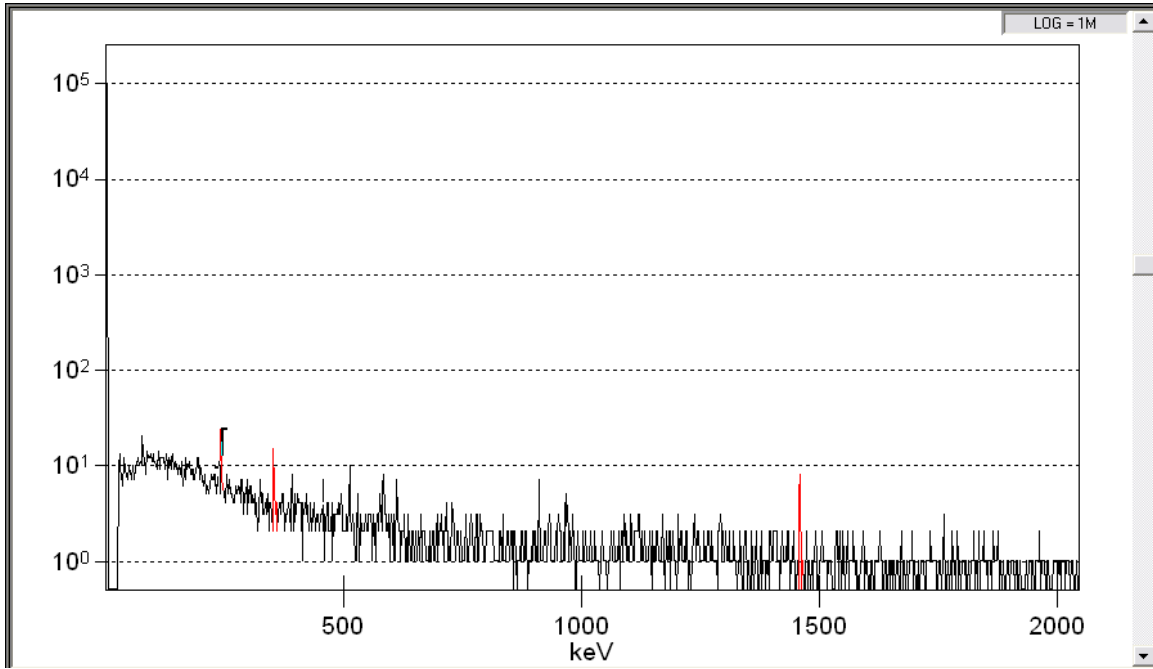


Frac Tank Chamber 1



***** G A M M A S P E C T R U M A N A L Y S I S *****

Filename: C:\GENIE2K\CAMFILES\Whittaker\Contam Pond\Frac Tank 1.CNF

Report Generated On : 7/10/2006 10:01:34 AM

Sample Title : Frac Tank Chamber 1
Sample Description : Water
Sample Identification : FT-1
Sample Type : Water
Sample Geometry : 500 ml Wet Dirt

Peak Locate Threshold : 5.00
Peak Locate Range (in channels) : 1 - 8192
Peak Area Range (in channels) : 1 - 8192
Identification Energy Tolerance : 1.500 FWHM

Sample Size : 1.187E+003 grams

Sample Taken On : 7/8/2006 9:30:00 AM
Acquisition Started : 7/8/2006 10:32:44 AM

Live Time : 1000.0 seconds
Real Time : 1000.4 seconds

Dead Time : 0.04 %

Energy Calibration Used Done On : 7/8/2006
Efficiency Calibration Used Done On : 4/30/2005
Efficiency ID : 00_ML__MARINELLI

 ***** ENERGY CALIBRATION REPORT *****

Detector Name: DET01
 Sample Title: Frac Tank Chamber 1

***** ENERGY CALIBRATION COEFFICIENTS *****

Energy Calibrate Performed on: 7/8/2006 7:57:40 AM
 by:
 Energy Calibrate Type: POLY

Energy(keV) = -0.196 + 0.250*ch + 0.00E+000*ch^2 + 0.00E+000*ch^3

***** SHAPE CALIBRATION COEFFICIENTS *****

Shape Calibrate Performed on:
 by:

FWHM = 1.000 + 0.030*E^1/2

LOW TAIL = 0.0E+000 + 0.0E+000*E

***** ENERGY CALIBRATION RESULTS TABLE *****

Centroid Channel	Centroid error	Energy (keV)
487.61	0.04	121.78
1376.99	0.04	344.28
3114.51	0.05	778.90
4446.37	0.05	1112.12

***** SHAPE CALIBRATION RESULTS TABLE *****

Energy (keV)	FWHM channels	FWHM error	TAIL channels	TAIL error
121.78	0.00	0.00	0.00	0.00
344.28	0.00	0.00	0.00	0.00
778.90	0.00	0.00	0.00	0.00
1112.12	0.00	0.00	0.00	0.00

 ***** EFFICIENCY CALIBRATION REPORT *****

Detector Name: DET01
 Sample Title: Frac Tank Chamber 1

Geometry Description: 00_ML_MARINELLI
 Efficiency Calibration Performed on: 4/30/2005 10:10:10 AM
 by:
 Geometry Type Used: LINEAR

Efficiency Triplets
 =====

Energy	Efficiency	Error
63.30	7.31E-003	7.31E-004
100.00	2.58E-002	2.58E-003
121.80	3.04E-002	3.04E-003
150.00	3.15E-002	3.15E-003
200.00	2.93E-002	2.34E-003
239.00	2.62E-002	2.10E-003
295.20	2.26E-002	1.81E-003
300.00	2.24E-002	1.79E-003
338.30	2.02E-002	1.52E-003
344.30	2.00E-002	1.50E-003
351.00	1.96E-002	1.37E-003
500.00	1.47E-002	8.82E-004
583.20	1.29E-002	7.71E-004
609.00	1.24E-002	7.45E-004
700.00	1.13E-002	6.77E-004
778.90	1.06E-002	6.12E-004
860.60	9.87E-003	5.43E-004
911.00	9.45E-003	4.72E-004
965.00	8.98E-003	4.04E-004
969.00	8.95E-003	4.03E-004
1000.00	8.72E-003	3.49E-004
1001.00	8.71E-003	3.48E-004
1112.00	8.02E-003	3.21E-004
1120.00	7.98E-003	3.19E-004
1400.00	6.81E-003	2.72E-004
1408.00	6.78E-003	2.71E-004
1765.00	5.59E-003	2.24E-004
2000.00	4.98E-003	1.99E-004

DUAL Efficiency Calibration Equation
 =====

Single Equation Terms -> Offset: -337.122
 Slope: 249.150
 Quadratic: -73.329
 Cubic: 10.657
 4th Order: -0.767
 5th Order: 0.022
 6th Order: 0.000
 7th Order: 0.000

8th Order:	0.000
9th Order:	0.000

EMPIRICAL Efficiency Calibration Equation

=====

Empirical Equation Terms ->	Scaling:	1031.650
	Offset:	-4.763
	Slope:	0.731
	Quadratic:	-0.050
	Cubic:	0.113
	4th Order:	-0.009
	5th Order:	-0.022

LINEAR Efficiency Calibration Equation

=====

Linear Equation Terms ->	Offset:	-0.000
	Slope:	-2.103
	Quadratic:	215.969
	Cubic:	-22800.293
	4th Order:	776382.938
	5th Order:	-12934173.0
	6th Order:	0.000
	7th Order:	0.000
	8th Order:	0.000
	9th Order:	0.000

** P E A K - T O - T O T A L C A L I B R A T I O N R E P O R T **

Detector Name: DET01
Sample Title: Frac Tank Chamber 1
Peak-to-Total Calibration Performed on: ?????????? ???????????

Peak-to-Total Calibration Equation
=====

No Peak-to-Total Equation

**** LIBRARY CORRELATION NID REPORT ****

Sample Title: Frac Tank Chamber 1
Nuclide Library: C:\GENIE2K\CAMFILES\Whittaker library 2.

Sensitivity Threshold (%): 0.00
Shape Correlation Threshold: 0.00
Gain Shift Tolerance/Optimized Value (%): 0.00 0.00
Shape Error Tolerance/Optimized Value (%): 0.00 0.00
Shielding Tolerance/Optimized Value (cm Fe): 0.00 0.00
Correlation NID Chi-Squared: 0.000

..... NUCLIDES

Nuclide Name	Tent. Signif.	Opt. Signif.	Corr. Coeff.	Activity (pCi/gram)	Activity Uncertainty
K-40 *	0.00	0.00	0.000	1.402E+000	2.148E-001
Ra-226d	0.00	0.00	0.000		
Th-232d *	0.00	0.00	0.000	1.562E-001	2.464E-002

? = Candidate Nuclide.
* = Identified Nuclide.
Errors quoted at 1.000 sigma
Background Stripping not performed.

***** P E A K L O C A T E R E P O R T *****

Detector Name: DET01
Sample Title: Frac Tank Chamber 1
Peak Locate Performed on: 7/10/2006 10:01:33 AM
Peak Locate From Channel: 1
Peak Locate To Channel: 8192
Peak Search Sensitivity: 5.00

Peak No.	Centroid Channel	Energy (keV)
1	955.19	238.75
2	5833.92	1459.22

? = Adjacent peak noted

Errors quoted at 1.000 sigma

***** P E A K L O C A T E R E P O R T *****

Detector Name: DET01
Sample Title: Frac Tank Chamber 1
Peak Locate Performed on: 7/10/2006 10:01:33 AM
Peak Locate From Channel: 1
Peak Locate To Channel: 8192
Peak Search Sensitivity: 5.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	955.19	0.2001	238.75	6.50
2	5833.92	0.1813	1459.22	5.15

? = Adjacent peak noted

Errors quoted at 1.000 sigma

```

*****
*****      P E A K      A N A L Y S I S      R E P O R T      *****
*****

```

```

Detector Name:  DET01
Sample Title:   Frac Tank Chamber 1
Peak Analysis Performed on: 7/10/2006 10:01:33 AM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 8192

```

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	951-	961	955.19	238.75	0.94	8.02E+001	12.38	2.58E+001
2	5826-	5841	5833.92	1459.22	0.88	4.30E+001	6.56	0.00E+000

```

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

```

Errors quoted at 1.000 sigma

```
*****  
***** S T A N D A R D   V M S   P E A K   A N A L Y S I S   R E P O R T   *****  
*****
```

Configuration Title:

```
Spectrum Title:          Frac Tank Chamber 1  
Peak Analysis Performed on: 7/10/06 10:01:33 AM  
Peak Analysis From Channel: 1      To Channel:      8192  
Peak Search Sensitivity: 5.00      Gaussian Sensitivity: 10.00  
Max Iterations: 10  Fit Singlets: No  Critical Level Test: Yes  
Use Fixed FWHM: No  FWHM Reject: No  FWHM Reject Ratio: 0.00  
Peak Fit Engine Name: PANOLIN1      Continuum Type: STEP
```

Pk	IT	Energy	Area	Bkgnd	FWHM	Channel	Left	PW	Cts/Sec	%err	Fit
1	0	238.75	80	26	0.94	955.19	951	11	8.0E-002	15.4	0.0
2	0	1459.22	43	0	0.88	5833.92	5826	16	4.3E-002	15.2	0.0

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000 sigma

```
*****  
*****      P E A K      A N A L Y S I S      R E P O R T      *****  
*****
```

```
Detector Name:  DET01  
Sample Title:   Frac Tank Chamber 1  
Peak Analysis Performed on: 7/10/2006 10:01:33 AM  
Peak Analysis From Channel: 1  
Peak Analysis To Channel: 8192
```

Peak No.	ROI start	ROI end	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts	Critical Level
1	951-	961	238.75	8.02E+001	12.38	2.58E+001	1.41E+001
2	5826-	5841	1459.22	4.30E+001	6.56	0.00E+000	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

```

*****
*****          P E A K      W I T H      N I D      R E P O R T          *****
*****

```

```

Detector Name:  DET01
Sample Title:   Frac Tank Chamber 1
Peak Analysis Performed on: 7/10/2006 10:01:33 AM
                   Peak Analysis From Channel: 1
                   Peak Analysis To Channel: 8192
Tentative NID Library:
Peak Match Tolerance : 1.500 FWHM

```

Peak No.	ROI Start	ROI End	Peak Centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts	Tentative Nuclide
1	951-	961	955.19	238.75	8.02E+001	12.38	2.58E+001	
2	5826-	5841	5833.92	1459.22	4.30E+001	6.56	0.00E+000	

```

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

```

Errors quoted at 1.000 sigma

***** P E A K E F F I C I E N C Y R E P O R T *****

Detector Name: DET01
Sample Title: Frac Tank Chamber 1
Peak Analysis Performed on: 7/10/2006 10:01:33 AM

Peak No.	Energy (keV)	Net Peak Area	Net Area Uncertainty	Peak Efficiency	Efficiency Uncertainty
1	238.75	8.02E+001	12.38	2.62E-002	8.64E-004
2	1459.22	4.30E+001	6.56	6.54E-003	9.52E-005

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

 ***** B A C K G R O U N D S U B T R A C T R E P O R T *****

Detector Name: DET01
 Sample Title: Frac Tank Chamber 1
 Peak Analysis Performed on: 7/10/2006 10:01:33 AM

Env. Background File: C:\GENIE2K\CAMFILES\Whittaker\Character

Peak No.	Energy (keV)	Original Area	Orig. Area Uncert.	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
1	238.75	8.02E+001	12.38			8.02E+001	1.24E+001
2	1459.22	4.30E+001	6.56			4.30E+001	6.56E+000

M = First peak in a multiplet region
 m = Other peak in a multiplet region
 F = Fitted singlet

Errors quoted at 1.000 sigma


```
*****  
*****          A R E A   C O R R E C T I O N   R E P O R T          *****  
*****          R E F E R E N C E   P E A K / B K G . S U B T R A C T          *****  
*****
```

Detector Name: DET01
Sample Title: Frac Tank Chamber 1
Peak Analysis Performed on: 7/10/2006 10:01:33 AM

Ref. Peak Energy: 0.00; Reference Date:
Peak Ratio: 0.00; Uncertainty: 0.00
Background File : C:\GENIE2K\CAMFILES\Whittaker\Characterization\B

Corrected area is: Original * Peak Ratio - Background

Peak No.	Energy (keV)	Original Area	Orig. Area Uncert.	Ambient Background	Backgr. Uncert.	Corrected Area	Corrected Uncert.
1	238.75	8.02E+001	12.38			8.02E+001	1.24E+001
2	1459.22	4.30E+001	6.56			4.30E+001	6.56E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

 ***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****

Sample Title: Frac Tank Chamber 1
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Whittaker library 2.

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.955	1460.80*	10.67	1.402E+000	2.148E-001
Th-232d	0.344	238.63*	44.60	1.562E-001	2.464E-002
		338.32	11.36		
		583.14	30.30		
		911.07	27.70		
		969.11	16.60		
		2614.70	99.80		

* = Energy line found in the spectrum.
 Energy Tolerance : 1.500 FWHM
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.000 sigma

***** U N I D E N T I F I E D P E A K S *****

Peak Locate Performed on: 7/10/2006 10:01:33 AM
 Peak Locate From Channel: 1
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
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All peaks were identified.

M = First peak in a multiplet region
 m = Other peak in a multiplet region
 F = Fitted singlet

Errors quoted at 1.000 sigma

 ***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****

Sample Title: Frac Tank Chamber 1
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Whittaker library 2.

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.955	1460.80*	10.67	1.40246E+000	2.14845E-001
Th-232d	0.344	238.63*	44.60	1.56187E-001	2.46426E-002
		338.32	11.36		
		583.14	30.30		
		911.07	27.70		
		969.11	16.60		
		2614.70	99.80		

* = Energy line found in the spectrum.
 @ = Energy line not used for Weighted Mean Activity
 Energy Tolerance : 1.500 FWHM
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.000 sigma

 ***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40	0.955	1.402458E+000	2.148447E-001
Th-232d	0.344	1.561874E-001	2.464258E-002

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis
 @ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

***** U N I D E N T I F I E D P E A K S *****

Peak Locate Performed on: 7/10/2006 10:01:33 AM
 Peak Locate From Channel: 1
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
----------	--------------	--------------------------------	------------------------	-----------	--------------

All peaks were identified.

 ***** N U C L I D E M D A R E P O R T *****

Detector Name: DET01
 Sample Geometry: 500 ml Wet Dirt
 Sample Title: Frac Tank Chamber 1
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Whittaker library 2.

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)
+	K-40 Ra-226d	1460.80*	10.67	8.8258E-002	8.83E-002 1.64E-001	1.4025E+000
		295.21	19.20	2.8927E-001		1.4793E-001
		351.92	37.20	1.7025E-001		5.4135E-002
		609.31	46.30	1.6409E-001		2.1292E-001
		1120.29	15.10	5.4580E-001		-2.6795E-001
+	Th-232d	1764.50	15.84	5.7685E-001	6.00E-002	4.6259E-001
		238.63*	44.60	5.9991E-002		1.5619E-001
		338.32	11.36	4.6119E-001		1.2935E-001
		583.14	30.30	2.5168E-001		1.0417E-001
		911.07	27.70	2.8244E-001		5.3618E-002
>		969.11	16.60	5.6163E-001		3.7617E-001
		2614.70	99.80	0.0000E+000		0.0000E+000

+ = Nuclide identified during the nuclide identification
 * = Energy line found in the spectrum
 > = MDA value not calculated
 @ = Half-life too short to be able to perform the decay correction

 ***** N U C L I D E M D A R E P O R T *****

Detector Name: DET01
 Sample Geometry: 500 ml Wet Dirt
 Sample Title: Frac Tank Chamber 1
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Whittaker library 2.

Level	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)	Dec.
+ 0.000E+000	K-40	1460.80*	10.67	8.826E-002	8.83E-002	1.402E+000	
001	Ra-226d	295.21	19.20	2.893E-001	1.64E-001	1.479E-001	1.375E-
002		351.92	37.20	1.703E-001		5.413E-002	8.088E-
002		609.31	46.30	1.641E-001		2.129E-001	7.678E-
001		1120.29	15.10	5.458E-001		-2.680E-001	2.475E-
001		1764.50	15.84	5.769E-001		4.626E-001	2.537E-
+ 002	Th-232d	238.63*	44.60	5.999E-002	6.00E-002	1.562E-001	2.736E-
001		338.32	11.36	4.612E-001		1.293E-001	2.171E-
001		583.14	30.30	2.517E-001		1.042E-001	1.181E-
001		911.07	27.70	2.824E-001		5.362E-002	1.293E-
001		969.11	16.60	5.616E-001		3.762E-001	2.600E-
> 0.000E+000		2614.70	99.80	0.000E+000		0.000E+000	

+ = Nuclide identified during the nuclide identification
 * = Energy line found in the spectrum
 > = MDA value not calculated
 @ = Half-life too short to be able to perform the decay correction

No Action Level results available for reporting purposes

```
*****  
*****          A U T O G A I N   A D J U S T          *****  
*****
```

Report Generated On:

7/10/2006 10:01:34 AM

No AGA results for reporting.
Status:

This report is valid only if a Certificate was the source of the true values.

No AGA results for reporting.
Status: