detection limits. See comments for additional assessment qualifiers.
		R-NTRS	Result rejected; not a true representative sample.
		R-NTRSFW	Result rejected; not a true representative sample of formation water.
		R-PRES	Result rejected due to improper preservative added.
		R-RERUN	Result unusable; results for re-analysis should be used.
		R-T	Result rejected due to missing holding time.
		REM	Location sampled has been remediated due to a CERCLA or RCRA action and should not be considered representative of current site conditions.
		U	Not detected.

PEMS/OREIS CODES

Assessment Codes (cont.)

U,J	Not detected and result estimated.
U-RAD	Result considered a non-detect; instrument measurement error is equal to or greater than the reported result.
U-RAD,&	Result considered a non-detect; instrument measurement error is equal to or greater than the reported result, see comments for additional assessment qualifiers.
USEC-ASRECD	The USEC-PGDP lab has historically reported results on an as-received or wet weight basis. This needs to be considered when reviewing the data. Percent Moisture data needs to be taken into account if available.
USECNITRIC-CF	During the period from May 2004 to September 2009, the USEC-PGDP lab used method RL-7128-NITRIC for isotopic uranium analysis by alpha spec. Method RL-7128-NITRIC utilizes only nitric acid for dissolution rather than hydrofluoric/nitric acid. The use of nitric acid only is a less aggressive dissolution for isotopic uranium analysis by alpha spec. It has been demonstrated that Method RL-7128-NITRIC can only be utilized for isotopic uranium analysis of soil with activity greater than 10 pCi/g due to low recoveries below that level. Therefore, if the data from Method RL-7128-NITRIC will be screened against the background values reported in Background Levels of Selected Radionuclides and Metals in Soils and Geologic Media at the PGDP (1997), the following adjusted background values must be used: U-234: 1.73 pCi/g surface and 1.63 pCi/g subsurface, U-235: 0.10 pCi/g, and U-238: 0.40 pCi/g (Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Appendix E (2009)). Risk assessors may use data from this time period for comparison against other thresholds below 10 pCi/g without adjusting the values as long as the level of uncertainty and its impact on the risk assessment/evaluation are adequately discussed. No additional action is required for comparisons to thresholds above 10 pCi/g.