

Maine Yankee

321 OLD FERRY RD. • WISCASSET, ME 04578-4922

May 16, 2005

MN-05-024

RA-05-027

Proposed Change No. 218, Supplement 23

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, DC 20555

- References:
- (1) License No. DPR-36 (Docket No. 50-309)
 - (2) Maine Yankee Letter to USNRC, MN-04-020, dated March 15, 2004, License Amendment Request: Release of Non-ISFSI Site Land, Proposed Change No. 218
 - (3) Maine Yankee Letter to USNRC, MN-05-001, dated January 20, 2005, Release of Non-ISFSI Site Land - FSS Final Report No. 7
 - (4) USNRC Letter to Maine Yankee, dated April 15, 2005 Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 7.

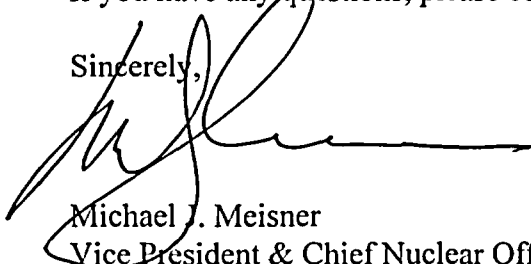
Subject: Response to NRC RAI on FSS Final Report No. 7

On March 15, 2004, Maine Yankee submitted a request for amendment (Reference No. 2) to the facility operating license (Reference No. 1) pursuant to 10 CFR 50.90 and in accordance with the NRC Approved License Termination Plan (LTP) for Maine Yankee, to indicate NRC's approval of the release of the Non-ISFSI site land from the jurisdiction of the license. In support of that request, Maine Yankee supplied the information required in LTP section 1.4.2 and 5.9.3. The land area associated with the license amendment request included the entire non-ISFSI portion of the site land. The dismantlement and survey information for the survey units is being submitted to the NRC in FSS Final Reports.

In Reference No. 3, Maine Yankee submitted FSS Final Report No. 7. In Reference No. 4, USNRC requested additional information on technical information submitted in FSS Final Report No 7. This additional information is provided in an attachment to this letter.

If you have any questions, please contact me.

Sincerely,



Michael J. Meisner
Vice President & Chief Nuclear Officer

NM5501

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

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Attachment: **Maine Yankee Response to NRC Request for Additional Information (RAI)
Regarding Final Status Survey (FSS) Final Report No. 7**

cc: **Dr. R. R. Bellamy, NRC Region I
Mr. D. R. Lewis, Esq., Shaw Pittman
Mr. C. Pray, State of Maine, Nuclear Safety Advisor
Mr. P. J. Dostie, State of Maine, Division of Health Engineering
Mr. D. Gillen, NRC Acting Director, Division of Waste Management
Mr. M. Rosenstein, USEPA Region I
Mr. S. J. Collins, NRC Regional Administrator, Region I
Mr. J. Buckley, NRC NMSS Project Manager, Decommissioning
Mr. M. Roberts, NRC Region I
Mr. R. Shadis, Friends of the Coast**

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NRC RAI No. 1 - FR-0111 SU 7

Section D describes an elevated area, identified by the State of Maine which necessitated Maine Yankee to remove an additional 1 to 2 feet of soil. During FSS the ISOCS had been used to scan survey the area, and the activity was determined to be 0.73 pCi/g Cs-137 (below the scan investigation level.) As a result of the State of Maine finding, an investigation was conducted. As a result of the investigation, elevated readings were found in an adjacent area using a SPA-3 detector. The area was sampled in additional directions and depths. One sample from a "likely depth of 18-24 in." had a Cs-137 specific activity of 5.86 pCi/g, which is "above the DCGL, but below the DCGL_{EMC}." In Table 2-2, the scan MDC for the ISOCS is listed as 0.12 - 0.5 pCi/g. Since the ISOCS originally determined the activity for this grid/area as 0.73 pCi/g, the staff has the following comment:

On page 12, of Maine Yankee Engineering Calculation EC-003-04, Revision 1, dated November 11, 2004, it states "conservatively posited that all the activity in an ISOC scan geometry of 3m² is located in a 1-m² circular volume of 15 cm depth located just inside the 3m radius of the detector's field of view." Since the elevated sample was from a soil depth of 18-24 inches, the staff questions the use of the ISOCS for determining the depth of soil to be remediated. Please justify the use of the ISOCS for determining the activity in soil at depths greater than 15 cm. Also, please provide the procedure for performing the surveys that determine the depth of soil to be remediated.

Maine Yankee Response:

There were two elevated areas identified by the State of Maine. The first area was identified during the remediation phase before the survey unit was turned over for FSS. This location resulted in the identification and removal of storm drain piping. Upon further review, Maine Yankee decided to remove an additional 1 to 2 feet of soil from most of the survey unit, as part of the remediation phase. This 1 to 2 feet of soil removal was not necessitated by the State of Maine identified location, but rather Maine Yankee judgement. The second area was located on the other side of the survey unit and was identified during the FSS phase. The ISOCS gamma scan survey result for this area was 0.73 pCi/g Cs-137. This location was subjected to an investigation. This investigation identified elevated activity in such a small areal extent that it was remediated by virtue of the sampling actions. This activity would have met the release criteria.

ISOCS is certainly appropriate for determining contamination at depth up to the limit at which the photons can penetrate the soil and still reach the detector. The depth of soil typically provided in the circular plane geometry is 15 cm. This depth is acceptable based on the remediation protocol which has the area remediated and sampled until the soil activity is less than the DCGL and samples taken at progressively deeper locations are the same or lower than the surface activity (see attached Appendix A - Soil Remediation Protocol). Furthermore, remediated soil is surveyed by ISOCS using the same evaluation criteria as FSS but using a detector distance of 2 m rather than 3 m.

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Three geoprobe soil samples were taken in the area in question (the second location described above) during site characterization. The geoprobe samples indicated Cs-137 activity at depths not exceeding approximately 24". The FSS investigation instructions required taking two samples at each of 5 locations, one set at the site of investigation, and 4 sets at 90 degree angles from the center location in order to bound the elevated reading. One sample in each set was to be collected at 0-15 cm depth and the second sample was to be collected at 30-45 cm depth. During the investigation process, the technicians typically used a 2x2 NaI detector to verify the location of the elevated area and to check that the activity at the bottom of the remediated hole has decreased. This process was followed in SU-7. Once the investigation samples had been collected, the area was scanned and a slightly elevated area was found next to (within 12" of) the center sample location. Soil was removed from the location for disposal until the detector indicated no additional activity. A sample of the soil removed was counted and the activity was 5.86 pCi/g. Because the soil was from nearly the same location as the center sample and it was the highest activity collected, it was conservatively used to represent the center location. The technicians recorded its approximate depth as 18" – 24". SU-7 contained gravel fill over a deep layer of clay. Based on the characterization data which did not indicate soil contamination below 24" and the experience of the remediation personnel that the clay layer was the lower boundary of soil activity, no additional sampling was performed.

Even though the elevated area was removed, the sample result from the removed soil was included in the EMC unity rule calculation in Table 3-1 "Investigation Table" as though it had been left. The area applied to this elevated result was conservatively set at 2 m², even though the actual area was only a fraction of this area. If this elevated activity had not been identified and removed, the survey unit would still have met the release criteria.

NRC RAI No. 2 - FR-0111 SU 9

Section C, states that, "the ISOCS is reconfigured and re-evaluated to account for the appropriate shielding effects of water and metal." Please provide the technical bases and justification for the changes to the MDC and other survey parameters.

Maine Yankee Response:

The Form 3 evaluation for the presence of pipe and free-standing water in FR0111 SU-9 is attached (Appendix B). The spectra for the applicable scan grids were re-analyzed and the resulting MDC's determined to ensure they were less than the investigation levels of 0.36 pCi/g Co-60 and 1.0 pCi/g Cs-137. The following is a table of the resulting MDC for each applicable scan grid.

Geometry	Scan Grid	MDC pCi/g Co-60	MDC pCi/g Cs-137
Metal Pipe	S048	0.199	0.337
	S049	0.199	0.313

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Geometry	Scan Grid	MDC pCi/g Co-60	MDC pCi/g Cs-137
	S050	0.171	0.305
	S051	0.197	0.311
Water	S004	0.295	0.351
	S073	0.296	0.533
	S074	0.290	0.573
	S078	0.273	0.245
	S079	0.275	0.254
	S080	0.257	0.493
	S081	0.146	0.135
	S083	0.283	0.638
	S085	0.298	0.592

NRC RAI No. 3 - All Supplement 7 SUs

Table 2-2 provides scan MDC ranges. For example, in SU-10, the ISOCS scan MDC is listed as 0.3 to 0.9 pCi/g with the comment that this is ~50% of the DCGL. However, 0.90 pCi/g exceeds the DCGL for Co-60 of 0.86 pCi/g. Please clarify the ISOCS scan MDCs for each of the survey units.

Maine Yankee Response:

The MDC values for ISOCS scans reported in Table 2-2 range from the lowest to the highest ISOCS MDC's achieved for that survey unit. In many cases, these ranges were nominal ranges which simply bounded the ISOCS MDC's. The following table shows the maximum nuclide-specific MDCs by survey unit, for those survey units which do not already contain nuclide specific ISOCS MDA ranges in Table 2-2. In the future, Table 2-2 will clearly show which MDC applies to Co-60 and which applies to Cs-137 for the final data set.

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ISOCS MDCs (values in pCi/g)			
Survey Unit	RR-Tbl 2-2	Co-60 (max)	Cs-137 (max)
FSS Final Report No. 6			
FR0111 SU-1	0.2 - 0.5	0.274	0.415
SU-1	0.2 - 0.5	0.0987	0.158
SU-3	0.25 - 0.8 (soil, etc) 0.4 - 0.8 (pipe)	0.326 0.413	0.397 0.786
SU-4	0.09 - 0.9	0.214 0.404 trench	0.334 0.803 trench
SU-5	0.1 - 0.4	0.287	0.402
FSS Final Report No. 7			
FR0111 SU-6	0.11 - 0.40	0.230	0.352
SU-7	0.12 - 0.50	0.255	0.415
SU-8	0.10 - 0.70	0.338	0.672
SU-9	0.15 - 0.70	0.298	0.638
SU-10	0.13 - 0.90	0.358	0.866
SU-13	0.14 - 0.30	0.218	0.278
FSS Final Report No. 8			
FR0100 SU-1	0.14 - 0.75	0.357	0.744
SU-2	0.14 - 0.30	0.255	0.386
SU-3	0.14 - 0.33	0.220	0.331
FR0111 SU-14	0.08 - 0.26 Co-60 0.14 - 0.40 Cs-137	Nuclide Specific MDA ranges provided in Table 2-2	
FR0900 SU-1	0.23 - 0.31 Co-60 0.25 - 0.53 Cs-137	Nuclide Specific MDA ranges provided in Table 2-2	
SU-3	0.15 - 0.24 Co-60 0.14 - 0.42 Cs-137	Nuclide Specific MDA ranges provided in Table 2-2	
FR2900 SU-1	0.11 - 0.45	0.236	0.404
FSS Final Report No. 9			
FR0111 SU-11	0.10 - 0.25 Co-60 0.14 - 0.43 Cs-137	Nuclide Specific MDA ranges provided in Table 2-2	
SU-12	0.0135 - 0.533	0.291	0.434
SU-17	0.090 - 0.454	0.261	0.454
FR0200 SU-3	0.10 - 0.34	0.219	0.344
FSS Final Report No. 9A			
FR0111 SU-15	0.091-0.246 Co-60 0.157-0.333 Cs-137	Nuclide Specific MDA ranges provided in Table 2-2	
SU-16	0.102-0.299 Co-60 0.152-0.484 Cs-137	Nuclide Specific MDA ranges provided in Table 2-2	

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References

1. Maine Yankee Letter to USNRC, MN-02-048, dated October 15, 2002, Revision 3, Maine Yankee's License Termination Plan
2. USNRC Letter to Maine Yankee dated February 28, 2003, "Issuance of Amendment No. 168 to Facility Operating License No. DPR-36 - Maine Yankee Atomic Power Station - Approval of the MY License Termination Plan
3. Maine Yankee Letter to USNRC, MN-04-020, dated March 15, 2004, License Amendment Request: Release of Non-ISFSI Site Land, Proposed Change No. 218
4. USNRC Memorandum from John T. Buckley to Claudia M. Craig dated March 23, 2004, Meeting Report for the March 17, 2004, Meeting with Maine Yankee Atomic Power Company (Maine Yankee)
5. USNRC Memorandum from John Buckley to Biweekly Notice Coordinator dated May 5, 2004, Request for Publication in Biweekly FR Notice - Notice of Consideration of Issuance of Amendment to Facility Operating License DPR-26, Proposed No Significant Hazards Consideration Determination, and Opportunity for Hearing (TAC No. L52090)
6. Maine Yankee Letter to USNRC, MN-04-031, dated May 6, 2004, Release of Non-ISFSI Site Land - FSS Final Report No. 1A, Proposed Change No. 218, Supplement 1
7. Federal Register Biweekly Notice: Applications and Amendments to Facility Operating Licenses Involving No Significant Hazards Consideration - Maine Yankee, 69FR29768, dated May 11, 2004
8. Maine Yankee Letter to USNRC, MN-04-042, dated July 6, 2004, Maine Yankee License Amendment Request - Release of Non-ISFSI Site Lands
9. USNRC Letter to State of Maine dated July 30, 2004, Response to State of Maine Comments on Maine Yankee License Amendment Request - Release of Non-ISFSI Site Lands
10. Maine Yankee Letter to USNRC, MN-04-044, dated August 12, 2004, Release of Non-ISFSI Site Land - Resubmittal of FSS Final Report No. 1, Proposed Change No. 218, Supplement 2
11. USNRC Letter to Maine Yankee dated August 18, 2004, Integrated Inspection No. 05000309/2004001
12. USNRC Letter to Maine Yankee dated August 18, 2004, Changes to the Maine Yankee Atomic Power Station License Termination Plan Using the 50.59 Process
13. Maine Yankee Letter to USNRC, MN-04-047, dated September 2, 2004, License Amendment Request - Release of Non-ISFSI Site Land, Proposed Change No. 218, Supplement 3
14. Maine Yankee Letter to USNRC, MN-04-048, dated September 7, 2004, Reply to NRC Letters Re: Changes to Maine Yankee LTP Using 50.59 Process
15. USNRC Letter to Maine Yankee dated October 14, 2004, Meeting Report for the September 9, 2004, Meeting with Maine Yankee Atomic Power Company (Maine Yankee)

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16. Maine Yankee Letter to USNRC, MN-04-049, dated September 15, 2004, Release of Non-ISFSI Site Land - FSS Final Report No. 2, Proposed Change No. 218, Supplement 4
17. USNRC Letter to Maine Yankee dated September 24, 2004, Request for Additional Information Regarding Final Status Survey (FSS) Final Report No. 1A.
18. Maine Yankee Letter to USNRC, MN-04-052, dated October 12, 2004, Release of Non-ISFSI Site Land - FSS Final Report No. 3, Proposed Change No. 218, Supplement 5
19. Maine Yankee Letter to USNRC, MN-04-053, dated October 14, 2004, Release of Non-ISFSI Site Land - Addendum to FSS Final Report No. 1, Proposed Change No. 218, Supplement 6
20. USNRC Letter to Maine Yankee dated November 4, 2004, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement Nos. 1 and 3
21. Maine Yankee Letter to USNRC, MN-04-056, dated November 17, 2004, Release of Non-ISFSI Site Land - FSS Final Report No. 4, Proposed Change No. 218, Supplement 7
22. USNRC Letter to Maine Yankee dated November 17, 2004, Maine Yankee - NRC Inspection Report NO. 05000309/2004001 and NRC Office of Investigations Report No. 1-2004-001
23. USNRC Letter to Maine Yankee dated November 22, 2004, Correction to NRC Letter to Maine Yankee, dated November 17, 2004.
24. USNRC Letter to Maine Yankee dated November 30, 2004, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 2
25. USNRC Letter to Maine Yankee dated November 30, 2004, Receipt of Final Status Survey (FSS) Supplement No. 4.
26. Maine Yankee Letter to USNRC, MN-04-058, dated December 7, 2004, Response to NRC RAI's on FSS Report Nos. 1 and 3, Proposed Change No. 218, Supplement 8
27. Maine Yankee Letter to USNRC, MN-04-059, dated December 7, 2004, Release of Non-ISFSI Site Land - FSS Final Report No. 5, Proposed Change No. 218, Supplement 9
28. Maine Yankee Letter to USNRC, MN-04-060, dated December 22, 2004, Release of Non-ISFSI Site Land - FSS Final Report No. 6, Proposed Change No 218, Supplement 10
29. Maine Yankee Letter to USNRC, MN-04-061, dated December 23, 2004, Response to NRC RAI's on FSS Report No. 2, Proposed Change No. 218, Supplement 11
30. USNRC Letter to Maine Yankee dated December 29, 2004, Receipt of Maine Yankee Final Status Survey Report Supplements 5 and 6
31. USNRC Letter to Maine Yankee dated January 5, 2005, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 4
32. USNRC Letter to Maine Yankee dated January 7, 2005, Receipt of Maine Yankee's Response to Request for Information on Final Status Survey Report Supplements 1 and 3
33. USNRC Letter to Maine Yankee dated January 19, 2005, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 2
34. Maine Yankee Letter to USNRC, MN-05-001, dated January 20, 2005, Release of Non-ISFSI Site Land - FSS Final Report No. 7, Proposed Change No. 218, Supplement 12
35. Maine Yankee Letter to USNRC, MN-05-002, dated January 26, 2005, Technical Basis Document for NRC Review: Exploranium GR-130 Minimum Detectable Concentration (MDC) of Cs-137 and Co-60 in Surface Soil - 30 Day Notice per LTP Requirement

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36. Maine Yankee Letter to the NRC, MN-05-003, dated January 26, 2005, Area Classification Change: Storm Drains (D3500) - Section 7
37. Maine Yankee Letter to USNRC, MN-05-004, dated January 27, 2005, Response to NRC RAI on FSS Report No. 4, Proposed Change No. 218, Supplement 13
38. USNRC Letter to Maine Yankee dated January 27, 2005, Receipt of Maine Yankee Final Report Supplement 7
39. USNRC Letter to Maine Yankee dated February 9, 2005, Response to Area Classification Change: Storm Drains (D3500)
40. Maine Yankee Letter to USNRC, MN-05-006, dated February 16, 2005, Response to NRC RAI's on FSS Final Report Nos. 1 and 2, Proposed Change No. 218, Supplement 14
41. Maine Yankee Letter to USNRC, MN-05-007, dated February 17, 2005, Release of Non-ISFSI Site Land - FSS Final Report No. 8, Proposed Change No. 218, Supplement 15
42. Maine Yankee Letter to USNRC, MN-05-008, dated February 23, 2005, Release of Non-ISFSI Land - FSS Final Report No. 8 - Attachment I, Figure 1 and 2 and Attachment II Header Page, Proposed Change No. 218, Supplement 16
43. Maine Yankee Letter to USNRC, MN-05-009, dated February 23, 2005, Response to NRC Comments on Maine Yankee Area Classification Change: Storm Drains (D3500) - Section 7
44. USNRC Letter to Maine Yankee dated February 23, 2005, Receipt of Maine Yankee Responses to Requests for Additional Information Regarding Supplements 1 and 2 and , Final Status Survey Report Supplement 8
45. USNRC Letter to Maine Yankee dated February 24, 2005, Acceptance of Maine Yankee Technical Basis Document for the Limited Use of the Exploranium GR-130 Instrument
46. USNRC Letter to Maine Yankee dated March 2, 2005¹, Approval of Final Status Survey Supplement No. 4
47. USNRC Letter to Maine Yankee dated March 13, 2005, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 5
48. USNRC Letter to Maine Yankee dated March 21, 2005, Storm Drain Area Survey Unit Classification Change
49. USNRC Letter to Maine Yankee dated March 28, 2005, Review of Maine Yankee Response to NRC RAI's on FSS Report Nos. 1 and 2
50. Maine Yankee Letter to USNRC, MN-05-015, dated April 7, 2005, Response to NRC RAI on FSS Final Report No. 5, Proposed Change No. 218, Supplement 17
51. Maine Yankee Letter to USNRC, MN-05-016, dated April 7, 2005, Release of Non-ISFSI Site Land - FSS Final Report No. 9, Proposed Change No. 218, Supplement 18
52. USNRC Letter to Maine Yankee dated April 7, 2005, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 6
53. Maine Yankee Letter to USNRC, MN-05-017, dated April 13, 2005, Response to NRC RAI of FSS Final Report Nos. 1 and 2, Proposed Change No. 218, Supplement 19

¹ This letter was erroneously dated "March 2, 2003" and should have been "March 2, 2005"

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54. USNRC Letter to Maine Yankee dated April 15, 2005, Request for Additional Information (RAI) Regarding Final Status Survey (FSS) Supplement No. 7
55. USNRC Letter to Maine Yankee dated May 3, 2005, Meeting Report for the April 19, 2005, Meeting with Maine Yankee Atomic Power Company (Maine Yankee)
56. Maine Yankee Letter to USNRC, MN-05-019, dated May 5, 2005, Response to NRC RAI on FSS Final Report No. 6, Proposed Change No. 218, Supplement 20
57. Maine Yankee Letter to USNRC, MN-05-020, dated May 5, 2005, Release of Non-ISFSI Site Land - FSS Final Report No. 9A, Proposed Change No. 218, Supplement 21
58. Maine Yankee Letter to USNRC, MN-05-23, dated May 10, 2005, Release of Non-ISFSI Site Land - FSS Final Report Nos. 1 and 2 - Resolution, Proposed Change No. 218, Supplement 22

Appendix A

SOIL REMEDIATION PROTOCOL

1. Survey units are initially excavated to the depth determined by soil characterization data (# of borings samples). A 5 meter area around the location of elevated readings was removed to ensure that any contamination propagating from the original source was adequately remediated.
2. Because contamination was assumed to spread from the surface downward (unless evidence to the contrary was found), remediation was performed until soil activity was reduced to background levels or the activity at the bottom of the excavation was diminishing with continued sampling and was below the DCGL.
3. Remediation measurements using ISOCS were typically made with the detector positioned 2 m above the surface but using the 3 m investigation criteria.
4. Once remediation was complete, a SPA-3 scan was performed in the remediated area checking for discrete sources of elevated activity.
5. When these remediation actions were complete, the FSS survey was performed. Soil samples were collected. If ISOCS was used, the area was typically scanned at a distance of 3m or less.

Appendix B

**FR-0111 SU 9
Yard West Excavation**

Form 3 - SURVEY DATA INVESTIGATION / EVALUATION SHEET

Form 3

SURVEY DATA INVESTIGATION / EVALUATION SHEET

FSS Survey Remediation Survey RP Survey FSS Related

Tracking Number: 05-001

Survey Area: FR 0111 SU9 Survey Date/Time: November 2004
Probe Type/ID: ISOCS 7722, 7607 E-600 ID: N/A
Discoverer: Anderson/Madison Date/Time Discovered: 1/10/05 10:00 hrs.

Meter Green Tagged YES NO Probe Green Tagged YES NO

Reason for Evaluation: Geometries used for scan analysis in SU9 did not include consideration of pipe surfaces present in S048 through S051 or presence of water in S004, S073, S074, S078 S079, S080, S081, S083 or S085. Need to ensure scan MDCs were less than the investigation levels of 0.36 pCi/g Co-60 and 1.0 pCi/g Cs-137.

Engineer/Supervisor Evaluation: The spectrums in question were re-analyzed and the MDCs compiled to ensure the required investigation levels were met. Documentation added to the survey package.

Instrument Failure Suspected YES (Forward to Instrument Technician) NO

Instrument Technician Evaluation:

Action: Resurvey Data Acceptable Other (please specify)
Refer to Engineer Evaluation for disposition.

Final Disposition: Revised ISOCS scan MDCs meet the survey package investigation levels as required.

Approved By: *A. Anderson* 1/10/05
Responsible Supervisor/Engineer

Reviewed By: *[Signature]* 1/10/05
FSS Superintendent

When form completed, file in applicable survey package for FSS or in Tech File 19.200.40.4 for non-FSS.

Geometry Composer Report

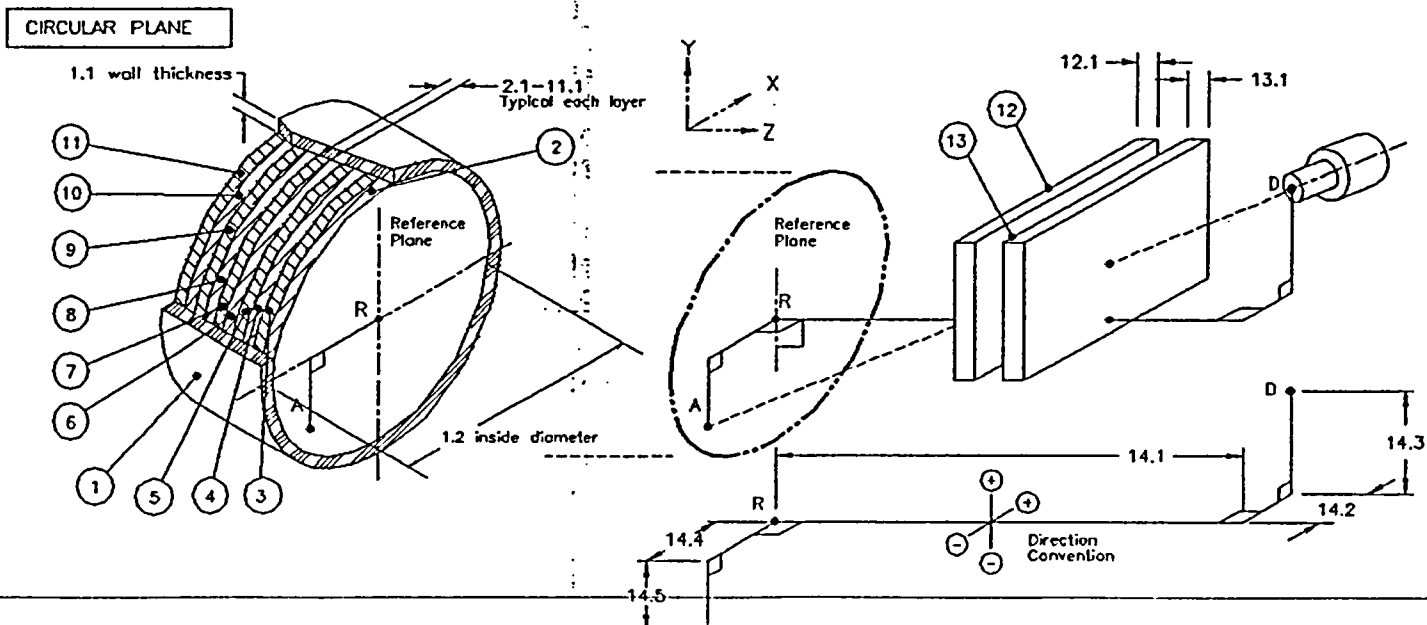
Date: Monday, January 10, 2005
 Description: Soil_at_3m90d_H2O
 Comment: test_w_3inH2O_abs
 File Name: c:\genie2k\isocs\data\geometry\in-situ\circular_plane\gsm\soil_at_3m90d_3inh20(7722).geo
 Software: ISOCS
 Template: CIRCULAR_PLANE, Version: default
 Detector: 7722
 Environment: Temperature= 22 C, Pressure= 760 mmHg, Rel.Humidity= 30%
 Integration: Convergence= 1.00%, MDRPN= 2^(4) CRPN= 2^(4)

#	Geometry Compon.	Dimensions (cm):						Material	D(g/cm3)	R.Conc.
		d1	d2	d3	d4	d5	d6			
1	Side Walls		600.00					none		
2	Layer 1							none		
3	Layer 2	15.00						dirt4	1.70	1.00
4	Layer 3							none		
5	Layer 4							none		
6	Layer 5							none		
7	Layer 6							none		
8	Layer 7							none		
9	Layer 8							none		
10	Layer 9							none		
11	Layer 10							none		
12	Absorber1	7.50						water	1.00	
13	Absorber2							none		
14	Source-Detector	300.00								

Collimator: 50mm-90d_new
 newISOCS_50mm_side_90deg_collimation_[large_hole_collimator]

List of energies for efficiency curve generation:

59.5 661.7 1173.2 1332.5



ISOCS/LABSOCS RESULTS

ISOCS/LabSOCS File: C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PLANE\GSM\s
 ISOCS/LabSOCS Time: 01/10/05 09:37:06
 Template: CIRCULAR PLANE
 Geom Description: OIL AT 3M90D H2O
 Comment: ISOCS:UNITS=ACT/G TEST_W_3INH20_ABS
 Detector: 7722
 Collimator: 50MM-90D_NEW
 Convergence: 1.00 %
 Area [Sq Meters]: 2.8274e+001 (C)
 Mass [Grams]: 7.2100e+006 (C)
 Length [Meters]: not used
 (C) = Value calculated by ISOCS
 (U) = Value modified by user

Energy	Efficiency (X Mass)	%Uncertainty	%Convergence	Final # of Voxels
59.54	7.02983e-001	10.0	-0.085996	11844
661.65	3.75705e+000	6.0	-0.111155	11844
1173.22	3.94012e+000	4.0	-0.122721	11844
1332.49	3.94993e+000	4.0	-0.124186	11844

Geometry Composer Report

Date: Monday, January 10, 2005
 Description: Soil_at_3m90d_pipe
 Comment: test_w_3mmpipe_abs
 File Name: c:\genie2k\isocs\data\geometry\in-situ\circular_plane\gsm\soil_at_3m90d_15mmpipe(7607).geo
 Software: ISOCS
 Template: CIRCULAR_PLANE, Version: default
 Detector: 7607
 Environment: Temperature= 22.C, Pressure= 760 mmHg, Rel.Humidity= 30%
 Integration: Convergence= 1.00%, MDRPN= 2^(4) CRPN= 2^(4)

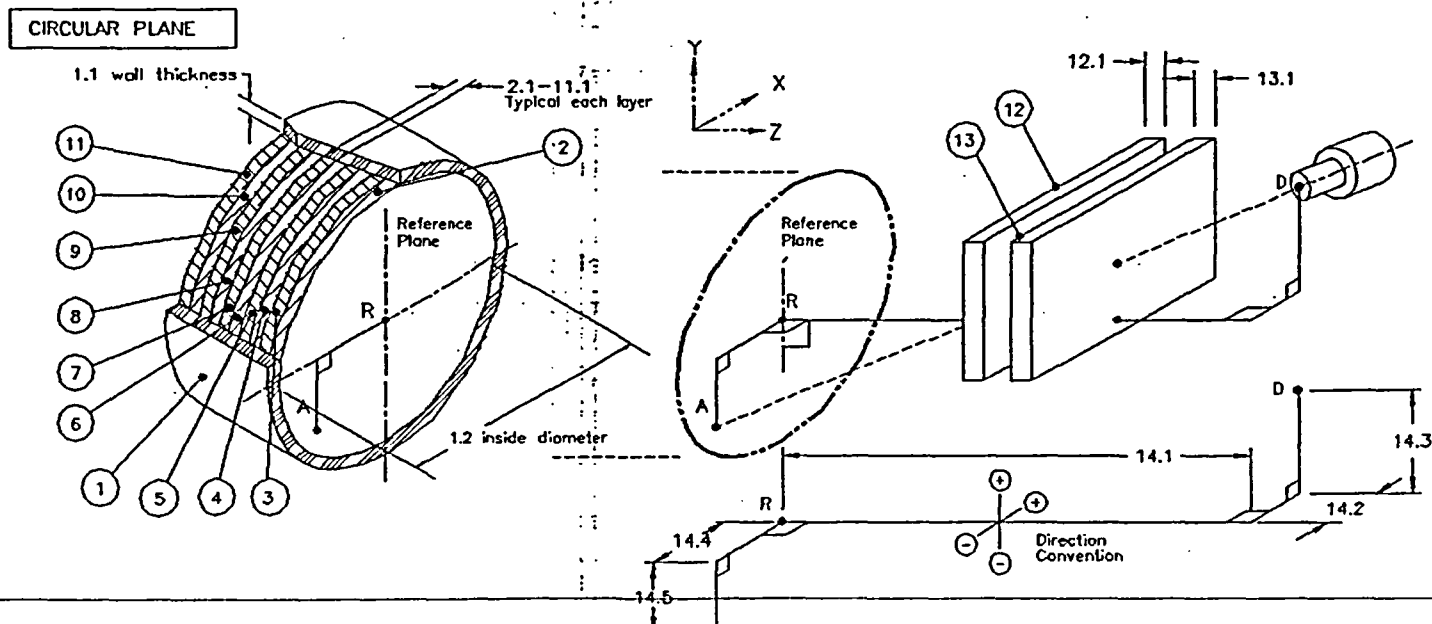
Dimensions (cm):

# Geometry Compon.	d1	d2	d3	d4	d5	d6	Material	D(g/cm3)	R.Conc.
1 Side Walls		600.00					none		
2 Layer 1							none		
3 Layer 2	15.00						dirt4	1.70	1.00
4 Layer 3							none		
5 Layer 4							none		
6 Layer 5							none		
7 Layer 6							none		
8 Layer 7							none		
9 Layer 8							none		
10 Layer 9							none		
11 Layer 10							none		
12 Absorber1	0.30						csteel	7.86	
13 Absorber2							none		
14 Source-Detector	300.00								

Collimator: 50mm-90d_new
 newISOCS_50mm_side_90deg_collimation_[large_hole_collimator]

List of energies for efficiency curve generation:

59.5 661.7 1173.2 1332.5



ISOCS/LABSOCs RESULTS

ISOCS/LabSOCS File: C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PLANE\GSM\s
 ISOCS/LabSOCS Time: 01/10/05 08:55:00
 Template: CIRCULAR PLANE
 Geom Description: IL AT 3M90D PIPE
 Comment: ISOCS:UNITS=ACT/G TEST_W_3MMPPIPE_ABS
 Detector: 7607
 Collimator: 50MM-90D_NEW
 Convergence: 1.00 %
 Area [Sq Meters]: 2.8274e+001 (C)
 Mass [Grams]: 7.2100e+006 (C)
 Length [Meters]: not used
 (C) = Value calculated by ISOCS
 (U) = Value modified by user

Energy	Efficiency (X Mass)	%Uncertainty	%Convergence	Final # of Voxels
59.54	1.78883e-001	10.0	0.081986	12042
661.65	6.49908e+000	6.0	-0.165589	12042
1173.22	5.89274e+000	4.0	-0.162896	12042
1332.49	5.73927e+000	4.0	-0.159890	12042

Geometry Composer Report

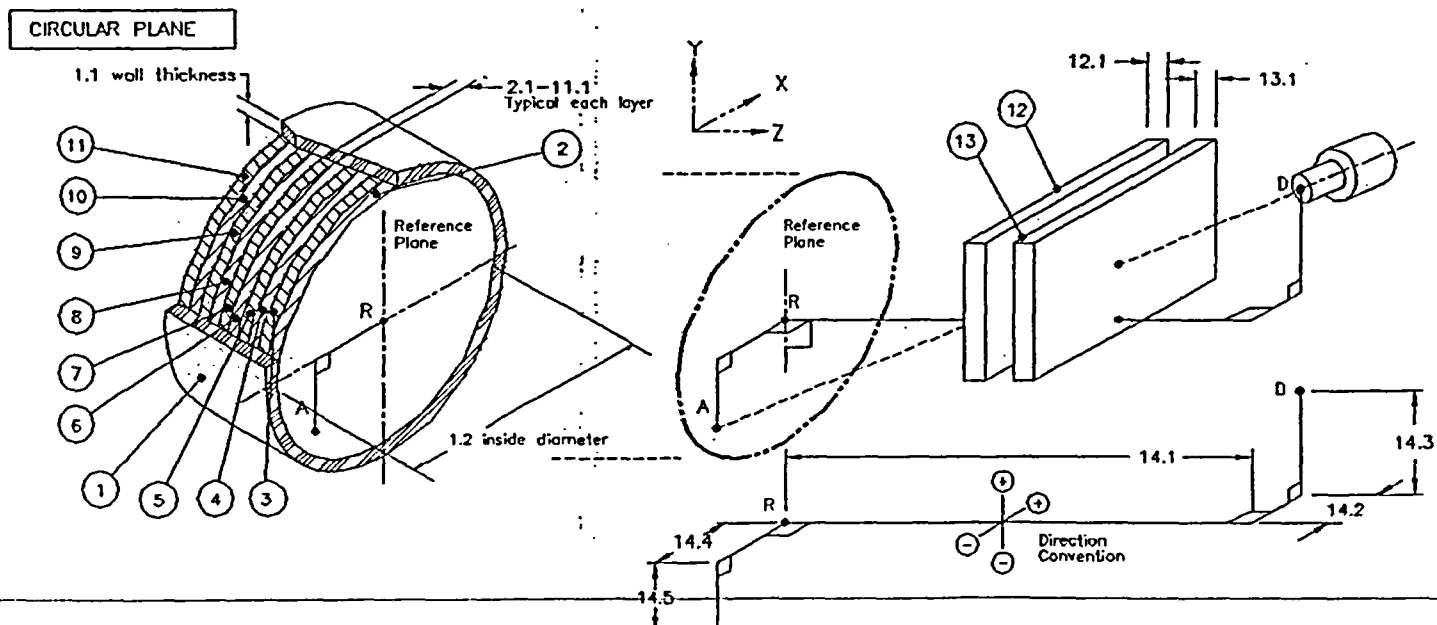
Date: Monday, January 10, 2005
 Description: Soil_at_3m90d_H2O
 Comment: test_w_3inH2O_abs
 File Name: c:\genie2k\isocs\data\geometry\in-situ\circular_plane\gsm\soil_at_3m90d_3inh20(7607).geo
 Software: ISOCS
 Template: CIRCULAR_PLANE, Version: default
 Detector: 7607
 Environment: Temperature= 22 C, Pressure= 760 mmHg, Rel.Humidity= 30%
 Integration: Convergence= 1.00%, MDRPN= 2^(4) CRPN= 2^(4)

#	Geometry Compon.	Dimensions (cm):						Material	D(g/cm3)	R.Conc.
		d1	d2	d3	d4	d5	d6			
1	Side Walls		600.00					none		
2	Layer 1							none		
3	Layer 2	15.00						dirt4	1.70	1.00
4	Layer 3							none		
5	Layer 4							none		
6	Layer 5							none		
7	Layer 6							none		
8	Layer 7							none		
9	Layer 8							none		
10	Layer 9							none		
11	Layer 10							none		
12	Absorber1	7.50						water	1.00	
13	Absorber2							none		
14	Source-Detector	300.00								

Collimator: 50mm-90d_new
 newISOCS_50mm_side_90deg_collimation_[large_hole_collimator]

List of energies for efficiency curve generation:

59.5 661.7 1173.2 1332.5



ISOCS/LABSOCS RESULTS

ISOCS/LabSOCS File: C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\CIRCULAR_PLANE\GSM\s
 ISOCS/LabSOCS Time: 01/10/05 09:08:08
 Template: CIRCULAR PLANE
 Geom Description: OIL AT 3M90D H2O
 Comment: ISOCS:UNITS=ACT/G TEST_W_3INH20_ABS
 Detector: 7607
 Collimator: 50MM-90D_NEW
 Convergence: 1.00 %
 Area [Sq Meters]: 2.8274e+001 (C)
 Mass [Grams]: 7.2100e+006 (C)
 Length [Meters]: not used
 (C) = Value calculated by ISOCS
 (U) = Value modified by user

Energy	Efficiency (X Mass)	%Uncertainty	%Convergence	Final # of Voxels
59.54	6.71752e-001	10.0	0.070002	12042
661.65	3.78133e+000	6.0	-0.172645	12042
1173.22	3.89617e+000	4.0	-0.168882	12042
1332.49	3.89341e+000	4.0	-0.165716	12042

 ***** GAMMA SPECTRUM ANALYSIS *****

ISOCs Report Generator ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 2:49:14 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : S048
 Sample Type : EXC
 Desc. 1 : FR0111-09-1-S048-GS-0000
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 4.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 4:55:04 PM
 Acquisition Started : 11/4/04 5:11:47 PM

Live Time : 1096.0 seconds
 Real Time : 1096.8 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : IL AT 3M90D_PIPE
 Efficiency Calibration Used Done On : 1/14/05

DA
 1/17/05

Peak Locate Analysis Report

1/14/2005 2:49:14 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 2:49:13 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 4.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.31	0.2217	75.27	5.88
2	278.17	0.2485	84.99	4.80
3	781.27	0.1686	238.57	8.97
4	966.17	0.2068	295.02	5.86
5	1151.62	0.1707	351.63	7.67
6	1670.66	0.2032	510.08	4.52
7	1908.27	0.1620	582.61	7.88
8	1993.61	0.1471	608.66	10.11
9	2980.59	0.1656	909.96	7.29
10	3169.92	0.2060	967.76	4.69
11	4780.40	0.0934	1459.38	20.16

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 2:49:14 PM

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*****
*****      P E A K      A N A L Y S I S      R E P O R T      *****
*****
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Detector Name: 7607
 Sample Title: Excavations
 Peak Analysis Performed on: 1/14/05 2:49:13 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	242-	257	246.31	75.27	1.49E+002	73.73%	9.70E+002
2	274-	283	278.17	84.99	6.00E+001	121.76%	5.82E+002
3	772-	792	781.27	238.57	2.56E+002	29.97%	3.49E+002
4	959-	975	966.17	295.02	1.08E+002	50.24%	2.08E+002
5	1146-	1160	1151.62	351.63	1.65E+002	29.44%	1.53E+002
6	1662-	1681	1670.66	510.08	1.34E+002	32.11%	9.98E+001
7	1901-	1915	1908.27	582.61	1.42E+002	23.86%	5.33E+001
8	1985-	2002	1993.61	608.66	2.01E+002	20.62%	7.59E+001
9	2972-	2988	2980.59	909.96	1.09E+002	27.66%	4.04E+001
10	3164-	3178	3169.92	967.76	5.00E+001	56.60%	5.40E+001
11	4768-	4793	4780.40	1459.38	8.89E+002	6.85%	1.87E+001

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05

2:49:14 PM

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 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.967	511.00*	100.00	4.794E-001	33.67%
K-40	0.922	1460.81*	10.67	3.637E+001	8.87%
TL-208	0.725	277.35	6.80		
		510.84*	21.60	2.219E+000	34.65%
		583.14*	84.20	6.205E-001	25.85%
		763.13	1.64		
		860.37	12.46		
PB-212	0.622	74.81*	10.70	3.156E+001	76.54%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	1.778E+000	34.37%
		300.09	3.41		
PB-214	0.681	53.23	1.11		
		74.82*	6.21	5.438E+001	76.34%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	1.768E+000	52.56%
351.92*	37.20	1.444E+000	32.46%		

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 2:49:14 PM Page 5

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.967	3.4535E-001	47.79%
K-40	0.922	3.6370E+001	8.87%
TL-208	0.725	6.2049E-001	25.64%
PB-212	0.622	1.7775E+000	34.16%
PB-214	0.681	1.5100E+000	27.72%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 2:49:13 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
2	84.99 <i>X-ray</i>	5.4779E-002	121.76
8	608.66 <i>B₁₂₄</i>	1.8350E-001	20.62
9	909.96	9.9090E-002	27.66
10	967.76 <i>AC 228</i>	4.5596E-002	56.60

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 2:49:14 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide-MDA (pCi/gm)		
CO-60	1173.22	100.00	2.58E-001	1.99E-001		
	1332.49	100.00	1.99E-001			
CS-137	661.65	85.12	3.37E-001	3.37E-001		
EU-152	121.78	28.40	2.98E+000	8.82E-001		
	244.69	7.49	6.21E+000			
	344.27	26.50	1.39E+000			
	443.98	2.81	1.03E+001			
	778.89	12.74	1.99E+000			
	867.32	4.16	6.34E+000			
	964.01	14.40	2.11E+000			
	1085.78	10.00	2.34E+000			
	1112.02	13.30	2.12E+000			
	1407.95	20.70	8.82E-001			
	EU-154	123.07	40.50		2.05E+000	6.24E-001
		247.94	6.60		6.26E+000	
		591.81	4.83		5.58E+000	
692.41		1.69	1.52E+001			
723.30		19.70	1.45E+000			
756.87		4.33	5.91E+000			
873.19		11.50	2.26E+000			
996.32		10.30	2.03E+000			
1004.76	17.90	1.28E+000				
1274.45	35.50	6.24E-001				
1596.53	1.85	7.30E+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

***** GAMMA SPECTRUM ANALYSIS *****

ISOCs Report Generator ISOCsAN.TPL 2/26/96
Report Generated On : 1/14/05 2:51:20 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
Sample Title : Excavations
Sample Identification : S049
Sample Type : EXC
Desc. 1 : FR0111-09-1-S049-GS-0000
Desc. 2 :
Desc. 3 :
Desc. 4 :

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 50 - 8192
Peak Area Range (in channels) : 50 - 8192
Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 5:15:57 PM
Acquisition Started : 11/4/04 5:15:57 PM

Live Time : 1000.0 seconds
Real Time : 1000.6 seconds

Energy Calibration Used Done On : 6/30/04
Efficiency / Geometry ID : IL_AT_3M90D_PIPE
Efficiency Calibration Used Done On : 1/14/05

Peak Locate Analysis Report

1/14/2005 2:51:20 PM Page 2

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

Detector Name: 7607
 Sample Title: Excavations
 Peak Locate Performed on: 1/14/2005 2:51:16 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192
 Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.39	0.2434	75.29	5.22
2	609.07	0.2339	186.01	4.70
3	780.96	0.1770	238.48	8.50
4	1151.89	0.1830	351.72	7.31
5	1672.15	0.2055	510.53	5.12
6	1907.75	0.1955	582.45	5.76
7	1993.33	0.1695	608.58	7.14
8	2981.61	0.1742	910.27	6.80
9	3170.62	0.2285	967.97	3.56
10	3666.71	0.2154	1119.41	4.15
11	4780.30	0.1014	1459.36	16.68
12	5773.99	0.2005	1762.70	3.60

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 2:51:20 PM

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

Detector Name: 7607
 Sample Title: Excavations
 Peak Analysis Performed on: 1/14/05 2:51:16 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	242-	251	246.39	75.29	6.10E+001	115.66%	5.44E+002
2	599-	617	609.07	186.01	9.74E+001	68.48%	3.14E+002
3	774-	786	780.96	238.48	9.32E+001	55.10%	2.26E+002
4	1146-	1160	1151.89	351.72	9.55E+001	43.29%	1.21E+002
5	1664-	1680	1672.15	510.53	8.25E+001	45.88%	9.25E+001
6	1900-	1914	1907.75	582.45	7.21E+001	41.97%	5.79E+001
7	1984-	2002	1993.33	608.58	1.03E+002	35.81%	7.40E+001
8	2974-	2988	2981.61	910.27	8.24E+001	31.38%	3.16E+001
9	3164-	3178	3170.62	967.97	4.01E+001	61.06%	3.99E+001
10	3660-	3674	3666.71	1119.41	3.99E+001	51.47%	2.41E+001
11	4768-	4792	4780.30	1459.36	6.60E+002	8.15%	2.21E+001
12	5766-	5780	5773.99	1762.70	4.18E+001	38.73%	9.22E+000

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

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Interference Corrected Activity Report 1/14/05 2:51:20 PM Page 4

 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.991	511.00*	100.00	3.238E-001	47.84%
K-40	0.919	1460.81*	10.67	2.983E+001	11.48%
TL-208	0.725	277.35	6.80		
		510.84*	21.60	1.499E+000	48.53%
		583.14*	84.20	3.463E-001	43.95%
		763.13	1.64		
		860.37	12.46		
PB-212	0.625	74.81*	10.70	1.762E+001	117.66%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	7.677E-001	57.45%
		300.09	3.41		
BI-214	0.402	609.31*	44.80	9.388E-001	37.93%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	1.224E+000	52.22%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
		1764.49*	15.36	1.378E+000	39.60%
		1847.42	2.04		
2118.55	1.14				
2204.21	4.86				
2447.86	1.50				
RA-226	1.000	186.10*	3.50	1.019E+001	70.31%
U-235	0.708	89.95	2.80		
		93.35	4.50		
		143.76	10.90		
		185.71*	57.50	6.202E-001	70.35%

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 2:51:20 PM Page 5

***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.991	2.4896E-001	63.59%
K-40	0.919	2.9831E+001	11.48%
TL-208	0.725	3.4629E-001	43.82%
PB-212	0.625	7.6774E-001	57.33%
BI-214	0.402	1.0974E+000	24.62%
? RA-226	1.000	1.0189E+001	70.31%
? U-235	0.708	6.2021E-001	70.35%

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 2:51:16 PM
Peak Locate From Channel: 50
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
4	351.72 Pb214	9.5491E-002	43.29
8	910.27	8.2447E-002	31.38
9	967.97 Ac228	4.0075E-002	61.06

M = First peak in a multiplet region
m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 2:51:20 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)		
CO-60	1173.22	100.00	2.49E-001	1.99E-001		
	1332.49	100.00	1.99E-001			
CS-137	661.65	85.12	3.13E-001	3.13E-001		
EU-152	121.78	28.40	2.87E+000	8.37E-001		
	244.69	7.49	6.20E+000			
	344.27	26.50	1.42E+000			
	443.98	2.81	1.03E+001			
	778.89	12.74	1.87E+000			
	867.32	4.16	6.17E+000			
	964.01	14.40	2.01E+000			
	1085.78	10.00	2.26E+000			
	1112.02	13.30	1.97E+000			
	1407.95	20.70	8.37E-001			
	EU-154	123.07	40.50		1.97E+000	5.76E-001
		247.94	6.60		6.20E+000	
		591.81	4.83		5.57E+000	
		692.41	1.69		1.56E+001	
723.30		19.70	1.23E+000			
756.87		4.33	5.80E+000			
873.19		11.50	2.12E+000			
996.32		10.30	2.12E+000			
1004.76	17.90	1.32E+000				
1274.45	35.50	5.76E-001				
1596.53	1.85	8.17E+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

***** GAMMA SPECTRUM ANALYSIS *****

ISOCs Report Generator ISOCsAN.TPL 2/26/96
Report Generated On : 1/14/05 2:52:49 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
Sample Title : Excavations
Sample Identification : s050
Sample Type : EXC
Desc. 1 : fr0111-09-1-s050-gs-0000
Desc. 2 :
Desc. 3 :
Desc. 4 :

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 50 - 8192
Peak Area Range (in channels) : 50 - 8192
Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gms

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/6/04 1:13:32 PM
Acquisition Started : 11/6/04 1:13:32 PM

Live Time : 1000.0 seconds
Real Time : 1000.6 seconds

Energy Calibration Used Done On : 6/30/04
Efficiency / Geometry ID : IL_AT_3M90D_PIPE
Efficiency Calibration Used Done On : 1/14/05

SA
1/17/05

Peak Locate Analysis Report

1/14/2005

2:52:49 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 2:52:46 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.11	0.2052	75.21	7.53
2	782.19	0.1855	238.86	7.50
3	966.98	0.2419	295.27	4.71
4	1109.87	0.2539	338.89	3.58
5	1153.20	0.1941	352.11	6.31
6	1673.37	0.2032	510.91	5.15
7	1910.35	0.1823	583.25	6.61
8	1995.66	0.1712	609.29	7.65
9	2984.20	0.1704	911.06	6.91
10	3174.09	0.2331	969.10	3.53
11	3195.89	0.2818	975.80	3.09
12	3669.01	0.2145	1120.11	3.74
13	4785.46	0.1013	1460.93	17.31
14	5779.83	0.2270	1764.48	3.28

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 2:52:49 PM

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

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Detector Name: 7607
 Sample Title: Excavations
 Peak Analysis Performed on: 1/14/05 2:52:46 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	242-	251	246.11	75.21	7.41E+001	98.60%	5.78E+002
2	774-	790	782.19	238.86	1.48E+002	42.93%	2.88E+002
3	961-	974	966.98	295.27	4.84E+001	82.13%	1.32E+002
4	1104-	1118	1109.87	338.89	4.36E+001	82.95%	1.02E+002
5	1147-	1161	1153.20	352.11	8.55E+001	48.56%	1.26E+002
6	1666-	1686	1673.37	510.91	1.32E+002	29.20%	7.02E+001
7	1903-	1919	1910.35	583.25	9.16E+001	37.40%	6.84E+001
8	1986-	2002	1995.66	609.29	9.97E+001	33.19%	5.93E+001
9	2977-	2993	2984.20	911.06	1.08E+002	23.86%	2.09E+001
M 10	3168-	3201	3174.31	969.10	5.39E+001	31.35%	2.52E+001
m 11	3168-	3201	3196.27	975.80	1.59E+001	72.10%	2.46E+001
12	3662-	3677	3669.01	1120.11	5.00E+001	43.32%	2.40E+001
13	4774-	4797	4785.46	1460.93	6.08E+002	8.39%	1.77E+001
14	5773-	5786	5779.83	1764.48	2.08E+001	69.91%	1.22E+001

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gms)	Activity Uncertainty
ANN	1.000	511.00*	100.00	5.174E-001	32.19%
K-40	0.999	1460.81*	10.67	2.750E+001	11.66%
TL-208	0.737	277.35	6.80		
		510.84*	21.60	2.395E+000	33.21%
		583.14*	84.20	4.400E-001	39.60%
		763.13	1.64		
		860.37	12.46		
PB-212	0.625	74.81*	10.70	2.156E+001	100.95%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	1.218E+000	45.91%
		300.09	3.41		
BI-214	0.430	609.31*	44.80	9.088E-001	35.46%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	1.535E+000	44.21%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
1764.49*	15.36	6.865E-001	70.39%		
1847.42	2.04				
2118.55	1.14				
2204.21	4.86				
2447.86	1.50				
PB-214	0.685	53.23	1.11		
		74.82*	6.21	3.715E+001	100.79%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
AC-228	0.319	295.21*	19.20	9.293E-001	83.83%
		351.92*	37.20	8.486E-001	51.36%
		89.95	2.10		
		93.35	3.50		
		105.00	1.60		

Interference Corrected Activity Report

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Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gms)	Activity Uncertainty
AC-228	0.319	129.08	2.80		
		209.28	4.40		
		270.23	3.60		
		327.64	3.20		
		338.32*	11.40	1.411E+000	93.22%
		409.51	2.13		
		463.00	4.40		
		794.70	4.60		
		835.50	1.75		
		911.07*	27.70	1.696E+000	27.42%
		964.60	5.20		
		969.11*	16.60	1.429E+000	39.30%
		1588.00	3.50		

* = Energy line found in the spectrum.

Energy tolerance used was 2.000

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gms)	Wt mean Activity Uncertainty
ANN	1.000	4.2239E-001	40.42%
K-40	0.999	2.7505E+001	11.66%
TL-208	0.737	4.3997E-001	39.46%
PB-212	0.625	1.2185E+000	45.75%
BI-214	0.430	9.3412E-001	26.69%
PB-214	0.685	8.6783E-001	43.83%
AC-228	0.319	1.5749E+000	21.94%

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 2:52:46 PM
Peak Locate From Channel: 50
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
m 11	975.80	1.5937E-002	72.10 - high uncertainty

M = First peak in a multiplet region
m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 2:52:49 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gms)	Nuclide MDA (pCi/gms)
CO-60	1173.22	100.00	2.33E-001	1.71E-001
	1332.49	100.00	1.71E-001	
CS-137	661.65	85.12	3.05E-001	3.05E-001
EU-152	121.78	28.40	2.86E+000	8.07E-001
	244.69	7.49	6.50E+000	
	344.27	26.50	1.32E+000	
	443.98	2.81	1.01E+001	
	778.89	12.74	1.89E+000	
	867.32	4.16	6.01E+000	
	964.01	14.40	1.99E+000	
	1085.78	10.00	2.19E+000	
	1112.02	13.30	1.92E+000	
	1407.95	20.70	8.07E-001	
EU-154	123.07	40.50	1.99E+000	6.00E-001
	247.94	6.60	6.41E+000	
	591.81	4.83	5.97E+000	
	692.41	1.69	1.46E+001	
	723.30	19.70	1.43E+000	
	756.87	4.33	5.76E+000	
	873.19	11.50	2.08E+000	
	996.32	10.30	2.14E+000	
	1004.76	17.90	1.33E+000	
1274.45	35.50	6.00E-001		
1596.53	1.85	7.85E+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

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

ISOCs Report Generator ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 2:54:05 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : s051
 Sample Type : EXC
 Desc. 1 : fr0111-09-1-s051-gs-0000
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gms

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/6/04 12:51:10 PM
 Acquisition Started : 11/6/04 12:51:10 PM

Live Time : 1000.0 seconds
 Real Time : 1000.6 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : IL AT 3M90D PIPE
 Efficiency Calibration Used Done On : 1/14/05

DA
 1/17/05

Peak Locate Analysis Report

1/14/2005 2:54:05 PM Page 2

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

Detector Name: 7607
 Sample Title: Excavations
 Peak Locate Performed on: 1/14/2005 2:54:04 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192
 Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.50	0.2238	75.33	6.09
2	304.12	0.2923	92.92	3.29
3	781.74	0.1665	238.72	9.07
4	967.62	0.2450	295.46	3.60
5	1152.96	0.1724	352.04	7.84
6	1673.56	0.2181	510.96	4.18
7	1910.43	0.2020	583.27	5.47
8	1995.52	0.1534	609.25	9.33
9	2984.46	0.1832	911.14	5.57
10	3172.88	0.1979	968.66	5.30
11	3669.50	0.2289	1120.26	3.70
12	4785.28	0.0984	1460.88	18.07
13	5780.79	0.2107	1764.77	3.93

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 2:54:05 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Analysis Performed on: 1/14/05 2:54:04 PM

Peak Analysis From Channel: 50

Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	242-	251	246.50	75.33	1.02E+002	72.96%	5.90E+002
2	300-	309	304.12	92.92	7.96E+001	77.95%	4.07E+002
3	775-	787	781.74	238.72	1.47E+002	35.04%	2.05E+002
4	962-	975	967.62	295.46	6.29E+001	65.82%	1.38E+002
5	1146-	1160	1152.96	352.04	1.07E+002	40.69%	1.34E+002
6	1663-	1685	1673.56	510.96	1.05E+002	45.34%	1.26E+002
7	1902-	1919	1910.43	583.27	6.08E+001	61.75%	9.42E+001
8	1988-	2002	1995.52	609.25	1.27E+002	26.30%	5.55E+001
9	2977-	2993	2984.46	911.14	8.10E+001	33.93%	3.70E+001
10	3167-	3180	3172.88	968.66	4.72E+001	48.24%	3.18E+001
11	3663-	3677	3669.50	1120.26	3.71E+001	59.43%	3.09E+001
12	4771-	4796	4785.28	1460.88	7.60E+002	7.26%	7.05E+000
13	5773-	5787	5780.79	1764.77	3.27E+001	46.21%	9.30E+000

M = First peak in a multiplet region

m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05 2:54:05 PM Page 4

 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gms)	Activity Uncertainty
ANN	1.000	511.00*	100.00	4.121E-001	46.46%
K-40	1.000	1460.81*	10.67	3.407E+001	9.19%
TL-208	0.735	277.35	6.80		
		510.84*	21.60	1.908E+000	47.17%
		583.14*	84.20	2.920E-001	62.55%
		763.13	1.64		
		860.37	12.46		
PB-212	0.621	74.81*	10.70	2.356E+001	75.81%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	1.115E+000	38.87%
		300.09	3.41		
BI-214	0.433	609.31*	44.80	1.152E+000	27.91%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	1.140E+000	59.72%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
1764.49*	15.36	1.075E+000	46.75%		
1847.42	2.04				
2118.55	1.14				
2204.21	4.86				
2447.86	1.50				
PB-214	0.681	53.23	1.11		
		74.82*	6.21	4.060E+001	75.60%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
TH-234	0.708	295.21*	19.20	1.132E+000	67.60%
		351.92*	37.20	1.029E+000	42.92%
		63.29	3.80		
		92.59*	5.41	1.269E+001	80.57%

* = Energy line found in the spectrum.

Energy tolerance used was 2.000

Nuclide confidence index threshold = 0.30

Interference Corrected Activity Report

1/14/05 2:54:05 PM Page 5

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05 2:54:05 PM Page 6

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gms)	Wt mean Activity Uncertainty
ANN	1.000	3.4906E-001	56.00%
K-40	1.000	3.4074E+001	9.19%
TL-208	0.735	2.9200E-001	62.47%
PB-212	0.621	1.1147E+000	38.69%
BI-214	0.433	1.1314E+000	22.25%
PB-214	0.681	1.0549E+000	36.27%
TH-234	0.708	1.2689E+001	80.57%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 2:54:04 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
9	911.14	8.0996E-002	33.93
10	968.66 Ac ²²⁸	4.7237E-002	48.24

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 2:54:05 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gms)	Nuclide MDA (pCi/gms)		
CO-60	1173.22	100.00	2.58E-001	1.97E-001		
	1332.49	100.00	1.97E-001			
CS-137	661.65	85.12	3.11E-001	3.11E-001		
EU-152	121.78	28.40	3.07E+000	8.01E-001		
	244.69	7.49	6.23E+000			
	344.27	26.50	1.38E+000			
	443.98	2.81	1.09E+001			
	778.89	12.74	2.07E+000			
	867.32	4.16	6.21E+000			
	964.01	14.40	2.04E+000			
	1085.78	10.00	2.45E+000			
	1112.02	13.30	2.03E+000			
	1407.95	20.70	8.01E-001			
	EU-154	123.07	40.50		2.11E+000	6.26E-001
		247.94	6.60		6.23E+000	
		591.81	4.83		6.16E+000	
692.41		1.69	1.65E+001			
723.30		19.70	1.26E+000			
756.87		4.33	5.67E+000			
873.19		11.50	2.10E+000			
996.32		10.30	2.16E+000			
1004.76	17.90	1.25E+000				
1274.45	35.50	6.26E-001				
1596.53	1.85	8.79E+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

Geometry Composer Report

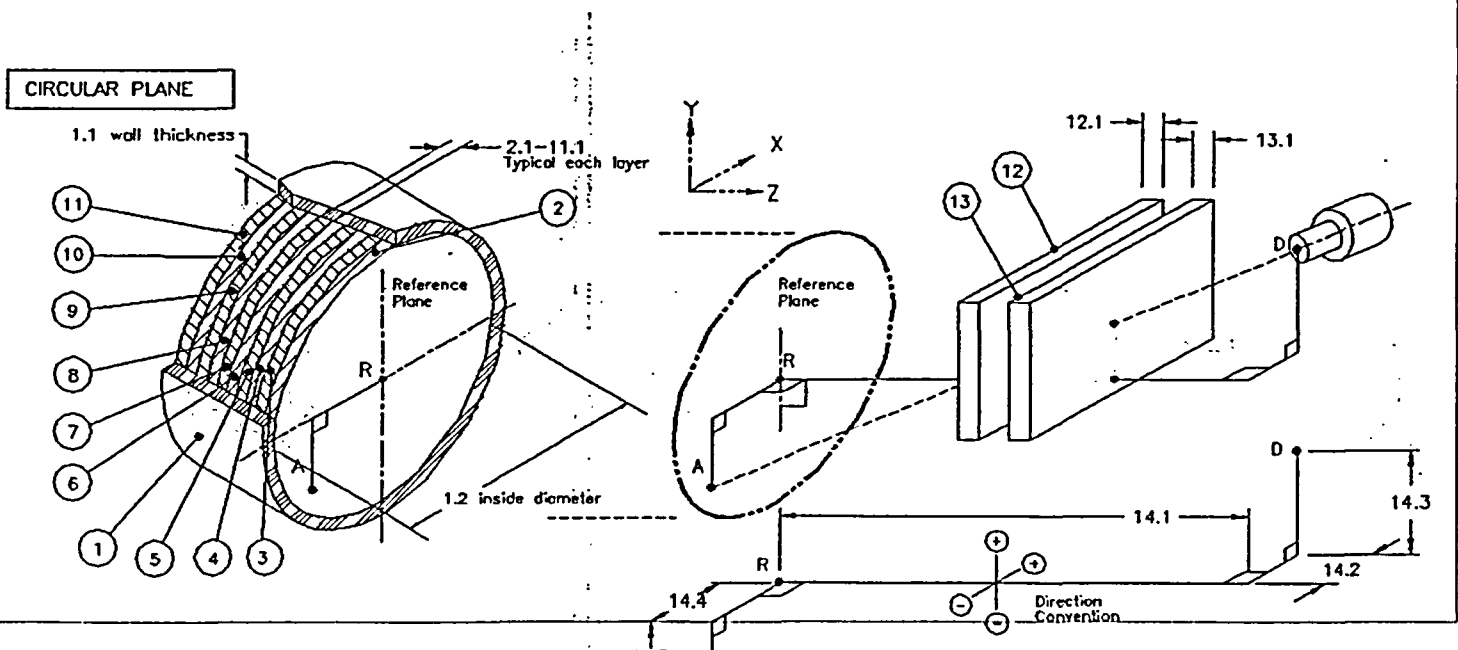
Date: Friday, January 14, 2005
 Description: Soil_at_3m90d_H2O
 Comment: 3" H2O Absorber
 File Name: c:\genie2k\isocs\data\geometry\in-situ\circular_plane\gsm\7607soil_3m_h2o.geo
 Software: ISOCS
 Template: CIRCULAR_PLANE, Version: default
 Detector: 7607
 Environment: Temperature= 22 C, Pressure= 760 mmHg, Rel.Humidity= 30%
 Integration: Convergence= 1.00%, MDRPN= 2^(4) CRPN= 2^(4)

#	Geometry Compon.	Dimensions (cm):						Material	D(g/cm3)	R.Conc.
		d1	d2	d3	d4	d5	d6			
1	Side Walls		600.00					none		
2	Layer 1	15.00						dirt4	1.70	1.00
3	Layer 2							none		
4	Layer 3							none		
5	Layer 4							none		
6	Layer 5							none		
7	Layer 6							none		
8	Layer 7							none		
9	Layer 8							none		
10	Layer 9							none		
11	Layer 10							none		
12	Absorber1	7.50						water	1.00	
13	Absorber2							none		
14	Source-Detector	300.00								

Collimator: 50mm-90d_new
 newISOCS_50mm_side_90deg_collimation_[large_hole_collimator]

List of energies for efficiency curve generation:

59.5 88.0 122.1 165.9 391.7 661.7 898.0 1173.2 1332.5 1836.0



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

ISOCs Report Generator ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:07:59 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : S004
 Sample Type : EXC
 Desc. 1 : FR0111-09-1-S004-GS-0000,1" of water
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/5/04 8:02:53 AM
 Acquisition Started : 11/5/04 8:19:35 AM

Live Time : 1045.0 seconds
 Real Time : 1045.8 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : OIL_AT_3M90D_H2O
 Efficiency Calibration Used Done On : 1/14/05

DA
 1/17/05

Peak Locate Analysis Report

1/14/2005 , 3:07:59 PM Page 2

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 3:07:55 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	238.84	0.3395	73.02	3.41
2	246.67	0.2196	75.31	6.49
3	278.25	0.2679	85.02	3.50
4	781.65	0.1770	238.69	7.16
5	966.85	0.2199	295.23	4.85
6	1152.77	0.1656	351.98	7.99
7	1342.81	0.2636	410.00	3.51
8	1672.32	0.2102	510.59	4.65
9	1910.06	0.1825	583.16	6.23
10	1995.08	0.1433	609.11	10.14
11	2167.33	0.2610	661.70	3.12
12	2380.47	0.2493	726.76	3.50
13	2984.37	0.1702	911.11	6.42
14	3173.51	0.2013	968.85	5.16
15	3668.63	0.1806	1120.00	5.98
16	4512.78	0.2489	1377.69	3.07
17	4785.10	0.0961	1460.82	18.94
18	5780.55	0.1684	1764.70	5.83
19	7222.82	0.2126	2204.98	3.87

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:07:59 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Analysis Performed on: 1/14/05 3:07:55 PM

Peak Analysis From Channel: 50

Peak Analysis To Channel: 8192

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
M	1	234-	251	238.94	73.02	1.15E+002	47.71%	8.36E+002
m	2	234-	251	246.45	75.31	2.10E+002	28.71%	9.23E+002
	3	271-	283	278.25	85.02	9.60E+001	94.72%	7.77E+002
	4	775-	787	781.65	238.69	1.83E+002	34.07%	3.15E+002
	5	961-	977	966.85	295.23	1.17E+002	47.25%	2.15E+002
	6	1144-	1162	1152.77	351.98	1.71E+002	32.86%	1.94E+002
	7	1337-	1350	1342.81	410.00	4.06E+001	89.20%	1.06E+002
	8	1666-	1683	1672.32	510.59	1.18E+002	38.84%	1.33E+002
	9	1903-	1921	1910.06	583.16	1.06E+002	40.00%	1.06E+002
	10	1988-	2006	1995.08	609.11	2.36E+002	19.35%	9.16E+001
	11	2161-	2175	2167.33	661.70	4.23E+001	65.03%	5.37E+001
	12	2374-	2388	2380.47	726.76	3.51E+001	74.10%	4.89E+001
	13	2974-	2993	2984.37	911.11	1.18E+002	28.95%	5.25E+001
	14	3166-	3181	3173.51	968.85	4.78E+001	55.72%	4.52E+001
	15	3661-	3677	3668.63	1120.00	8.65E+001	34.49%	4.65E+001
	16	4506-	4519	4512.78	1377.69	1.80E+001	82.28%	1.40E+001
	17	4773-	4796	4785.10	1460.82	8.01E+002	7.33%	2.40E+001
	18	5770-	5789	5780.55	1764.70	7.83E+001	26.50%	9.73E+000
	19	7216-	7229	7222.82	2204.98	1.90E+001	44.97%	0.00E+000

M = First peak in a multiplet region

m = Other peak in a multiplet region

Errors quoted at 1.960 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.993	511.00*	100.00	8.149E-001	41.14%
K-40	1.000	1460.81*	10.67	5.019E+001	10.92%
CS-137	1.000	661.65*	85.12	3.403E-001	66.09%
TL-208	0.736	277.35	6.80		
		510.84*	21.60	3.773E+000	41.94%
		583.14*	84.20	8.619E-001	42.07%
		763.13	1.64		
		860.37	12.46		
BI-212	0.537	727.17*	11.80	2.017E+000	75.20%
		785.46	1.97		
		1620.62	2.75		
PB-212	0.544	74.81*	10.70	4.151E+001	35.95%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	3.053E+000	37.76%
		300.09	3.41		
BI-214	0.530	609.31*	44.80	3.615E+000	23.03%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	3.882E+000	35.60%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67*	3.92	3.056E+000	82.75%
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
		1764.49*	15.36	3.449E+000	27.76%
		1847.42	2.04		
		2118.55	1.14		
		2204.21*	4.86	2.653E+000	45.79%
		2447.86	1.50		
PB-214	0.641	53.23	1.11		
		74.82*	6.21	7.153E+001	35.51%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	4.392E+000	50.16%

Interference Corrected Activity Report 1/14/05 3:07:59 PM Page 5

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
PB-214	0.641	351.92*	37.20	3.238E+000	36.87%

* = Energy line found in the spectrum.
Energy tolerance used was 2.000
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

Interference Corrected Activity Report

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***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.993	6.2874E-001	54.75%
K-40	1.000	5.0191E+001	10.92%
CS-137	1.000	3.4028E-001	66.09%
TL-208	0.736	8.6187E-001	41.94%
BI-212	0.537	2.0172E+000	75.20%
PB-212	0.544	3.0528E+000	37.57%
BI-214	0.530	3.4144E+000	14.85%
PB-214	0.641	3.5001E+000	29.99%

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

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***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:07:55 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M 1	73.02	1.1004E-001	47.71
3	85.02 / Xray	9.1849E-002	94.72
7	410.00	3.8805E-002	89.20 - high uncertainty
13	911.11	1.1244E-001	28.95
14	968.85 / Ac 228	4.5750E-002	55.72

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)
CO-60	1173.22	100.00	4.11E-001	2.95E-001
	1332.49	100.00	2.95E-001	
+ CS-137	661.65*	85.12	3.51E-001	3.51E-001
EU-152	121.78	28.40	6.71E+000	1.31E+000
	244.69	7.49	1.56E+001	
	344.27	26.50	3.01E+000	
	443.98	2.81	2.22E+001	
	778.89	12.74	3.42E+000	
	867.32	4.16	9.92E+000	
	964.01	14.40	3.30E+000	
	1085.78	10.00	3.42E+000	
	1112.02	13.30	3.34E+000	
	1407.95	20.70	1.31E+000	
EU-154	123.07	40.50	4.66E+000	9.68E-001
	247.94	6.60	1.55E+001	
	591.81	4.83	1.13E+001	
	692.41	1.69	2.83E+001	
	723.30	19.70	2.57E+000	
	756.87	4.33	1.03E+001	
	873.19	11.50	3.51E+000	
	996.32	10.30	3.72E+000	
	1004.76	17.90	2.18E+000	
	1274.45	35.50	9.68E-001	
	1596.53	1.85	1.28E+001	

+ = 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

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

ISOCs Report Generator : ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:09:12 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : s073
 Sample Type : EXC
 Desc. 1 : fr0111-09-1-s073-gs-0000
 Desc. 2 : 2 " H2O
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 11:45:19 AM
 Acquisition Started : 11/4/04 12:02:02 PM

Live Time : 1121.0 seconds
 Real Time : 1121.7 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : OIL AT 3M90D_H2O
 Efficiency Calibration Used Done On : 1/14/05

SA
 1/14/05

Peak Locate Analysis Report

1/14/2005 3:09:12 PM Page 2

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 3:09:08 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.15	0.2524	75.22	4.84
2	781.14	0.1595	238.53	9.93
3	792.92	0.2835	242.16	3.59
4	966.55	0.2263	295.14	5.04
5	1108.56	0.2426	338.49	3.60
6	1151.58	0.1589	351.62	9.02
7	1671.41	0.2292	510.31	3.62
8	1907.66	0.1667	582.43	7.83
9	1993.38	0.1566	608.59	8.52
10	2981.48	0.1700	910.23	6.52
11	3169.81	0.1977	967.72	5.49
12	3666.16	0.2282	1119.24	3.78
13	4780.44	0.0961	1459.40	18.84
14	5212.32	0.2558	1591.23	3.20
15	5775.87	0.1882	1763.27	4.67

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:09:12 PM

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

Detector Name: 7607
 Sample Title: Excavations
 Peak Analysis Performed on: 1/14/05 3:09:08 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
	1	234-	256	246.15	75.22	4.78E+002	30.19%	1.27E+003
M	2	772-	803	781.11	238.53	2.72E+002	16.05%	3.40E+002
m	3	772-	803	793.01	242.16	8.34E+001	38.81%	3.28E+002
	4	961-	973	966.55	295.14	5.87E+001	78.51%	1.87E+002
	5	1097-	1116	1108.56	338.49	9.24E+001	58.74%	1.93E+002
	6	1144-	1162	1151.58	351.62	2.02E+002	26.78%	1.65E+002
	7	1662-	1684	1671.41	510.31	1.38E+002	33.61%	1.09E+002
	8	1898-	1915	1907.66	582.43	1.29E+002	31.71%	9.41E+001
	9	1985-	2004	1993.38	608.59	1.87E+002	21.37%	6.53E+001
	10	2974-	2990	2981.48	910.23	9.58E+001	32.12%	4.82E+001
	11	3163-	3178	3169.81	967.72	5.87E+001	44.70%	3.93E+001
	12	3660-	3673	3666.16	1119.24	3.50E+001	82.09%	6.50E+001
	13	4768-	4792	4780.44	1459.40	8.47E+002	6.98%	1.56E+001
	14	5206-	5219	5212.32	1591.23	1.17E+001	86.30%	5.29E+000
	15	5767-	5785	5775.87	1763.27	6.63E+001	26.87%	4.75E+000

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

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 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.981	511.00*	100.00	8.852E-001	36.24%
K-40	0.923	1460.81*	10.67	4.950E+001	10.69%
TL-208	0.721	277.35	6.80		
		510.84*	21.60	4.098E+000	37.15%
		583.14*	84.20	9.786E-001	34.28%
		763.13	1.64		
		860.37	12.46		
PB-212	0.544	74.81*	10.70	8.823E+001	37.14%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	4.238E+000	22.86%
		300.09	3.41		
BI-214	0.393	609.31*	44.80	2.662E+000	24.76%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	1.465E+000	82.57%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
		1764.49*	15.36	2.721E+000	28.10%
		1847.42	2.04		
		2118.55	1.14		
		2204.21	4.86		
		2447.86	1.50		
PB-214	0.791	53.23	1.11		
		74.82*	6.21	1.520E+002	36.72%
		77.11	10.50		
		87.30	4.67		
		241.98*	7.49	7.711E+000	42.22%
		295.21*	19.20	2.057E+000	80.29%
		351.92*	37.20	3.555E+000	31.57%
AC-228	0.312	89.95	2.10		
		93.35	3.50		
		105.00	1.60		

Interference Corrected Activity Report

1/14/05

3:09:12 PM

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Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
AC-228	0.312	129.08	2.80		
		209.28	4.40		
		270.23	3.60		
		327.64	3.20		
		338.32*	11.40	5.343E+000	72.53%
		409.51	2.13		
		463.00	4.40		
		794.70	4.60		
		835.50	1.75		
		911.07*	27.70	2.143E+000	34.85%
		964.60	5.20		
		969.11*	16.60	2.190E+000	50.59%
		1588.00	3.50		

* = Energy line found in the spectrum.

Energy tolerance used was 2.000

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:09:12 PM Page 6

***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.981	6.7381E-001	48.80%
K-40	0.923	4.9499E+001	10.69%
TL-208	0.721	9.7862E-001	34.13%
PB-212	0.544	4.2379E+000	22.54%
BI-214	0.393	2.5091E+000	18.39%
PB-214	0.791	3.4303E+000	26.03%
AC-228	0.312	2.2368E+000	27.34%

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:09:08 PM
Peak Locate From Channel: 50
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
14	1591.23 <i>T/20x double escape</i>	1.0442E-002	86.30

M = First peak in a multiplet region
m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:09:12 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)		
CO-60	1173.22	100.00	4.01E-001	2.96E-001		
	1332.49	100.00	2.96E-001			
CS-137	661.65	85.12	5.33E-001	5.33E-001		
EU-152	121.78	28.40	6.30E+000	1.34E+000		
	244.69	7.49	1.47E+001			
	344.27	26.50	2.87E+000			
	443.98	2.81	2.07E+001			
	778.89	12.74	3.38E+000			
	867.32	4.16	9.38E+000			
	964.01	14.40	3.04E+000			
	1085.78	10.00	3.44E+000			
	1112.02	13.30	3.29E+000			
	1407.95	20.70	1.34E+000			
	EU-154	123.07	40.50		4.37E+000	8.99E-001
		247.94	6.60		1.48E+001	
		591.81	4.83		9.45E+000	
692.41		1.69	2.55E+001			
723.30		19.70	2.33E+000			
756.87		4.33	1.02E+001			
873.19		11.50	3.36E+000			
996.32		10.30	3.24E+000			
1004.76	17.90	1.80E+000				
1274.45	35.50	8.99E-001				
1596.53	1.85	1.14E+001				

+ = 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

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

ISOCS Report Generator ISOCSAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:14:18 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : s074
 Sample Type : EXC
 Desc. 1 : fr0111-09-1-s074-gs-0000
 Desc. 2 : 2" H2O
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 12:46:38 PM
 Acquisition Started : 11/4/04 12:46:38 PM

Live Time : 1000.0 seconds
 Real Time : 1000.6 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : OIL AT 3M90D_H2O
 Efficiency Calibration Used Done On : 1/14/05

DA
 1/17/05

Peak Locate Analysis Report

1/14/2005 3:14:18 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 3:14:17 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.29	0.2398	75.26	5.05
2	781.56	0.2121	238.66	5.16
3	966.43	0.2435	295.10	3.79
4	1107.07	0.2822	338.03	3.20
5	1151.72	0.2051	351.66	5.12
6	1908.01	0.1976	582.53	5.46
7	1993.27	0.1612	608.56	17.67
8	2981.71	0.1898	910.30	5.23
9	3665.43	0.2309	1119.02	3.28
10	4507.41	0.2492	1376.05	3.18
11	4780.31	0.1084	1459.36	14.16
12	5774.25	0.1943	1762.78	4.39

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:14:18 PM

Page 3

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

Detector Name: 7607
 Sample Title: Excavations
 Peak Analysis Performed on: 1/14/05 3:14:17 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	234-	251	246.29	75.26	2.86E+002	41.27%	1.02E+003
2	769-	793	781.56	238.66	2.28E+002	39.38%	4.51E+002
3	958-	977	966.43	295.10	1.19E+002	46.67%	1.96E+002
4	1102-	1114	1107.07	338.03	3.35E+001	117.63%	1.41E+002
5	1139-	1163	1151.72	351.66	1.40E+002	45.06%	2.19E+002
6	1899-	1915	1908.01	582.53	8.30E+001	43.78%	8.30E+001
7	1984-	2003	1993.27	608.56	1.67E+002	24.47%	7.63E+001
8	2975-	2990	2981.71	910.30	1.04E+002	28.78%	4.22E+001
9	3656-	3675	3665.43	1119.02	6.58E+001	43.82%	4.12E+001
10	4501-	4514	4507.41	1376.05	2.23E+001	56.13%	6.69E+000
11	4765-	4793	4780.31	1459.36	6.72E+002	8.10%	2.15E+001
12	5766-	5781	5774.25	1762.78	5.29E+001	32.80%	8.07E+000

M = First peak in a multiplet region

m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05 3:14:18 PM Page 4

 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
K-40	0.919	1460.81*	10.67	4.404E+001	9.48%
TL-208	0.455	277.35	6.80		
		510.84	21.60		
		583.14*	84.20	6.984E-001	44.61%
		763.13	1.64		
		860.37	12.46		
PB-212	0.543	74.81*	10.70	5.648E+001	52.69%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	3.906E+000	42.12%
		300.09	3.41		
BI-214	0.434	609.31*	44.80	2.631E+000	25.68%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	3.091E+000	44.20%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67*	3.92	3.970E+000	56.45%
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
1764.49*	15.36	2.431E+000	33.55%		
1847.42	2.04				
2118.55	1.14				
2204.21	4.86				
2447.86	1.50				
PB-214	0.638	53.23	1.11		
		74.82*	6.21	9.732E+001	52.40%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	4.644E+000	49.30%
351.92*	37.20	2.775E+000	47.44%		

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:14:18 PM Page 5

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
K-40	0.919	4.4044E+001	9.48%
TL-208	0.455	6.9840E-001	44.61%
PB-212	0.543	3.9060E+000	41.95%
BI-214	0.434	2.6789E+000	17.74%
PB-214	0.638	3.2398E+000	35.23%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:14:17 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (KeV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
4	338.03	3.3494E-002	117.63
8	910.30 <i>Ac 228</i>	1.0377E-001	28.78

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:14:18 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)		
CO-60	1173.22	100.00	3.95E-001	2.90E-001		
	1332.49	100.00	2.90E-001			
CS-137	661.65	85.12	5.73E-001	5.73E-001		
EU-152	121.78	28.40	6.63E+000	1.33E+000		
	244.69	7.49	1.51E+001			
	344.27	26.50	3.03E+000			
	443.98	2.81	2.12E+001			
	778.89	12.74	3.46E+000			
	867.32	4.16	1.01E+001			
	964.01	14.40	3.25E+000			
	1085.78	10.00	3.89E+000			
	1112.02	13.30	3.28E+000			
	1407.95	20.70	1.33E+000			
	EU-154	123.07	40.50		4.57E+000	9.52E-001
		247.94	6.60		1.53E+001	
		591.81	4.83		1.04E+001	
		692.41	1.69		2.84E+001	
723.30		19.70	2.43E+000			
756.87		4.33	1.00E+001			
873.19		11.50	3.36E+000			
996.32		10.30	3.77E+000			
1004.76	17.90	2.20E+000				
1274.45	35.50	9.52E-001				
1596.53	1.85	1.20E+001				

+ = 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

Geometry Composer Report

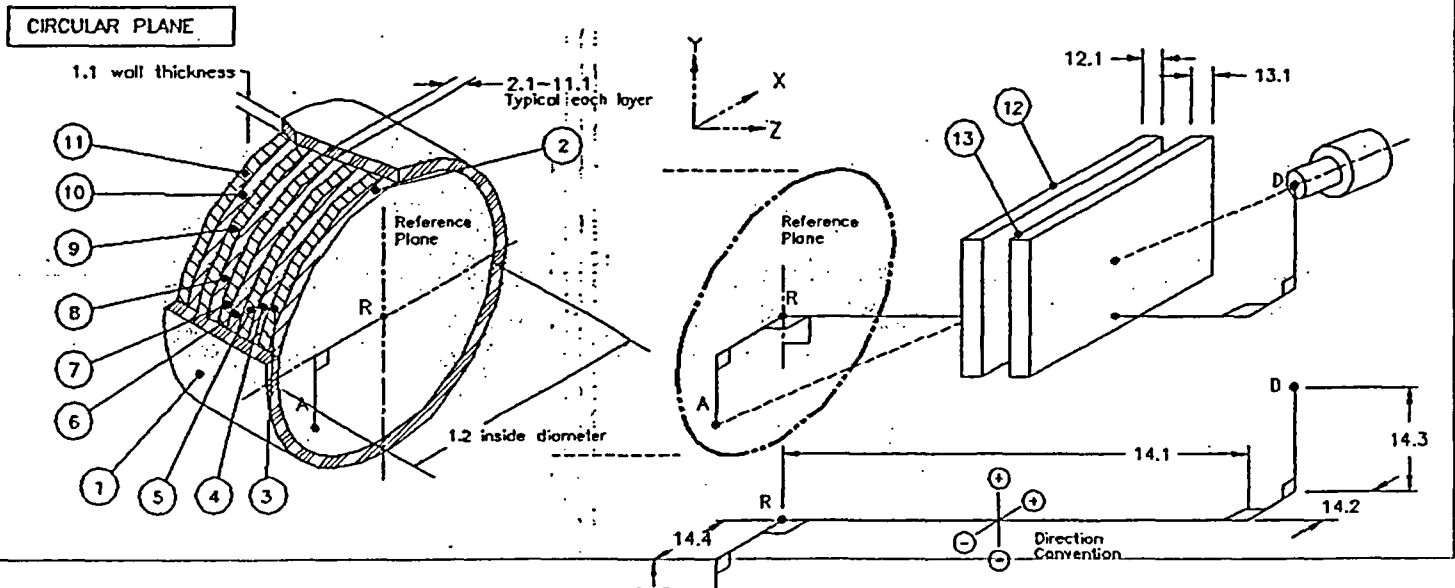
Date: Friday, January 14, 2005
 Description: Soil_at_3m90d_H2O;
 Comment: test_w_3inH2O_abs
 File Name: c:\genie2k\isocs\data\geometry\in-situ\circular_plane\gsm\soil_at_3m90d:3inh20(7722).geo
 Software: ISOCS
 Template: CIRCULAR_PLANE, Version: default
 Detector: 7722
 Environment: Temperature= 22 °C, Pressure= 760 mmHg, Rel.Humidity= 30%
 Integration: Convergence= 1.00%, MDRPN= 2^(4) CRPN= 2^(4)

# Geometry Compon.	Dimensions (cm):						Material	D(g/cm3)	R.Conc.
	d1	d2	d3	d4	d5	d6			
1 Side Walls		600.00					none		
2 Layer 1	15.00						dirt4	1.70	1.00
3 Layer 2							none		
4 Layer 3							none		
5 Layer 4							none		
6 Layer 5							none		
7 Layer 6							none		
8 Layer 7							none		
9 Layer 8							none		
10 Layer 9							none		
11 Layer 10							none		
12 Absorber1	7.50						water	1.00	
13 Absorber2							none		
14 Source-Detector	300.00								

Collimator: 50mm-90d_new
 newISOCS_50mm_side_90deg_collimation_[large_hole_collimator]

List of energies for efficiency curve generation:

59.5 88.0 122.1 165.9 391.7 661.7 898.0 1173.2 1332.5 1836.0



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

ISOCs Report Generator ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:35:53 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\77
 Sample Title : Excavation
 Sample Identification : S078
 Sample Type : Exc
 Desc. 1 : FR0111-09-1-S078-GS-0000,1" of water
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 3:52:34 PM
 Acquisition Started : 11/4/04 3:52:34 PM

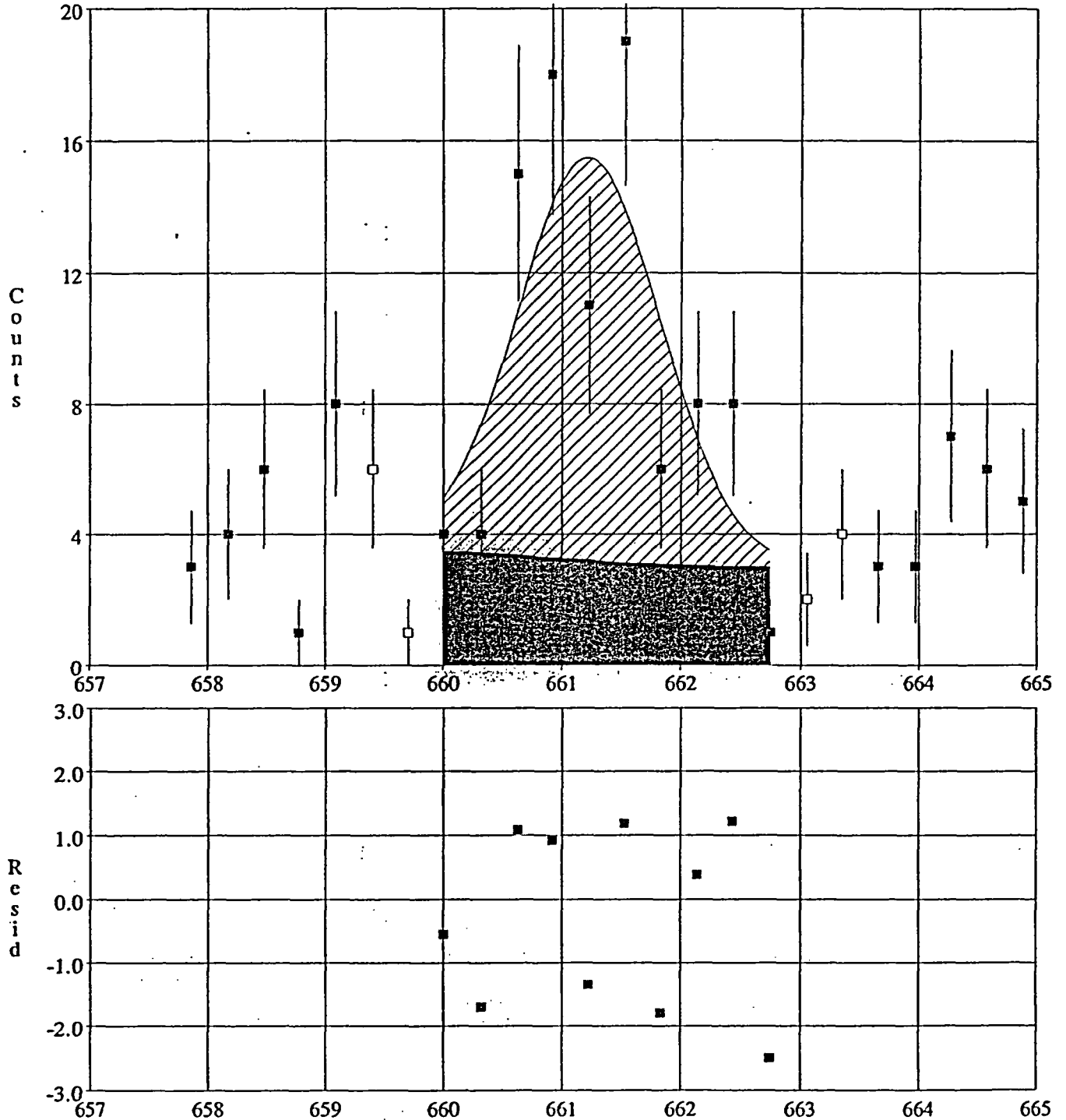
Live Time : 1000.0 seconds
 Real Time : 1000.7 seconds

Energy Calibration Used Done On : 4/29/04
 Efficiency / Geometry ID : OIL_AT_3M90D_H20
 Efficiency Calibration Used Done On : 1/14/05

2A
 1/17/05

Datasource : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\7722-EXC01225.CNF
 Sample ID : S078 Iterations : 4
 Sample Date : 11/04/04 3:52:34 PM Chi-square : 1.46
 Fit Engine : Sum / Non-Linear LSQ Fit Region Start : 660.002 keV
 Bkgnd Type : Step Region End : 662.750 keV

Nbr	Energy	Centroid	Area	%Error	FWHM	Ratio
.1	661.219	2165.98	60.94	15.83	1.426	1.00



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

Detector Name: 7722
 Sample Title: Excavation
 Peak Locate Performed on: 1/14/2005 3:34:25 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192
 Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	238.86	0.3469	72.94	4.27
2	245.81	0.2977	75.09	4.49
3	781.06	0.2415	238.47	5.97
4	966.34	0.3212	295.03	3.78
5	1152.37	0.2356	351.81	6.25
6	1908.34	0.2381	582.57	5.20
7	1993.96	0.1987	608.71	7.49
8	2165.81	0.2617	661.22	4.27
9	2381.14	0.2941	726.89	3.39
10	2982.19	0.2296	910.36	4.76
11	3171.72	0.2735	968.22	3.66
12	3667.76	0.2793	1119.63	3.21
13	4363.78	0.2790	1332.09	3.68
14	4783.37	0.1220	1460.17	15.01
15	5779.45	0.2218	1764.22	4.28

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:35:54 PM

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*****
****          P E A K    A N A L Y S I S    R E P O R T          ****
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Detector Name: 7722
Sample Title:  Excavation
Peak Analysis Performed on: 1/14/05 3:34:25 PM
Peak Analysis From Channel: 50
Peak Analysis To Channel: 8192

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	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
M	1	235-	251	238.76	72.94	1.13E+002	33.82%	4.98E+002
m	2	235-	251	245.81	75.09	2.08E+002	21.05%	6.54E+002
	3	775-	788	781.06	238.47	1.88E+002	32.74%	2.87E+002
	4	959-	985	966.34	295.03	7.35E+001	101.52%	3.10E+002
	5	1144-	1158	1152.37	351.81	1.38E+002	33.00%	1.38E+002
	6	1902-	1915	1908.34	582.57	9.50E+001	31.83%	5.20E+001
	7	1990-	1999	1993.96	608.71	1.39E+002	22.17%	4.69E+001
M	8	2162-	2171	2165.98	661.22	6.09E+001	31.03%	3.21E+001
	9	2375-	2386	2381.14	726.89	3.93E+001	50.32%	2.47E+001
	10	2976-	2990	2982.19	910.36	8.83E+001	33.15%	4.67E+001
	11	3165-	3179	3171.72	968.22	4.99E+001	52.27%	4.41E+001
	12	3660-	3674	3667.76	1119.63	4.71E+001	49.01%	3.19E+001
	13	4359-	4369	4363.78	1332.09	1.34E+001	104.80%	1.56E+001
	14	4773-	4794	4783.37	1460.17	6.70E+002	7.79%	1.07E+001
	15	5771-	5787	5779.45	1764.22	5.47E+001	29.70%	4.31E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05 3:35:54 PM Page 4

 ***** 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: Excavation
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
K-40	0.984	1460.81*	10.67	4.359E+001	11.23%
CS-137	0.993	661.65*	85.12	5.146E-001	33.19%
TL-208	0.455	277.35	6.80		
		510.84	21.60		
		583.14*	84.20	8.150E-001	34.39%
		763.13	1.64		
		860.37	12.46		
BI-212	0.539	727.17*	11.80	2.365E+000	51.91%
		785.46	1.97		
		1620.62	2.75		
PB-212	0.542	74.81*	10.70	4.259E+001	30.19%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	3.329E+000	36.57%
		300.09	3.41		
BI-214	0.404	609.31*	44.80	2.238E+000	25.45%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	2.186E+000	49.79%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
		1764.49*	15.36	2.548E+000	30.82%
		1847.42	2.04		
		2118.55	1.14		
		2204.21	4.86		
		2447.86	1.50		
PB-214	0.639	53.23	1.11		
		74.82*	6.21	7.339E+001	29.67%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	2.925E+000	102.91%
		351.92*	37.20	2.754E+000	37.00%

Interference Corrected Activity Report . 1/14/05 3:35:54 PM Page 5

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

* = Energy line found in the spectrum.
Energy tolerance used was 2.000
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:35:54 PM Page 6

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
K-40	0.984	4.3592E+001	11.23%
CS-137	0.993	5.1457E-001	33.19%
TL-208	0.455	8.1504E-001	34.39%
BI-212	0.539	2.3647E+000	51.91%
PB-212	0.542	3.3291E+000	36.37%
BI-214	0.404	2.3210E+000	18.30%
PB-214	0.639	2.7717E+000	34.82%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:34:25 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
M 1	72.94	1.1256E-001	33.82
10	910.36	8.8278E-002	33.15
11	968.22	4.9926E-002	52.27
13	1332.09	1.3414E-002	104.80

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:35:54 PM

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

Detector Name: 7722
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavation
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)
CO-60	1173.22	100.00	3.19E-001	2.73E-001
	1332.49	100.00	2.73E-001	
+ CS-137	661.65*	85.12	2.45E-001	2.45E-001
EU-152	121.78	28.40	4.86E+000	1.09E+000
	244.69	7.49	1.03E+001	
	344.27	26.50	1.99E+000	
	443.98	2.81	1.66E+001	
	778.89	12.74	2.77E+000	
	867.32	4.16	7.92E+000	
	964.01	14.40	2.89E+000	
	1085.78	10.00	2.86E+000	
	1112.02	13.30	2.32E+000	
	1407.95	20.70	1.09E+000	
EU-154	123.07	40.50	3.42E+000	7.23E-001
	247.94	6.60	1.07E+001	
	591.81	4.83	8.45E+000	
	692.41	1.69	2.36E+001	
	723.30	19.70	2.08E+000	
	756.87	4.33	8.63E+000	
	873.19	11.50	2.89E+000	
	996.32	10.30	3.07E+000	
	1004.76	17.90	1.80E+000	
	1274.45	35.50	7.23E-001	
	1596.53	1.85	1.04E+001	

+ = 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

 ***** GAMMA SPECTRUM ANALYSIS *****

ISOCs Report Generator ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:18:24 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : S079
 Sample Type : EXC
 Desc. 1 : FR0111-09-1-S079-GS-0000, 3" water
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 2:34:09 PM
 Acquisition Started : 11/4/04 2:34:09 PM

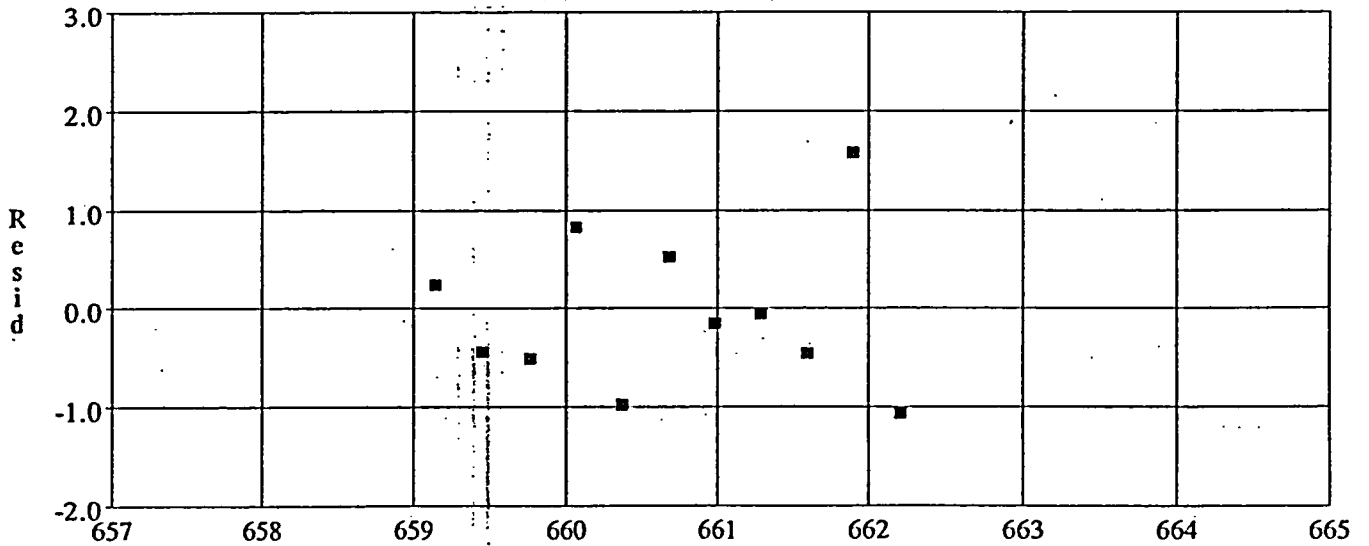
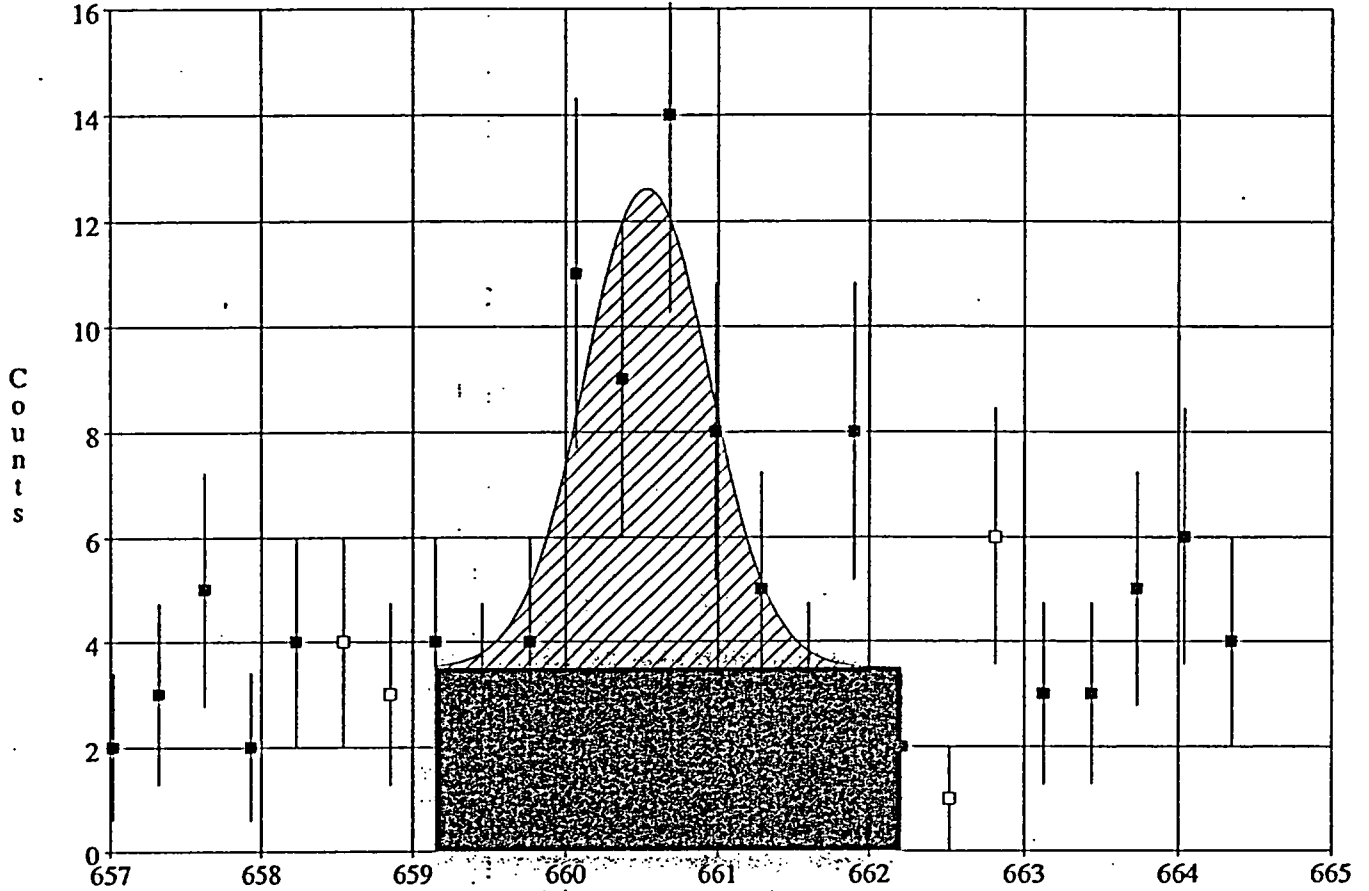
Live Time : 1000.0 seconds
 Real Time : 1000.7 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : OIL_AT_3M90D_H2O
 Efficiency Calibration Used Done On : 1/14/05

DA
 1/17/05

Datasource : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\7607-EXC00800.CNF
 Sample ID : S079 Iterations : 20
 Sample Date : 11/04/04 2:34:09 PM Chi-square : 0.70
 Fit Engine : Sum / Non-Linear LSQ Fit Region Start : 659.153 keV
 Bkgnd Type : Step Region End : 662.206 keV

Nbr	Energy	Centroid	Area	%Error	FWHM	Ratio
1	660.534	2163.52	30.56	26.26	0.962	0.45



Peak Locate Analysis Report

1/14/2005 3:18:24 PM Page 2

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 3:17:02 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	246.02	0.2279	75.18	6.16
2	781.21	0.1931	238.56	6.97
3	966.10	0.2105	295.00	5.83
4	1151.56	0.1828	351.61	7.17
5	1671.84	0.2109	510.44	4.09
6	1908.25	0.1868	582.61	6.81
7	1993.19	0.1650	608.54	7.86
8	2163.61	0.2441	660.53	3.88
9	2981.16	0.1979	910.13	4.99
10	3170.70	0.2165	967.99	4.46
11	3665.67	0.1946	1119.09	5.39
12	4780.08	0.1029	1459.29	16.69
13	5212.10	0.2277	1591.17	3.67
14	5774.74	0.1893	1762.93	5.07

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:18:24 PM

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

Detector Name: 7607
 Sample Title: Excavations
 Peak Analysis Performed on: 1/14/05 3:17:02 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	242-	251	246.02	75.18	9.61E+001	81.15%	6.57E+002
2	770-	787	781.21	238.56	1.58E+002	42.43%	3.13E+002
3	959-	973	966.10	295.00	6.68E+001	67.86%	1.62E+002
4	1145-	1164	1151.56	351.61	1.21E+002	43.67%	1.72E+002
5	1660-	1680	1671.84	510.44	7.49E+001	64.18%	1.43E+002
6	1902-	1916	1908.25	582.61	8.23E+001	38.63%	6.17E+001
7	1984-	2001	1993.19	608.54	1.10E+002	36.22%	9.10E+001
M 8	2159-	2169	2163.52	660.53	3.06E+001	51.47%	3.50E+001
9	2973-	2989	2981.16	910.13	8.09E+001	32.16%	3.01E+001
10	3165-	3180	3170.70	967.99	4.66E+001	54.73%	3.94E+001
11	3659-	3673	3665.67	1119.09	4.17E+001	55.23%	3.33E+001
12	4769-	4791	4780.08	1459.29	5.90E+002	8.72%	2.54E+001
13	5206-	5219	5212.10	1591.17	2.05E+001	52.64%	3.50E+000
14	5768-	5781	5774.74	1762.93	4.05E+001	34.27%	3.50E+000

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:18:24 PM Page 4

 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.988	511.00*	100.00	5.385E-001	65.60%
K-40	0.912	1460.81*	10.67	3.860E+001	11.90%
CS-137	0.951	661.65*	85.12	2.567E-001	52.80%
TL-208	0.728	277.35	6.80		
		510.84*	21.60	2.493E+000	66.10%
		583.14*	84.20	7.002E-001	40.76%
		763.13	1.64		
		860.37	12.46		
PB-212	0.544	74.81*	10.70	1.992E+001	83.98%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	2.766E+000	45.45%
		300.09	3.41		
BI-214	0.385	609.31*	44.80	1.758E+000	38.32%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	1.953E+000	55.93%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
		1764.49*	15.36	1.865E+000	35.24%
		1847.42	2.04		
		2118.55	1.14		
		2204.21	4.86		
		2447.86	1.50		
PB-214	0.639	53.23	1.11		
		74.82*	6.21	3.433E+001	83.80%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	2.622E+000	69.91%
		351.92*	37.20	2.390E+000	46.76%

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:18:24 PM Page 6

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide ID Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.988	3.8729E-001	92.58%
K-40	0.912	3.8603E+001	11.90%
CS-137	0.951	2.5667E-001	52.80%
TL-208	0.728	7.0022E-001	40.63%
PB-212	0.544	2.7656E+000	45.29%
BI-214	0.385	1.8345E+000	23.55%
PB-214	0.639	2.4532E+000	38.90%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:17:02 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
9	910.13	8.0914E-002	32.16
10	967.99 <i>Ac228</i>	4.6605E-002	54.73
13	1591.17 <i>20% double escape</i>	2.0500E-002	52.64

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:18:24 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)
CO-60	1173.22	100.00	3.70E-001	2.75E-001
	1332.49	100.00	2.75E-001	
+ CS-137	661.65*	85.12	2.54E-001	2.54E-001
EU-152	121.78	28.40	6.50E+000	1.27E+000
	244.69	7.49	1.42E+001	
	344.27	26.50	2.92E+000	
	443.98	2.81	2.13E+001	
	778.89	12.74	3.40E+000	
	867.32	4.16	1.02E+001	
	964.01	14.40	3.30E+000	
	1085.78	10.00	3.59E+000	
	1112.02	13.30	3.15E+000	
	1407.95	20.70	1.27E+000	
EU-154	123.07	40.50	4.49E+000	9.68E-001
	247.94	6.60	1.40E+001	
	591.81	4.83	9.64E+000	
	692.41	1.69	2.74E+001	
	723.30	19.70	2.36E+000	
	756.87	4.33	9.94E+000	
	873.19	11.50	3.47E+000	
	996.32	10.30	3.72E+000	
	1004.76	17.90	2.02E+000	
	1274.45	35.50	9.68E-001	
	1596.53	1.85	1.33E+001	

+ = 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

 ***** GAMMA SPECTRUM ANALYSIS *****

ISOCS Report Generator ISOCSAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:38:47 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\77
 Sample Title : Excavation
 Sample Identification : S080
 Sample Type : Exc
 Desc. 1 : FR0111-09-1-S080-GS-0000, 1" water
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 2:48:13 PM
 Acquisition Started : 11/4/04 2:48:13 PM

Live Time : 1000.0 seconds
 Real Time : 1000.7 seconds

Energy Calibration Used Done On : 4/29/04
 Efficiency / Geometry ID : OIL_AT_3M90D_H20
 Efficiency Calibration Used Done On : 1/14/05

2A
 1/17/05

Peak Locate Analysis Report

1/14/2005 3:38:47 PM Page 2

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

Detector Name: 7722

Sample Title: Excavation

Peak Locate Performed on: 1/14/2005 3:38:43 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	245.80	0.2688	75.09	6.15
2	781.17	0.2459	238.51	5.91
3	965.78	0.3295	294.86	3.06
4	1151.38	0.2327	351.51	6.32
5	1908.61	0.2529	582.66	4.05
6	1994.12	0.2095	608.76	6.09
7	2514.69	0.2856	767.66	4.21
8	2983.00	0.2434	910.61	4.65
9	3667.67	0.2488	1119.61	4.16
10	4783.81	0.1236	1460.31	14.45

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:38:47 PM

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

Detector Name: 7722
 Sample Title: Excavation
 Peak Analysis Performed on: 1/14/05 3:38:43 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	243-	251	245.80	75.09	1.73E+002	44.03%	6.25E+002
2	774-	787	781.17	238.51	1.38E+002	42.86%	2.77E+002
3	961-	973	965.78	294.86	8.53E+001	48.05%	1.33E+002
4	1143-	1157	1151.38	351.51	1.49E+002	29.02%	1.16E+002
5	1900-	1914	1908.61	582.66	9.66E+001	33.52%	6.14E+001
6	1987-	2001	1994.12	608.76	1.45E+002	23.30%	5.28E+001
7	2510-	2518	2514.69	767.66	1.51E+001	123.05%	3.49E+001
8	2976-	2992	2983.00	910.61	8.09E+001	37.11%	4.91E+001
9	3660-	3675	3667.67	1119.61	5.50E+001	43.88%	3.20E+001
10	4773-	4794	4783.81	1460.31	7.19E+002	7.61%	1.63E+001

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05 3:38:47 PM Page 4

 ***** 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: Excavation
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
K-40	0.990	1460.81*	10.67	4.674E+001	11.11%
TL-208	0.457	277.35	6.80		
		510.84	21.60		
		583.14*	84.20	8.288E-001	35.96%
		763.13	1.64		
PB-212	0.542	860.37	12.46		
		74.81*	10.70	3.549E+001	49.06%
		77.11	18.00		
		87.30	8.00		
PB-214	0.635	238.63*	44.60	2.432E+000	45.85%
		300.09	3.41		
		53.23	1.11		
		74.82*	6.21	6.115E+001	48.74%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	3.394E+000	50.92%
		351.92*	37.20	2.976E+000	33.49%

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:38:47 PM Page 5

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
K-40	0.990	4.6737E+001	11.11%
TL-208	0.457	8.2880E-001	35.96%
PB-212	0.542	2.4319E+000	45.69%
PB-214	0.635	3.0808E+000	28.03%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:38:43 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
6	608.76 <i>B1214</i>	1.4524E-001	23.30
7	767.66	1.5080E-002	123.05 - <i>high uncertainty</i>
8	910.61 <i>Ac228</i>	8.0892E-002	37.11
9	1119.61 <i>B1214</i>	5.4960E-002	43.88

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:38:47 PM

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

Detector Name: 7722
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavation
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)		
CO-60	1173.22	100.00	3.09E-001	2.57E-001		
	1332.49	100.00	2.57E-001			
CS-137	661.65	85.12	4.93E-001	4.93E-001		
EU-152	121.78	28.40	4.72E+000	9.67E-001		
	244.69	7.49	1.04E+001			
	344.27	26.50	2.00E+000			
	443.98	2.81	1.73E+001			
	778.89	12.74	2.74E+000			
	867.32	4.16	8.00E+000			
	964.01	14.40	2.81E+000			
	1085.78	10.00	3.22E+000			
	1112.02	13.30	2.37E+000			
	1407.95	20.70	9.67E-001			
	EU-154	123.07	40.50		3.25E+000	8.02E-001
		247.94	6.60		1.09E+001	
		591.81	4.83		8.15E+000	
692.41		1.69	2.22E+001			
723.30		19.70	1.95E+000			
756.87		4.33	8.34E+000			
873.19		11.50	2.92E+000			
996.32		10.30	3.11E+000			
1004.76	17.90	1.69E+000				
1274.45	35.50	8.02E-001				
1596.53	1.85	1.02E+001				

+ = 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

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

ISOCs Report Generator ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:54:47 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\77
 Sample Title : Excavation
 Sample Identification : S081
 Sample Type : Exc
 Desc. 1 : FR0111-09-1-S081-GS-0000, 2" water
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 2:26:02 PM
 Acquisition Started : 11/4/04 2:26:02 PM

Live Time : 1000.0 seconds
 Real Time : 1000.7 seconds

Energy Calibration Used Done On : 4/29/04
 Efficiency / Geometry ID : Soil 3m 90d
 Efficiency Calibration Used Done On : 1/29/04

DA
 1/17/05

Peak Locate Analysis Report

1/14/2005

3:54:47 PM

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

Detector Name: 7722

Sample Title: Excavation

Peak Locate Performed on: 1/14/2005 3:54:44 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	245.84	0.3307	75.10	4.25
2	781.46	0.2279	238.60	6.44
3	966.01	0.2874	294.93	3.21
4	1152.22	0.2244	351.77	7.03
5	1672.67	0.3326	510.63	3.18
6	1908.77	0.2420	582.70	4.90
7	1994.77	0.2176	608.96	6.00
8	2166.27	0.2702	661.30	4.08
9	2514.84	0.3012	767.71	3.34
10	2982.72	0.2287	910.52	3.84
11	3172.98	0.2390	968.60	4.18
12	3668.95	0.2624	1119.99	3.25
13	4784.41	0.1301	1460.49	11.90

? = 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: 7722
 Sample Title: Excavation
 Peak Analysis Performed on: 1/14/05 3:54:44 PM
 Peak Analysis From Channel: 50
 Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	242-	250	245.84	75.10	8.88E+001	88.35%	7.07E+002
2	774-	786	781.46	238.60	1.59E+002	35.30%	2.51E+002
3	961-	972	966.01	294.93	8.75E+001	48.02%	1.48E+002
4	1147-	1160	1152.22	351.77	1.63E+002	26.33%	1.14E+002
5	1663-	1676	1672.67	510.63	6.07E+001	59.96%	1.02E+002
6	1902-	1914	1908.77	582.70	7.99E+001	37.82%	6.01E+001
7	1988-	2001	1994.77	608.96	1.52E+002	22.85%	5.90E+001
8	2161-	2171	2166.27	661.30	5.22E+001	44.35%	3.68E+001
9	2509-	2520	2514.84	767.71	3.46E+001	60.70%	3.14E+001
10	2977-	2989	2982.72	910.52	8.05E+001	33.85%	4.25E+001
11	3165-	3181	3172.98	968.60	7.20E+001	36.75%	3.50E+001
12	3663-	3675	3668.95	1119.99	4.76E+001	47.58%	3.24E+001
13	4776-	4795	4784.41	1460.49	6.85E+002	7.75%	1.51E+001

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:54:47 PM Page 4

 ***** 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: Excavation
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.995	511.00*	100.00	2.002E-001	67.64%
K-40	0.996	1460.81*	10.67	2.650E+001	19.54%
CS-137	0.995	661.65*	85.12	2.107E-001	45.89%
TL-208	0.735	277.35	6.80		
		510.84*	21.60	9.269E-001	68.13%
		583.14*	84.20	3.188E-001	42.51%
		763.13	1.64		
		860.37	12.46		
PB-212	0.505	74.81*	10.70	4.833E+000	113.61%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	1.178E+000	123.32%
		300.09	3.41		
BI-214	0.304	609.31*	44.80	1.148E+000	27.95%
		665.45	1.29		
		768.36*	4.80	2.549E+000	61.83%
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	1.242E+000	48.67%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
		1764.49	15.36		
		1847.42	2.04		
		2118.55	1.14		
		2204.21	4.86		
		2447.86	1.50		
PB-214	0.608	53.23	1.11		
		74.82*	6.21	8.328E+000	113.48%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
		295.21*	19.20	1.473E+000	107.20%
		351.92*	37.20	1.407E+000	79.39%

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:54:47 PM Page 6

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.995	1.3135E-001	105.46%
K-40	0.996	2.6498E+001	19.54%
CS-137	0.995	2.1068E-001	45.89%
TL-208	0.735	3.1878E-001	42.39%
PB-212	0.505	1.1781E+000	123.26%
BI-214	0.304	1.2120E+000	23.01%
PB-214	0.608	1.4292E+000	63.81%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:54:44 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
10	910.52	8.0472E-002	33.85
11	968.60	7.1979E-002	36.75

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:54:47 PM

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

Detector Name: 7722
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavation
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)
CO-60	1173.22	100.00	1.89E-001	1.46E-001
	1332.49	100.00	1.46E-001	
+ CS-137	661.65*	85.12	1.35E-001	1.35E-001
EU-152	121.78	28.40	2.02E+000	6.56E-001
	244.69	7.49	4.52E+000	
	344.27	26.50	8.72E-001	
	443.98	2.81	7.45E+000	
	778.89	12.74	1.41E+000	
	867.32	4.16	4.24E+000	
	964.01	14.40	1.53E+000	
	1085.78	10.00	1.64E+000	
	1112.02	13.30	1.41E+000	
	1407.95	20.70	6.56E-001	
EU-154	123.07	40.50	1.41E+000	4.42E-001
	247.94	6.60	4.76E+000	
	591.81	4.83	4.04E+000	
	692.41	1.69	1.13E+001	
	723.30	19.70	1.02E+000	
	756.87	4.33	4.44E+000	
	873.19	11.50	1.54E+000	
	996.32	10.30	1.68E+000	
	1004.76	17.90	9.20E-001	
	1274.45	35.50	4.42E-001	
	1596.53	1.85	5.12E+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

***** GAMMA SPECTRUM ANALYSIS *****

ISOCs Report Generator : ISOCsAN.TPL 2/26/96
Report Generated On : 1/14/05 3:21:38 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
Sample Title : Excavations
Sample Identification : S083
Sample Type : EXC
Desc. 1 : FR0111-09-1-S083-GS-0000, 2" water
Desc. 2 :
Desc. 3 :
Desc. 4 :

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 50 - 8192
Peak Area Range (in channels) : 50 - 8192
Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 3:02:46 PM
Acquisition Started : 11/4/04 3:02:46 PM

Live Time : 1000.0 seconds
Real Time : 1000.7 seconds

Energy Calibration Used Done On : 6/30/04
Efficiency / Geometry ID : OIL_AT_3M90D_H2O
Efficiency Calibration Used Done On : 1/14/05

DA
1/17/05

Peak Locate Analysis Report

1/14/2005 3:21:38 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 3:21:34 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	245.71	0.2459	75.09	5.32
2	781.05	0.1697	238.51	9.10
3	966.08	0.2076	294.99	5.37
4	1151.61	0.1724	351.63	7.63
5	1672.72	0.2296	510.71	4.18
6	1907.92	0.1748	582.51	6.84
7	1993.13	0.1495	608.52	9.45
8	2980.98	0.1776	910.08	6.32
9	3169.60	0.2178	967.66	4.64
10	3493.02	0.2632	1066.39	3.08
11	3664.99	0.2180	1118.88	3.27
12	4780.21	0.0979	1459.33	18.37
13	5774.56	0.1877	1762.87	4.94

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:21:38 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Analysis Performed on: 1/14/05 3:21:34 PM

Peak Analysis From Channel: 50

Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	234-	250	245.71	75.09	3.04E+002	38.74%	1.04E+003
2	773-	787	781.05	238.51	1.70E+002	36.83%	2.96E+002
3	961-	973	966.08	294.99	8.62E+001	52.12%	1.65E+002
4	1146-	1162	1151.61	351.63	1.46E+002	33.77%	1.52E+002
5	1665-	1681	1672.72	510.71	6.14E+001	67.19%	1.22E+002
6	1899-	1916	1907.92	582.51	1.07E+002	38.51%	1.02E+002
7	1986-	2000	1993.13	608.52	1.77E+002	20.30%	5.57E+001
8	2972-	2989	2980.98	910.08	9.75E+001	30.43%	4.05E+001
9	3163-	3177	3169.60	967.66	3.15E+001	84.45%	5.25E+001
10	3488-	3499	3493.02	1066.39	1.97E+001	88.56%	2.33E+001
11	3657-	3673	3664.99	1118.88	4.80E+001	51.72%	3.60E+001
12	4769-	4791	4780.21	1459.33	7.40E+002	7.37%	8.72E+000
13	5766-	5782	5774.56	1762.87	4.87E+001	31.92%	4.34E+000

M = First peak in a multiplet region

m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:21:38 PM Page 4

 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty		
K-40	0.916	1460.81*	10.67	4.847E+001	10.95%		
		TL-208	0.725	277.35	6.80		
				510.84*	21.60	2.042E+000	69.03%
				583.14*	84.20	9.096E-001	40.65%
				763.13	1.64		
PB-212	0.545	860.37	12.46				
				74.81*	10.70	6.322E+001	44.37%
				77.11	18.00		
				87.30	8.00		
				238.63*	44.60	2.968E+000	40.27%
BI-214	0.381	300.09	3.41				
				609.31*	44.80	2.834E+000	23.85%
				665.45	1.29		
				768.36	4.80		
				806.17	1.12		
				934.06	3.03		
				1120.29*	14.80	2.252E+000	52.47%
				1155.19	1.64		
				1238.11	5.86		
				1280.96	1.44		
				1377.67	3.92		
				1401.50	1.55		
				1407.98	2.80		
				1509.23	2.12		
				1661.28	1.14		
		1729.59	2.88				
		1764.49*	15.36	2.241E+000	32.96%		
		1847.42	2.04				
		2118.55	1.14				
		2204.21	4.86				
		2447.86	1.50				
PB-214	0.639	53.23	1.11				
				74.82*	6.21	1.089E+002	44.02%
				77.11	10.50		
				87.30	4.67		
				241.98	7.49		
		295.21*	19.20	3.385E+000	54.77%		
		351.92*	37.20	2.879E+000	37.68%		

* = Energy line found in the spectrum.
 Energy tolerance used was 2.000
 Nuclide confidence index threshold = 0.30
 Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:21:38 PM Page 5

 ***** INTERFERENCE CORRECTED REPORT *****

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
X	ANN	0.997		
	K-40	0.916	4.8471E+001	10.95%
	TL-208	0.725	9.8249E-001	36.40%
	PB-212	0.545	2.9681E+000	40.09%
	BI-214	0.381	2.5165E+000	18.25%
	PB-214	0.639	3.0080E+000	31.13%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:21:34 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
8	910.08	9.7500E-002	30.43
9	967.66 <i>Ac228</i>	3.1500E-002	84.45
10	1066.39	1.9698E-002	88.56

} high uncertainty

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:21:38 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)
CO-60	1173.22	100.00	4.04E-001	2.83E-001
	1332.49	100.00	2.83E-001	
CS-137	661.65	85.12	6.38E-001	6.38E-001
EU-152	121.78	28.40	6.83E+000	1.37E+000
	244.69	7.49	1.51E+001	
	344.27	26.50	3.15E+000	
	443.98	2.81	2.23E+001	
	778.89	12.74	3.42E+000	
	867.32	4.16	9.57E+000	
	964.01	14.40	3.13E+000	
	1085.78	10.00	3.81E+000	
	1112.02	13.30	3.35E+000	
	1407.95	20.70	1.37E+000	
	EU-154	123.07	40.50	
247.94		6.60	1.52E+001	
591.81		4.83	1.09E+001	
692.41		1.69	2.84E+001	
723.30		19.70	2.42E+000	
756.87		4.33	1.09E+001	
873.19		11.50	3.44E+000	
996.32		10.30	3.69E+000	
1004.76		17.90	2.29E+000	
1274.45		35.50	1.08E+000	
1596.53	1.85	1.33E+001		

- + = 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

 ***** GAMMA SPECTRUM ANALYSIS *****

ISOCs Report Generator : ISOCsAN.TPL 2/26/96
 Report Generated On : 1/14/05 3:23:11 PM

Spectrum File Name : C:\GENIE2K\CAMFILES\Backyard\FR0111-SU9\76
 Sample Title : Excavations
 Sample Identification : S085
 Sample Type : EXC
 Desc. 1 : FR0111-09-1-S085-GS-0000, 1" water
 Desc. 2 :
 Desc. 3 :
 Desc. 4 :

Peak Locate Threshold : 3.00
 Peak Locate Range (in channels) : 50 - 8192
 Peak Area Range (in channels) : 50 - 8192
 Identification Energy Tolerance : 2.000 keV

Sample Size : 1.000E+000 gm

Note: For Point Source, report UNIT = none.

Sample Taken On : 11/4/04 3:21:59 PM
 Acquisition Started : 11/4/04 3:38:42 PM

Live Time : 1045.0 seconds
 Real Time : 1045.7 seconds

Energy Calibration Used Done On : 6/30/04
 Efficiency / Geometry ID : OIL_AT_3M90D_H2O
 Efficiency Calibration Used Done On : 1/14/05

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 17
 DA 1/17/05

Peak Locate Analysis Report

1/14/2005 3:23:11 PM Page 2

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

Detector Name: 7607

Sample Title: Excavations

Peak Locate Performed on: 1/14/2005 3:23:07 PM

Peak Locate From Channel: 50

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	245.75	0.2171	75.10	6.52
2	781.22	0.1648	238.56	9.60
3	966.02	0.2180	294.97	5.16
4	1107.10	0.2183	338.04	5.49
5	1151.48	0.1666	351.59	8.30
6	1671.25	0.2008	510.26	5.30
7	1907.95	0.1612	582.52	7.96
8	1993.46	0.1480	608.62	9.72
9	2981.16	0.1746	910.13	6.04
10	3170.65	0.2015	967.98	4.67
11	3665.55	0.1927	1119.06	4.98
12	4780.30	0.0968	1459.35	18.64
13	5775.13	0.1822	1763.05	5.16
14	7216.73	0.2306	2203.12	3.32

? = Adjacent peak noted

Errors quoted at 1.000 sigma

Peak Analysis Report

1/14/05 3:23:12 PM

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

Detector Name: 7607

Sample Title: Excavations

Peak Analysis Performed on: 1/14/05 3:23:07 PM

Peak Analysis From Channel: 50

Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	Net Peak Area	Net Area % Uncert.	Continuum Counts
1	241-	251	245.75	75.10	1.27E+002	70.19%	8.07E+002
2	775-	786	781.22	238.56	1.60E+002	34.56%	2.54E+002
3	955-	974	966.02	294.97	1.43E+002	42.13%	2.27E+002
4	1101-	1113	1107.10	338.04	5.62E+001	76.27%	1.60E+002
5	1139-	1158	1151.48	351.59	1.89E+002	29.20%	1.72E+002
6	1660-	1682	1671.25	510.26	1.52E+002	32.51%	1.24E+002
7	1901-	1915	1907.95	582.52	1.33E+002	27.24%	7.15E+001
8	1984-	2001	1993.46	608.62	1.81E+002	21.66%	6.72E+001
9	2971-	2990	2981.16	910.13	1.09E+002	28.92%	4.23E+001
10	3163-	3180	3170.65	967.98	7.73E+001	34.45%	3.27E+001
11	3656-	3673	3665.55	1119.06	5.42E+001	50.36%	4.28E+001
12	4770-	4791	4780.30	1459.35	7.61E+002	7.54%	2.53E+001
13	5767-	5782	5775.13	1763.05	5.20E+001	32.88%	7.97E+000
14	7210-	7223	7216.73	2203.12	1.85E+001	56.24%	3.50E+000

M = First peak in a multiplet region

m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Interference Corrected Activity Report

1/14/05 3:23:12 PM Page 4

 ***** 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: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
ANN	0.978	511.00*	100.00	1.045E+000	35.22%
K-40	0.919	1460.81*	10.67	4.766E+001	11.07%
TL-208	0.724	277.35	6.80		
		510.84*	21.60	4.839E+000	36.16%
		583.14*	84.20	1.079E+000	30.20%
		763.13	1.64		
		860.37	12.46		
PB-212	0.545	74.81*	10.70	2.521E+001	73.45%
		77.11	18.00		
		87.30	8.00		
		238.63*	44.60	2.672E+000	38.21%
		300.09	3.41		
BI-214	0.452	609.31*	44.80	-2.765E+000	25.01%
		665.45	1.29		
		768.36	4.80		
		806.17	1.12		
		934.06	3.03		
		1120.29*	14.80	2.432E+000	51.12%
		1155.19	1.64		
		1238.11	5.86		
		1280.96	1.44		
		1377.67	3.92		
		1401.50	1.55		
		1407.98	2.80		
		1509.23	2.12		
		1661.28	1.14		
		1729.59	2.88		
1764.49*	15.36	2.293E+000	33.89%		
1847.42	2.04				
2118.55	1.14				
2204.21*	4.86	2.583E+000	56.90%		
2447.86	1.50				
PB-214	0.639	53.23	1.11		
		74.82*	6.21	4.344E+001	73.23%
		77.11	10.50		
		87.30	4.67		
		241.98	7.49		
AC-228	0.314	295.21*	19.20	5.356E+000	45.37%
		351.92*	37.20	3.569E+000	33.65%
		89.95	2.10		
		93.35	3.50		
		105.00	1.60		

Interference Corrected Activity Report

1/14/05

3:23:12 PM

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Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gm)	Activity Uncertainty
AC-228	0.314	129.08	2.80		
		209.28	4.40		
		270.23	3.60		
		327.64	3.20		
		338.32*	11.40	3.487E+000	87.33%
		409.51	2.13		
		463.00	4.40		
		794.70	4.60		
		835.50	1.75		
		911.07*	27.70	2.607E+000	31.92%
		964.60	5.20		
		969.11*	16.60	3.092E+000	41.82%
		1588.00	3.50		

* = Energy line found in the spectrum.
Energy tolerance used was 2.000
Nuclide confidence index threshold = 0.30
Errors quoted at 1.960 sigma

Interference Corrected Activity Report 1/14/05 3:23:12 PM Page 6

 ***** INTERFERENCE CORRECTED REPORT *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gm)	Wt mean Activity Uncertainty
ANN	0.978	8.1206E-001	46.15%
K-40	0.919	4.7664E+001	11.07%
TL-208	0.724	1.0794E+000	30.02%
PB-212	0.545	2.6724E+000	38.02%
BI-214	0.452	2.5424E+000	17.85%
PB-214	0.639	3.9194E+000	27.47%
AC-228	0.314	2.7861E+000	24.48%

? = nuclide is part of an undetermined solution
 X = nuclide rejected by the interference analysis

Errors quoted at 1.960 sigma

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 1/14/05 3:23:07 PM
 Peak Locate From Channel: 50
 Peak Locate To Channel: 8192

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

M = First peak in a multiplet region
 m = Other peak in a multiplet region

Errors quoted at 1.960 sigma

Nuclide MDA Report

1/14/05 3:23:12 PM

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

Detector Name: 7607
 Sample Geometry: Soil 3m 90d
 Sample Title: Excavations
 Nuclide Library Used: C:\GENIE2K\CAMFILES\Backyard.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gm)	Nuclide MDA (pCi/gm)
CO-60	1173.22	100.00	3.86E-001	2.98E-001
	1332.49	100.00	2.98E-001	
CS-137	661.65	85.12	5.92E-001	5.92E-001
EU-152	121.78	28.40	6.79E+000	1.33E+000
	244.69	7.49	1.50E+001	
	344.27	26.50	3.15E+000	
	443.98	2.81	2.08E+001	
	778.89	12.74	3.37E+000	
	867.32	4.16	9.98E+000	
	964.01	14.40	3.36E+000	
	1085.78	10.00	3.95E+000	
	1112.02	13.30	3.39E+000	
	1407.95	20.70	1.33E+000	
	EU-154	123.07	40.50	
247.94		6.60	1.51E+001	
591.81		4.83	1.03E+001	
692.41		1.69	2.90E+001	
723.30		19.70	2.53E+000	
756.87		4.33	1.02E+001	
873.19		11.50	3.43E+000	
996.32		10.30	3.62E+000	
1004.76		17.90	2.14E+000	
1274.45	35.50	9.39E-001		
1596.53	1.85	1.17E+001		

+ = 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