ONONDAGA LAKE PRE-DESIGN INVESTIGATION: SMU 8 HIGH-RESOLUTION CORES
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APPENDIX F

DATA SUMMARY FOR SMU 8 2008 HIGH-RESOLUTION CORES

F.1.0 INTRODUCTION

This appendix describes results from sampling conducted in Sediment Management Unit (SMU) 8 of Onondaga Lake during November 2008 consistent with the monitoring and contingency approach approved by the State of New York Department of Environmental Conservation (NYSDEC) for monitoring natural recovery in SMU 8 (Parsons, 2008a). Sampling and processing of these cores is described in Section 2.5 of this Phase IV PDI Data Summary Report. The reason these cores are known as high-resolution cores is that each core was sliced into vertical segments as small as two centimeters (0.8 inch).

The purpose of the sediment analyses described in this appendix was to better quantify accumulation rates to date in SMU 8 as part of the ongoing evaluation of monitored natural recovery (MNR). MNR in SMU 8 is one of the elements of the remedy for Onondaga Lake specified in the Record of Decision (ROD) for the Onondaga Lake Bottom Subsite (NYSDEC and USEPA, 2005). Results described herein will be applied as part of the initial design for SMU 8 to help determine if any additional remedial measures will be needed in SMU 8 in the future, such as additional thin-layer capping. Other Honeywell efforts to be used to help assess MNR include previous and future monitoring and modeling efforts and microbead marker placement and monitoring work described in a separate work plan (Parsons, 2008b).

The remedy for Onondaga Lake, as specified in the ROD, includes MNR in SMU 8 to achieve the mercury probable effect concentration of 2.2 milligrams per kilogram (mg/kg or parts per million) in the lake's profundal zone (where water depths exceed 9 meters or 30 ft) and to achieve the bioaccumulation-based sediment quality value for mercury of 0.8 mg/kg on an area-wide basis, within ten years following the remediation of upland sources, dredging and/or isolation capping of littoral sediment (in SMUs 1 through 7), and initial thin layer capping in the profundal zone.

SMU 8 sediment was sampled during November 2008 at seven locations and analyzed for two radioisotopes (lead-210 and cesium-137), mercury, bulk density, and water content in accordance with the work plan approved in advance by NYSDEC for this effort (Parsons, 2008f). One of the seven locations (ST-51A) was immediately adjacent to ST-51. Results from the radioisotope and mercury analyses will be used to update previous quantifications of sedimentation (i.e., sediment accumulation) rates in SMU 8. Results from mercury and bulk density analyses will also be used to further describe ongoing natural recovery. Results from this sampling and analysis will, in combination with other relevant data, provide the basis for refining the MNR assessment and predictions described in the Feasibility Study Report for Onondaga Lake (Parsons, 2004).

Sediment accumulation was evaluated by measuring concentrations of lead-210, cesium-137, and mercury. Lead-210 is a naturally-occurring radioactive element that has a half life of 22.3 years. Cesium-137 is a thermonuclear by-product with a half life of 30.3 years. Cesium deposition began in approximately the year 1952, increased significantly in 1954-1955 (see Figure 1), and peaked during the years 1963-1964 (USGS, 2008). Mercury loadings to the lake from Honeywell predecessor company operations increased during the 1940's and early 1950's and later declined significantly in the year 1970 based on substantial reductions in discharges of mercury to the lake that Honeywell's predecessor company instituted at that time. Measuring levels of these two radioisotopes and variability of sediment mercury concentrations with depth provided multiple lines of evidence for quantifying parameters needed as input to the MNR Model (use of which is discussed in Parsons, 2004 and in Parsons, 2008a).

In addition to demonstrating long-term sediment stability, radioisotope core data provide a method to quantify sediment accumulation rates for quiescent waters. Accumulation rates measured by cores shown in Appendix N of the Feasibility Study Report for Onondaga Lake (Parsons, 2004) vary in a range of approximately 0.3 cm/yr to 0.6 cm/yr (average 0.4 cm/yr) after 1986 when Honeywell's predecessor ceased manufacturing of soda ash. Rates after 1986 are all based on data from Hairston et. al, (1999).

Data from high-resolution cores rely on known chemical markers to establish the time span (and thereby accumulation rate) represented by the core or portions of the core. A limitation in the Onondaga Lake system is that for cesium-137 and mercury, the last known marker is from at least 20 years ago. Most of the discrete cesium-137 and mercury markers for Onondaga Lake include events that occurred until the mid-to-late 1980's; thus, they have little use in establishing the time span in more recent (upper) sections of such cores. Lead-210 data can be used to associate historical dates with specific sediment depths within a core. However, sedimentation rates quantified from small vertical intervals within a core reflect an overall sedimentation rate throughout the entire lead-210 profile that may differ substantially from more recent, short-term sedimentation rates over the last few years.

Locations selected for collecting high-resolution cores represent the North Basin (80068), the Ninemile Creek Outlet Area (80073), the saddle between the two deep basins (80103), the north end of the South Basin (80076), the middle of the South Basin (ST51 and ST51a), and the south corner of the lake (80089). These locations provide coverage throughout the profundal zone of the lake. The ST51a core was collected as a field duplicate of the ST51 core.

Analyses of cesium-137 and lead-210 were conducted based on the SOPs presented in Appendix B of the approved work plan. Analyses for mercury, bulk density, and water content were conducted using standard procedures respectively that have been used previously and continue to be used successfully as part of the Onondaga Lake pre-design investigation work efforts and as part of the Onondaga Lake baseline monitoring effort. Test America's Pittsburgh, Pennsylvania laboratory conducted the analyses for mercury and water content. Flett Research from Winnipeg, Manitoba, Canada conducted the analyses for radioisotopes, water content, and bulk density. Analyses for bulk density were conducted by weighing, drying, and then re-weighing a typical sediment volume of five milliliters.

Flett Research also assessed the lead-210 data using a slope regression model. The model is an iterative best-fit digital model designed to process data for cases where background activity is not known. The purpose of the modeling was to estimate the age at the bottom of each core section. Sediment accumulation rates were estimated in units of dry grams per square centimeter per year. Lead-210 is most often the primary method used to calculate sediment age and accumulation rates. Cesium-137 measurements serve to check lead-210 estimates, and in some cases, are used to help choose one of several possible lead-210 interpretations. The dry bulk density profiles can also be important in interpreting the core's history, and like cesium-137, may help in deciding which of several possible lead-210 interpretations is most likely. SMU 8 sediment is expected to be relatively homogeneous, so Flett Research measured bulk density by homogenizing each wet sample well, weighing a precise volume of the wet sediment, drying, and then reweighing the sample.

F.2.0 DATA ASSESSMENT

Mercury results for samples from these high-resolution cores are presented as Attachment A to this appendix. Radioisotope results from these cores are presented as Attachment B to this appendix.

Results from SMU 8 sediment mercury concentration measured in samples collected during 2007 and 2008 were compared to similar results from 1992 and 2005 (Table F.1). The 2008 data were obtained from cores, while the other data were obtained from various types of surface sediment sampling devices (e.g., sample tubes collected within box cores). As shown in Table F.1, overall mercury surface sediment concentrations have decreased since 1992 at all locations sampled during 2008. Overall, this pattern suggests significant natural recovery has taken place since 1992.

The following is a summary of radioisotope results for each core location:

a. 80068 (North Basin) – For the lead profile, a decrease to background is observable. The Cs-137 peak is clear and additional samples nearby would likely only change the estimated deposition rate by a few years. Also, it is likely that the cesium-137 peak (or very close to it) was captured.

b. 80073 (Ninemile Creek Outlet Area) – The low mercury result at a depth of 68 to 70 centimeters below the top of sediment seems questionable given the high levels found on either side (unless it is an extreme example of the split peak found in other profiles). However, if this one data point is ignored, the profile has very low adjacent variability. Other characteristics are distinguishable. Both the lead-210 and cesium-137 profiles indicate the area that has been re-worked over time rather than constant deposition. However, given a rough expected lead profile is apparent along with a smeared out cesium-137 peak, reworking appears to have been on a small temporal and depth scale and does not impact the sediments to great depths. In general, this is still a fairly constantly accreting environment and is conducive to natural recovery. The accumulation rates are higher than from other SMU 8 locations which are expected given proximity to the Ninemile Creek outlet.

c. 80103 (Saddle) – Both profiles look good.

d. 80076 (South Basin) – Although concentrations are rising at the bottom of the core, and background levels have likely not been achieved, the radioisotope results have been assessed to provide estimates of background levels.

e. ST-51 (South Basin) – Same result as ST-51a. Good duplication with ST-51a is apparent except that one core is shifted a few centimeters relative to the other at depths greater than about 33 cm. Correction of this shift would not occur by sampling additional intervals, because the results already present would not be nullified. The cesium-137 peak is less clear for this core, but the lead-210 profile is clear.

f. ST-51a (South Basin) – The cesium-137 peak appears to be smeared over several intervals and is less clear for this core.

g. 80089 (South Corner) – Flett Research has assumed that lead-210 can be calibrated to the cesium-137 peak which seems reasonable and is often done for work at other sites.

Flett Research developed sedimentation rates for the upper portion of the 2008 high-resolution cores based on lead-210 profiles (Table F.2).

Lead-210: *Quality Assurance*

Every sample was spiked with a standard traceable Po-209 standard. A duplicate was run for every tenth sample provided sufficient material is available. Dry bulk density duplicates were performed at a frequency of one in 20 samples. A blank was run every 20th sample. Detector blanks were run every 90 days. All data were reviewed by the chief scientist at Flett Research before release. Sample duplicates were repeated if different by more than three times the mean standard deviation of the duplicates. Laboratory Control Samples (LCS) are not normally run for accuracy determination, because only the relatively loosely bound Po-210 (of atmospheric origin) is being targeted for measurement. It is expected that Po-210 of geologic origin would be less completely recovered using the specified methods.

Cesium-137: *Quality Assurance*

Efficiency calibration for cesium-137 was performed using a NBS (NIST) Gamma-Ray Emission-Rate Spiked Clay standard. Characterized material from the proficiency sample program for cesium-137 in soil and plant materials were used as a LCS. The LCS was prepared in the same geometry as the field samples to check the accuracy of the method. The frequency was one per twenty samples. The LCS was not outside of the control limits (for accuracy and precision as specified in the QAPP).

Quality assurance data for the radioisotope analyses are located on the core spreadsheets attached to this appendix, together with the sample data.

There exists no standard core against which any lead-210 model can be verified. Flett Research has observed that the CRS and linear regression models yield essentially identical results for nearly perfect (constant sedimentation) cores, the only situation where comparison is

possible. In nearly perfect cores, the 1963 peak input of cesium-137 is usually correctly dated by the lead-210 techniques.

Flett Research assessed the cesium-137 and lead-210 data in accordance with SOPs presented in Appendix B of the Phase IV Addendum 8 Pre-Design Investigation Work Plan (Parsons, 2008d) which include checking for consistency with prior results and assessing patterns of results based on sample depth and location. The Flett Research spreadsheets have been checked by Flett Research for applications to many projects. The data spreadsheets, CRS modeling input, and model output provided by Flett Research have been reviewed as well.

Mercury data from the high-resolution cores has been validated as reported in Attachment A. These results include supplemental mercury analyses on select archive samples as requested by NYSDEC in January 2010. Detailed radioisotope results are provided in Attachment B. These results include supplemental lead-210 and bulk density analyses conducted on select archive samples in March 2009.

F.3.0 REFERENCES FOR APPENDIX F

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Parsons, 2008c. *Onondaga Lake Pre-Design Investigation: Phase III Addendum 6 Data Summary Report.* Prepared for Honeywell. Prepared in association with Exponent and Anchor Environmental. June 2008.

Parsons, 2008d. *Onondaga Lake Pre-Design Investigation: Phase IV Work Plan Addendum 8 SMU 8 High-Resolution Cores*. Prepared for Honeywell. Prepared in association with Anchor Environmental and Exponent. November 2008.

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Olsen CR, Simpson HJ, Bopp RF, Williams SC, Peng TH, Deck BL, 1978. *Geochemical Analysis of the Sediments and Sedimentation of the Hudson River Estuary*. J Sed Petrol 48:401-418.

Orson RA, Simpson RL, Good EE. 1990. *Rates of Sediment Accumulation in a Tidal- The Freshwater Marsh*. J. Sediment Petrology. J Sed Petrol 19:849-869.

TABLES

Table F.1

Onondaga Lake Comparison of MNR Sediment Data for SMU-8

Mercury Concentration (mg/kg dry weight)

LOCATION		Actual* 1992 Top 2 cm	Actual 2005 Top 2 cm	Actual 2007 Top 2 cm	Actual 2007 Top 4 cm	Actual 2008 Top 2 cm	Actual 2008 Top 4 cm	Actual Change 1992-2005 (Top 2 cm)	Actual Change 1992-2007 (Top 2 cm)	Actual Change 1992-2007 (2cm to 4cm)	Actual Change 1992-2008 (Top 2 cm)	Actual Change 1992-2008 (2cm to 4cm)
North Basin												
S103	OL-SS-80001	2.30	0.79	1.10	1.40	0.70	0.85	-1.51	-1.20	-0.90	-1.60	-1.45
S97	OL-SS-80002	3.60	0.64	NC	NC	NC	NC	-2.96	NA	NA	NA	NA
S80	OL-SS-80003	2.10	0.86	1.10	1.30	NC	NC	-1.24	-1.00	-0.80	NA	NA
S85	OL-SS-80004	1.90	1.30	1.70	1.80	1.00	1.25	-0.60	-0.20	-0.10	-0.90	-0.65
S78	OL-SS-80005	2.70	1.20	1.60	1.70	NC	NC	-1.50	-1.10	-1.00	NA	NA
S69	OL-SS-80006	3.00	1.10	1.60	1.75	1.50	1.35	-1.90	-1.40	-1.25	-1.50	-1.65
Basin Average		**2.60**	**0.98**	**1.42**	**1.59**	**1.07**	**1.15**	**-1.62**	**-1.18**	**-1.01**	**-1.45**	**-1.11**
South Basin												
S64	OL-SS-80007	2.50	1.00	1.40	1.45	1.40	1.45	-1.50	-1.10	-1.05	-1.10	-1.05
S58	OL-SS-80008	2.70	1.10	1.60	1.65	NC	NC	-1.60	-1.10	-1.05	NA	NA
S57	OL-SS-80009	3.60	1.10	1.80	1.80	NC	NC	-2.50	-1.80	-1.80	NA	NA
S49	OL-SS-80010	3.00	0.58	1.60	1.70	NC	NC	-2.42	-1.40	-1.30	NA	NA
S43	OL-SS-80011	2.40	1.00	1.70	1.95	NC	NC	-1.40	-0.70	-0.45	NA	NA
S33	OL-SS-80012	2.50	1.80	1.90	1.90	NC	NC	-0.70	-0.60	-0.60	NA	NA
None	OL-SS-80013	NC	1.90	NC	NC	NC	NC	NA	NA	NA	NA	NA
S41	OL-SS-80014	2.60	1.40	2.30	2.30	NC	NC	-1.20	-0.30	-0.30	NA	NA
S31	OL-SS-80015	2.90	1.60	1.60	2.06	2.20	2.05	-1.30	-1.30	-0.84	-0.70	-0.85
S27	OL-SS-80016	3.10	1.50	NC	NC	NC	NC	-1.60	NA	NA	NA	NA
S25	OL-SS-80017	3.10	2.40	1.80	2.25	NC	NC	-0.70	-1.30	-0.85	NA	NA
S30	OL-SS-80018	3.20	1.50	NA	NA	NC	NC	-1.70	NA	NA	NA	NA
S354*	OL-SS-80019	3.30	1.60	2.30	2.50	NC	NC	-1.70	-1.00	-0.80	NA	NA
S24	OL-SS-80020	5.00	2.80	NC	NC	NC	NC	-2.20	NA	NA	NA	NA
Basin Average		**3.07**	**1.52**	**1.80**	**1.96**	**1.80**	**1.75**	**-1.55**	**-1.27**	**-1.11**	**-1.27**	**-1.32**
Average for 30 to 60 ft Water Depth		**3.03**	**1.73**	**1.89**	**2.07**	**1.60**	**1.65**	**-1.30**	**-1.14**	**-0.96**	**-1.43**	**-1.38**
Average for Over 60 ft Water Depth		**2.70**	**0.97**	**1.51**	**1.64**	**1.13**	**1.21**	**-1.73**	**-1.19**	**-1.06**	**-1.57**	**-1.49**
Overall Average		**2.92**	**1.36**	**1.67**	**1.83**	**1.36**	**1.39**	**-1.56**	**-1.25**	**-1.09**	**-1.56**	**-1.53**

*S354 sampled in 2000

2005 sample results compared to closest geographic sample location from 1992 or 2000

Samples located between 30 and 60 ft water depth.

Samples located deeper than 60 ft water depth.

NC - Sample not collected.

NA - Sample not available so change can not be quantified

TABLE F.2

SEDIMENTATION RATES BASED ON UPPER PORTIONS OF PHASE IV (2008) PRE-DESIGN INVESTIGATION HIGH-RESOLUTION CORES

Core ID (OL-STA-XXXXX)	Sediment Depth Within Core (centimeters)	Sedimentation Rate (rounded) (grams per square centimeter per year)	Estimated Sediment Age at Bottom of Depth Interval (years)
80068-North Basin	0 to 10	0.13 to 0.16	21
80073-Ninemile Creek Outlet Area	0 to 10	0.34 to 0.50	7.0
80103-Saddle	0 to 18	0.23 to 0.31	22
80076-South Basin	0 to 14	0.19 to 0.27	19
ST-51-South Basin	0 to 18	0.20 to 0.27	23
ST51A-South Basin (field duplicate of ST51)	0 to 18	0.21 to 0.30	24
80089-South Corner	0 to 10	0.24 to 0.31	13

From results provided by Flett Research during 2009.

ATTACHMENT A

VALIDATED MERCURY DATA

Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
OL-STA-80068	0-2 cm	OL-0696-17	11/25/2008	SOIL	REG	SED	0.7	J	12.1	
OL-STA-80068	2-4 cm	OL-0696-18	11/25/2008	SOIL	REG	SED	1	J	19.3	
OL-STA-80068	4-6 cm	OL-0696-19	11/25/2008	SOIL	REG	SED	1.2	J	25.1	
OL-STA-80068	6-8 cm	OL-0696-20	11/25/2008	SOIL	REG	SED	1.3	J	30	
OL-STA-80068	8-10 cm	OL-0698-01	11/25/2008	SOIL	REG	SED	1.5	J	29.7	
OL-STA-80068	10-12 cm	OL-1066-01	11/25/2008	SOIL	REG	SED	3.4	J	31.9	
OL-STA-80068	12-14 cm	OL-0698-02	11/25/2008	SOIL	REG	SED	1.1	J	40.1	
OL-STA-80068	14-16 cm	OL-1066-02	11/25/2008	SOIL	REG	SED	1.3	J	36.8	
OL-STA-80068	16-18 cm	OL-0698-03	11/25/2008	SOIL	REG	SED	1.8	J	33.3	
OL-STA-80068	18-20 cm	OL-1066-03	11/25/2008	SOIL	REG	SED	2.7	J	31.6	
OL-STA-80068	20-22 cm	OL-0698-04	11/25/2008	SOIL	REG	SED	4.1	J	31.9	
OL-STA-80068	24-26 cm	OL-0698-05	11/25/2008	SOIL	REG	SED	72.3	J	23.7	
OL-STA-80068	28-30 cm	OL-0698-06	11/25/2008	SOIL	REG	SED	40.4	J	25.6	
OL-STA-80068	32-34 cm	OL-0698-07	11/25/2008	SOIL	REG	SED	64.4	J	28.8	
OL-STA-80068	36-38 cm	OL-0698-08	11/25/2008	SOIL	REG	SED	1.7	J	32.8	
OL-STA-80068	40-42 cm	OL-0698-09	11/25/2008	SOIL	REG	SED	1.6	J	35.6	
OL-STA-80068	44-46 cm	OL-0698-10	11/25/2008	SOIL	REG	SED	1.8	J	33.5	
OL-STA-80068	48-50 cm	OL-0698-11	11/25/2008	SOIL	REG	SED	1.5	J	34.7	
OL-STA-80068	52-54 cm	OL-0698-12	11/25/2008	SOIL	REG	SED	1	J	35.5	
OL-STA-80068	56-58 cm	OL-0698-13	11/25/2008	SOIL	REG	SED	1.2	J	35.6	
OL-STA-80068	60-62 cm	OL-0698-14	11/25/2008	SOIL	REG	SED	0.28	J	40.8	
OL-STA-80068	64-66 cm	OL-0698-15	11/25/2008	SOIL	REG	SED	0.098	J	38.6	
OL-STA-80068	68-70 cm	OL-0698-16	11/25/2008	SOIL	REG	SED	0.08	J	35.5	

Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
OL-STA-80073	0-2 cm	OL-0700-01	11/26/2008	SOIL	REG	SED	1	J	19.2	
OL-STA-80073	2-4 cm	OL-0700-02	11/26/2008	SOIL	REG	SED	1.5	J	17.2	
OL-STA-80073	4-6 cm	OL-0700-03	11/26/2008	SOIL	REG	SED	1.2	J	21.5	
OL-STA-80073	6-8 cm	OL-0700-04	11/26/2008	SOIL	REG	SED	2.2	J	24.1	
OL-STA-80073	8-10 cm	OL-0700-05	11/26/2008	SOIL	REG	SED	2.4	J	28.5	
OL-STA-80073	12-14 cm	OL-0700-06	11/26/2008	SOIL	REG	SED	2.4	J	29.1	
OL-STA-80073	16-18 cm	OL-0700-07	11/26/2008	SOIL	REG	SED	2.4	J	32.4	
OL-STA-80073	20-22 cm	OL-0700-08	11/26/2008	SOIL	REG	SED	2	J	33.5	
OL-STA-80073	24-26 cm	OL-0700-09	11/26/2008	SOIL	REG	SED	3	J	37.8	
OL-STA-80073	28-30 cm	OL-0700-10	11/26/2008	SOIL	REG	SED	1.1	J	44.8	
OL-STA-80073	32-34 cm	OL-0700-11	11/26/2008	SOIL	REG	SED	2.7	J	43.8	
OL-STA-80073	36-38 cm	OL-0700-12	11/26/2008	SOIL	REG	SED	0.93	J	43.8	
OL-STA-80073	40-42 cm	OL-0700-13	11/26/2008	SOIL	REG	SED	1.1	J	50.2	
OL-STA-80073	44-46 cm	OL-0700-14	11/26/2008	SOIL	REG	SED	2.5	J	42	
OL-STA-80073	48-50 cm	OL-0700-15	11/26/2008	SOIL	REG	SED	4.2	J	39	
OL-STA-80073	52-54 cm	OL-0700-16	11/26/2008	SOIL	REG	SED	5.8	J	45.3	
OL-STA-80073	56-58 cm	OL-0700-17	11/26/2008	SOIL	REG	SED	8	J	37.6	
OL-STA-80073	60-62 cm	OL-0700-18	11/26/2008	SOIL	REG	SED	84.1	J	37.4	
OL-STA-80073	64-66 cm	OL-0700-19	11/26/2008	SOIL	REG	SED	82.5	J	36.8	
OL-STA-80073	68-70 cm	OL-0700-20	11/26/2008	SOIL	REG	SED	0.042	J	38.7	
OL-STA-80073	72-74 cm	OL-0702-01	11/26/2008	SOIL	REG	SED	74.3	J	39.5	
OL-STA-80073	76-78 cm	OL-0702-02	11/26/2008	SOIL	REG	SED	49	J	39.8	
OL-STA-80073	80-82 cm	OL-0702-03	11/26/2008	SOIL	REG	SED	32	J	40.3	
OL-STA-80073	84-86 cm	OL-0702-04	11/26/2008	SOIL	REG	SED	10.5	J	36	
OL-STA-80073	88-90 cm	OL-0702-05	11/26/2008	SOIL	REG	SED	25.1	J	41.8	
OL-STA-80073	92-94 cm	OL-0702-06	11/26/2008	SOIL	REG	SED	15.3	J	43.1	
OL-STA-80073	96-98 cm	OL-0702-07	11/26/2008	SOIL	REG	SED	14.1	J	46.3	

Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
OL-STA-80076	0-2 cm	OL-0708-08	11/26/2008	SOIL	REG	SED	1.4	J	14.9	
OL-STA-80076	2-4 cm	OL-0708-09	11/26/2008	SOIL	REG	SED	1.5	J	18.1	
OL-STA-80076	4-6 cm	OL-0708-10	11/26/2008	SOIL	REG	SED	2.1	J	19	
OL-STA-80076	6-8 cm	OL-0708-11	11/26/2008	SOIL	REG	SED	2.3	J	24.4	
OL-STA-80076	8-10 cm	OL-0708-12	11/26/2008	SOIL	REG	SED	2.3	J	24.6	
OL-STA-80076	10-12 cm	OL-1066-04	11/26/2008	SOIL	REG	SED	1.7	J	28.5	
OL-STA-80076	12-14 cm	OL-0708-13	11/26/2008	SOIL	REG	SED	1.8	J	32.1	
OL-STA-80076	14-16 cm	OL-1066-05	11/26/2008	SOIL	REG	SED	4.9	J	30.8	
OL-STA-80076	16-18 cm	OL-0708-14	11/26/2008	SOIL	REG	SED	2.8	J	34.8	
OL-STA-80076	18-20 cm	OL-1066-06	11/26/2008	SOIL	REG	SED	1.2	J	37.8	
OL-STA-80076	20-22 cm	OL-0708-15	11/26/2008	SOIL	REG	SED	1.4	J	35	
OL-STA-80076	24-26 cm	OL-0708-16	11/26/2008	SOIL	REG	SED	2.2	J	32.2	
OL-STA-80076	28-30 cm	OL-0708-17	11/26/2008	SOIL	REG	SED	3.8	J	28.9	
OL-STA-80076	32-34 cm	OL-0708-18	11/26/2008	SOIL	REG	SED	73.5	J	24.2	
OL-STA-80076	36-38 cm	OL-0708-19	11/26/2008	SOIL	REG	SED	102	J	25	
OL-STA-80076	40-42 cm	OL-0708-20	11/26/2008	SOIL	REG	SED	38.5	J	26.8	
OL-STA-80076	44-46 cm	OL-0710-01	11/26/2008	SOIL	REG	SED	67.4	J	27.5	
OL-STA-80076	48-50 cm	OL-0710-02	11/26/2008	SOIL	REG	SED	9.4	J	30.4	
OL-STA-80076	52-54 cm	OL-0710-03	11/26/2008	SOIL	REG	SED	1.4	J	37	
OL-STA-80076	56-58 cm	OL-0710-04	11/26/2008	SOIL	REG	SED	1.3	J	33.5	
OL-STA-80076	60-62 cm	OL-0710-05	11/26/2008	SOIL	REG	SED	1.8	J	32.8	
OL-STA-80076	64-66 cm	OL-0710-06	11/26/2008	SOIL	REG	SED	2.3	J	32.2	
OL-STA-80076	68-70 cm	OL-0710-07	11/26/2008	SOIL	REG	SED	3.2	J	34.4	

Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
OL-STA-80089	0-2 cm	OL-0696-01	11/25/2008	SOIL	REG	SED	2.2	J	16.4	
OL-STA-80089	2-4 cm	OL-0696-02	11/25/2008	SOIL	REG	SED	1.9	J	22.3	
OL-STA-80089	4-6 cm	OL-0696-03	11/25/2008	SOIL	REG	SED	3	J	27.8	
OL-STA-80089	6-8 cm	OL-0696-04	11/25/2008	SOIL	REG	SED	2.2	J	29.8	
OL-STA-80089	8-10 cm	OL-0696-05	11/25/2008	SOIL	REG	SED	2.9	J	29.5	
OL-STA-80089	10-12 cm	OL-1066-07	11/25/2008	SOIL	REG	SED	2.4	J	43.8	
OL-STA-80089	12-14 cm	OL-0696-06	11/25/2008	SOIL	REG	SED	2.8	J	31.4	
OL-STA-80089	14-16 cm	OL-1066-08	11/25/2008	SOIL	REG	SED	5.5	J	32	
OL-STA-80089	16-18 cm	OL-0696-07	11/25/2008	SOIL	REG	SED	2.6	J	35.2	
OL-STA-80089	18-20 cm	OL-1066-09	11/25/2008	SOIL	REG	SED	1.8	J	39.6	
OL-STA-80089	20-22 cm	OL-0696-08	11/25/2008	SOIL	REG	SED	1.8	J	39.8	
OL-STA-80089	24-26 cm	OL-0696-09	11/25/2008	SOIL	REG	SED	2	J	37.4	
OL-STA-80089	28-30 cm	OL-0696-10	11/25/2008	SOIL	REG	SED	2.5	J	28.2	
OL-STA-80089	32-34 cm	OL-0696-11	11/25/2008	SOIL	REG	SED	4.9	J	29.8	
OL-STA-80089	36-38 cm	OL-0696-12	11/25/2008	SOIL	REG	SED	46.1	J	23.9	
OL-STA-80089	40-42 cm	OL-0696-13	11/25/2008	SOIL	REG	SED	57.7	J	25.5	
OL-STA-80089	44-46 cm	OL-0696-14	11/25/2008	SOIL	REG	SED	17	J	24.8	
OL-STA-80089	48-50 cm	OL-0696-15	11/25/2008	SOIL	REG	SED	42.2	J	26	
OL-STA-80089	52-54 cm	OL-0696-16	11/25/2008	SOIL	REG	SED	57.1	J	28.7	

Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
OL-STA-80103	0-2 cm	OL-0706-08	11/26/2008	SOIL	REG	SED	1.5	J	23.8	
OL-STA-80103	2-4 cm	OL-0706-09	11/26/2008	SOIL	REG	SED	1.2	J	25.3	
OL-STA-80103	4-6 cm	OL-0706-10	11/26/2008	SOIL	REG	SED	1.6	J	17.3	
OL-STA-80103	6-8 cm	OL-0706-11	11/26/2008	SOIL	REG	SED	2.4	J	26	
OL-STA-80103	8-10 cm	OL-0706-12	11/26/2008	SOIL	REG	SED	2.4	J	27.6	
OL-STA-80103	10-12 cm	OL-1066-10	11/26/2008	SOIL	REG	SED	1.4	J	27.2	
OL-STA-80103	12-14 cm	OL-0706-13	11/26/2008	SOIL	REG	SED	2.1	J	30.4	
OL-STA-80103	14-16 cm	OL-1066-11	11/26/2008	SOIL	REG	SED	1.6	J	33.3	
OL-STA-80103	16-18 cm	OL-0706-14	11/26/2008	SOIL	REG	SED	2.1	J	33.9	
OL-STA-80103	18-20 cm	OL-1066-12	11/26/2008	SOIL	REG	SED	3.6	J	33.4	
OL-STA-80103	20-22 cm	OL-0706-15	11/26/2008	SOIL	REG	SED	1.6	J	37.9	
OL-STA-80103	24-26 cm	OL-0706-16	11/26/2008	SOIL	REG	SED	1.3	J	37.8	
OL-STA-80103	28-30 cm	OL-0706-17	11/26/2008	SOIL	REG	SED	2.3	J	35.5	
OL-STA-80103	32-34 cm	OL-0706-18	11/26/2008	SOIL	REG	SED	3.9	J	30.3	
OL-STA-80103	36-38 cm	OL-0706-19	11/26/2008	SOIL	REG	SED	16.2	J	28.8	
OL-STA-80103	40-42 cm	OL-0706-20	11/26/2008	SOIL	REG	SED	86.1	J	27.2	
OL-STA-80103	44-46 cm	OL-0708-01	11/26/2008	SOIL	REG	SED	36.3	J	31	
OL-STA-80103	48-50 cm	OL-0708-02	11/26/2008	SOIL	REG	SED	55.9	J	32.2	
OL-STA-80103	52-54 cm	OL-0708-03	11/26/2008	SOIL	REG	SED	14.3	J	29.9	
OL-STA-80103	56-58 cm	OL-0708-04	11/26/2008	SOIL	REG	SED	1.4	J	36.7	
OL-STA-80103	60-62 cm	OL-0708-05	11/26/2008	SOIL	REG	SED	0.95	J	40.2	
OL-STA-80103	64-66 cm	OL-0708-06	11/26/2008	SOIL	REG	SED	1	J	40.6	
OL-STA-80103	68-70 cm	OL-0708-07	11/26/2008	SOIL	REG	SED	1.8	J	35.1	

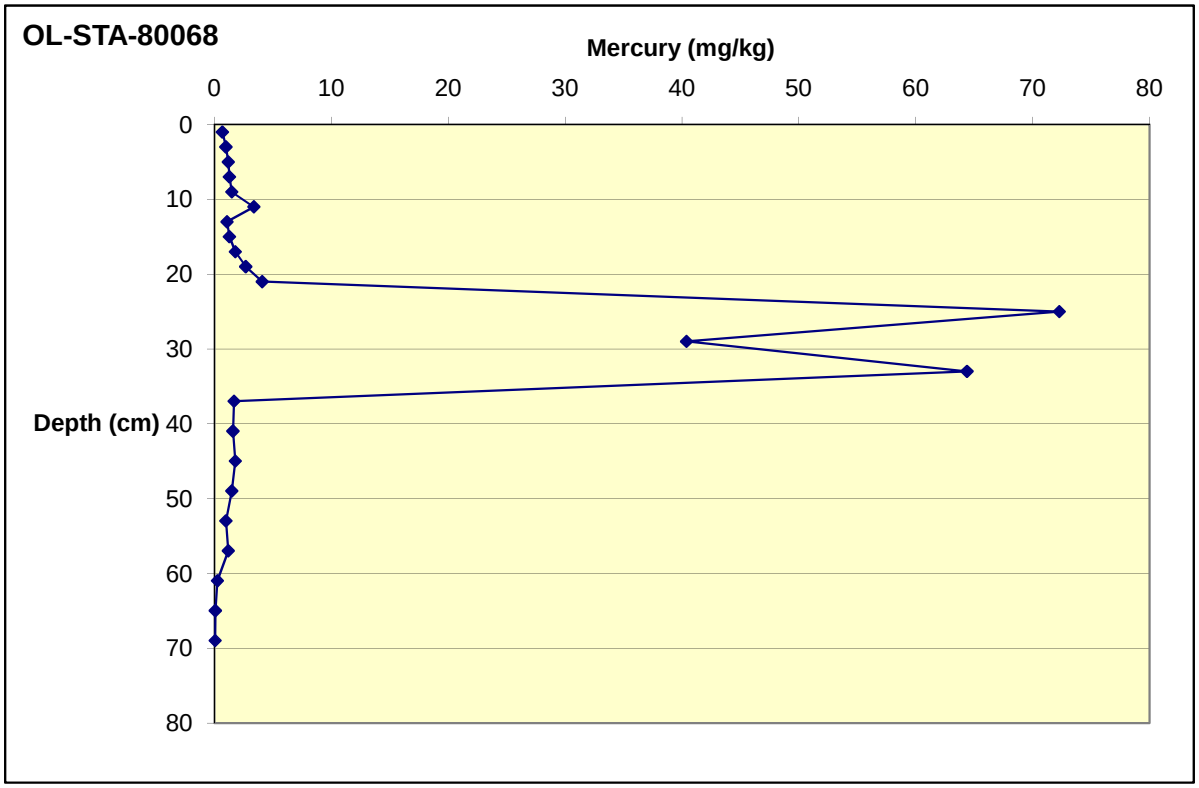
Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
ST-51a	0-2 cm	OL-0704-08	11/26/2008	SOIL	REG	SED	1.3	J	16.9	
ST-51a	2-4 cm	OL-0704-09	11/26/2008	SOIL	REG	SED	1.4	J	23.7	
ST-51a	4-6 cm	OL-0704-10	11/26/2008	SOIL	REG	SED	1.8	J	14.8	
ST-51a	6-8 cm	OL-0704-11	11/26/2008	SOIL	REG	SED	2.2	J	19.6	
ST-51a	8-10 cm	OL-0704-12	11/26/2008	SOIL	REG	SED	2.5	J	25.7	
ST-51a	12-14 cm	OL-0704-13	11/26/2008	SOIL	REG	SED	1.1	J	28.8	
ST-51a	16-18 cm	OL-0704-14	11/26/2008	SOIL	REG	SED	1.9	J	30.1	
ST-51a	20-22 cm	OL-0704-15	11/26/2008	SOIL	REG	SED	4.1	J	34	
ST-51a	24-26 cm	OL-0704-16	11/26/2008	SOIL	REG	SED	1.7	J	36.2	
ST-51a	28-30 cm	OL-0704-17	11/26/2008	SOIL	REG	SED	3.6	J	29.2	
ST-51a	32-34 cm	OL-0704-18	11/26/2008	SOIL	REG	SED	4.9	J	25.3	
ST-51a	36-38 cm	OL-0704-19	11/26/2008	SOIL	REG	SED	77.9	J	20.9	
ST-51a	40-42 cm	OL-0704-20	11/26/2008	SOIL	REG	SED	44.4	J	25.6	
ST-51a	44-46 cm	OL-0706-01	11/26/2008	SOIL	REG	SED	31.7	J	29.3	
ST-51a	48-50 cm	OL-0706-02	11/26/2008	SOIL	REG	SED	28	J	28.8	
ST-51a	52-54 cm	OL-0706-03	11/26/2008	SOIL	REG	SED	1.2	J	33.1	
ST-51a	56-58 cm	OL-0706-04	11/26/2008	SOIL	REG	SED	2	J	35.5	
ST-51a	60-62 cm	OL-0706-05	11/26/2008	SOIL	REG	SED	1.7	J	38.8	
ST-51a	64-66 cm	OL-0706-06	11/26/2008	SOIL	REG	SED	2.1	J	32.5	
ST-51a	68-70 cm	OL-0706-07	11/26/2008	SOIL	REG	SED	2.9	J	30.6	

Onondaga Lake
Validated SMU 8 High Resolution Cores

						Parameter	MERCURY		SOLIDS, PERCENT	
						Units	mg/kg		%	
Location ID	Sample Depth	Field Sample ID	Sample Date	Matrix	Purpose	Samp Type				
ST51	0-2 cm	OL-0702-08	11/26/2008	SOIL	REG	SED	1	J	15.1	
ST51	2-4 cm	OL-0702-09	11/26/2008	SOIL	REG	SED	1.3	J	16.2	
ST51	4-6 cm	OL-0702-10	11/26/2008	SOIL	REG	SED	2.4	J	12.9	
ST51	6-8 cm	OL-0702-11	11/26/2008	SOIL	REG	SED	2.1	J	19.5	
ST51	8-10 cm	OL-0702-12	11/26/2008	SOIL	REG	SED	2.4	J	25.4	
ST51	10-12 cm	OL-1066-13	11/26/2008	SOIL	REG	SED	1.8	J	27.2	
ST51	12-14 cm	OL-0702-13	11/26/2008	SOIL	REG	SED	1.2	J	28.9	
ST51	14-16 cm	OL-1066-14	11/26/2008	SOIL	REG	SED	1.9	J	29.1	
ST51	16-18 cm	OL-0702-14	11/26/2008	SOIL	REG	SED	1.8	J	31	
ST51	18-20 cm	OL-1066-15	11/26/2008	SOIL	REG	SED	2.2	J	29.7	
ST51	20-22 cm	OL-0702-15	11/26/2008	SOIL	REG	SED	3.1	J	29.5	
ST51	24-26 cm	OL-0702-16	11/26/2008	SOIL	REG	SED	1.6	J	39.2	
ST51	28-30 cm	OL-0702-17	11/26/2008	SOIL	REG	SED	2.1	J	33.6	
ST51	32-34 cm	OL-0702-18	11/26/2008	SOIL	REG	SED	3.2	J	27.9	
ST51	36-38 cm	OL-0702-19	11/26/2008	SOIL	REG	SED	12.1	J	23.2	
ST51	40-42 cm	OL-0702-20	11/26/2008	SOIL	REG	SED	81.6	J	19.4	
ST51	44-46 cm	OL-0704-01	11/26/2008	SOIL	REG	SED	42	J	23.4	
ST51	48-50 cm	OL-0704-02	11/26/2008	SOIL	REG	SED	40.5	J	26.4	
ST51	52-54 cm	OL-0704-03	11/26/2008	SOIL	REG	SED	43.5	J	29.1	
ST51	56-58 cm	OL-0704-04	11/26/2008	SOIL	REG	SED	3.8	J	31.4	
ST51	60-62 cm	OL-0704-05	11/26/2008	SOIL	REG	SED	1.4	J	34.4	
ST51	64-66 cm	OL-0704-06	11/26/2008	SOIL	REG	SED	1.6	J	33.9	
ST51	68-70 cm	OL-0704-07	11/26/2008	SOIL	REG	SED	2.1	J	34.1	

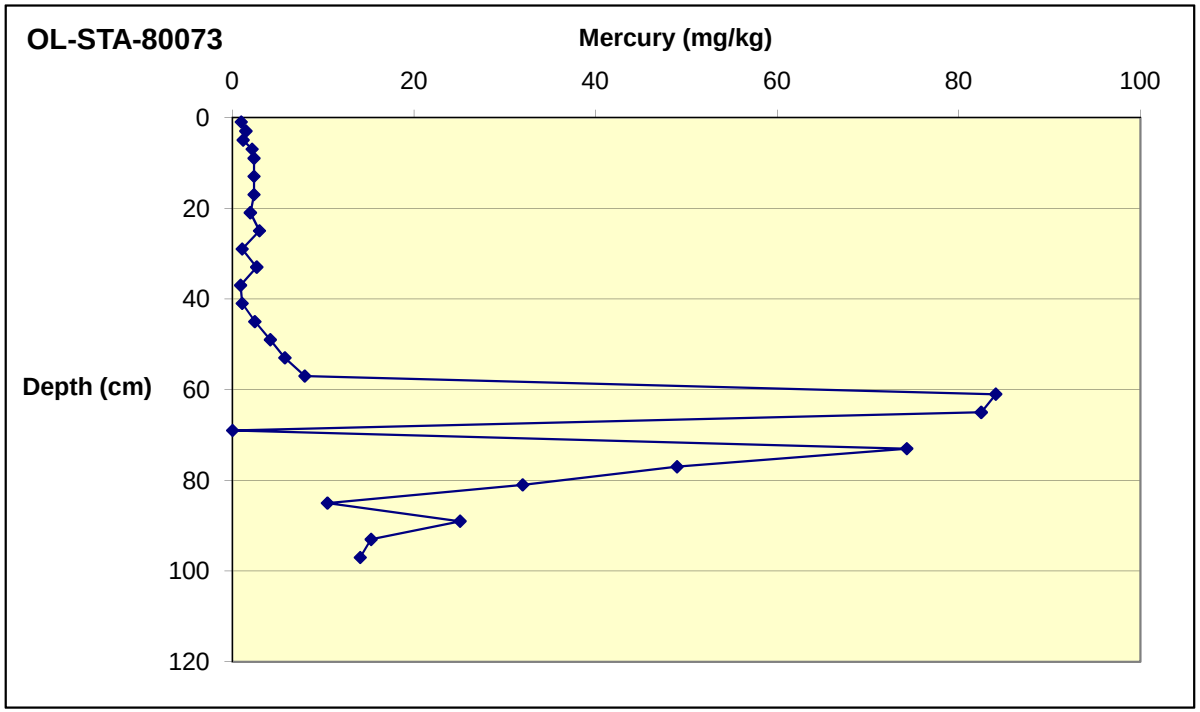
Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	0.7
2-4 cm	3	1
4-6 cm	5	1.2
6-8 cm	7	1.3
8-10 cm	9	1.5
10-12 cm	11	3.4
12-14 cm	13	1.1
14-16 cm	15	1.3
16-18 cm	17	1.8
18-20 cm	19	2.7
20-22 cm	21	4.1
24-26 cm	25	72.3
28-30 cm	29	40.4
32-34 cm	33	64.4
36-38 cm	37	1.7
40-42 cm	41	1.6
44-46 cm	45	1.8
48-50 cm	49	1.5
52-54 cm	53	1
56-58 cm	57	1.2
60-62 cm	61	0.28
64-66 cm	65	0.098
68-70 cm	69	0.08



Notes:

1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.

Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	1
2-4 cm	3	1.5
4-6 cm	5	1.2
6-8 cm	7	2.2
8-10 cm	9	2.4
12-14 cm	13	2.4
16-18 cm	17	2.4
20-22 cm	21	2
24-26 cm	25	3
28-30 cm	29	1.1
32-34 cm	33	2.7
36-38 cm	37	0.93
40-42 cm	41	1.1
44-46 cm	45	2.5
48-50 cm	49	4.2
52-54 cm	53	5.8
56-58 cm	57	8
60-62 cm	61	84.1
64-66 cm	65	82.5
68-70 cm	69	0.042
72-74 cm	73	74.3
76-78 cm	77	49
80-82 cm	81	32
84-86 cm	85	10.5
88-90 cm	89	25.1
92-94 cm	93	15.3
96-98 cm	97	14.1



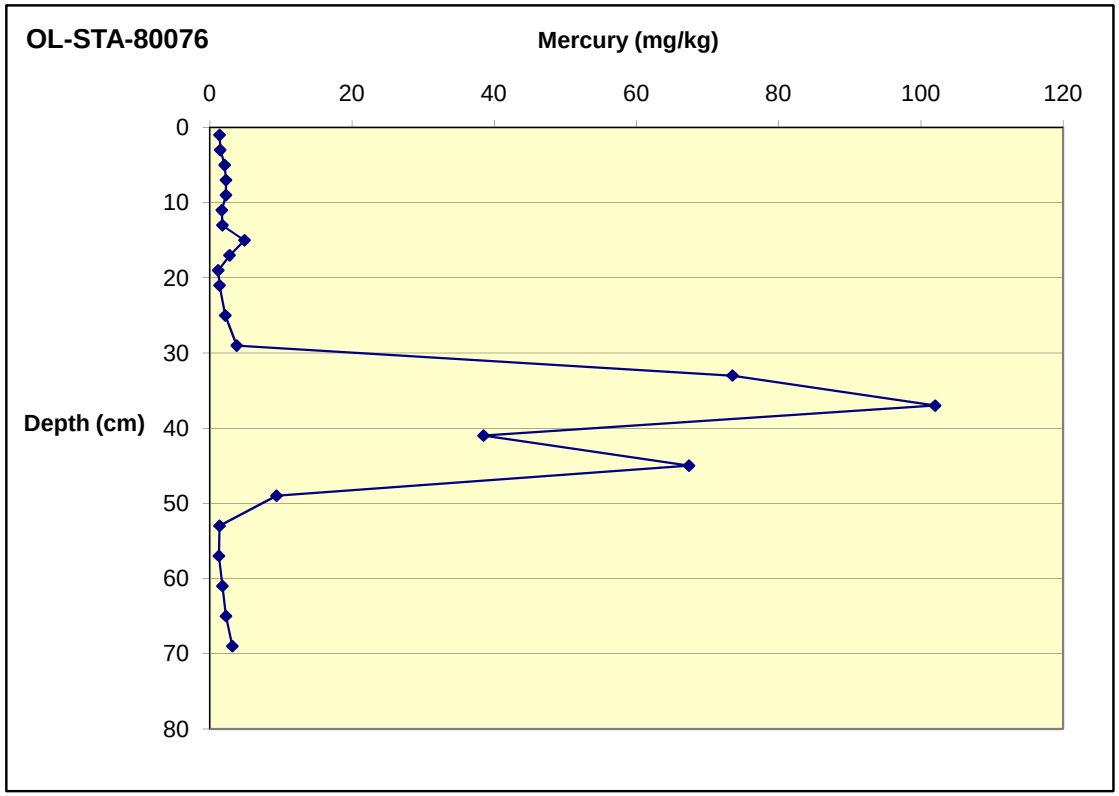
Notes:

1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.

Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	1.4
2-4 cm	3	1.5
4-6 cm	5	2.1
6-8 cm	7	2.3
8-10 cm	9	2.3
10-12 cm	11	1.7
12-14 cm	13	1.8
14-16 cm	15	4.9
16-18 cm	17	2.8
18-20 cm	19	1.2
20-22 cm	21	1.4
24-26 cm	25	2.2
28-30 cm	29	3.8
32-34 cm	33	73.5
36-38 cm	37	102
40-42 cm	41	38.5
44-46 cm	45	67.4
48-50 cm	49	9.4
52-54 cm	53	1.4
56-58 cm	57	1.3
60-62 cm	61	1.8
64-66 cm	65	2.3
68-70 cm	69	3.2

Notes:

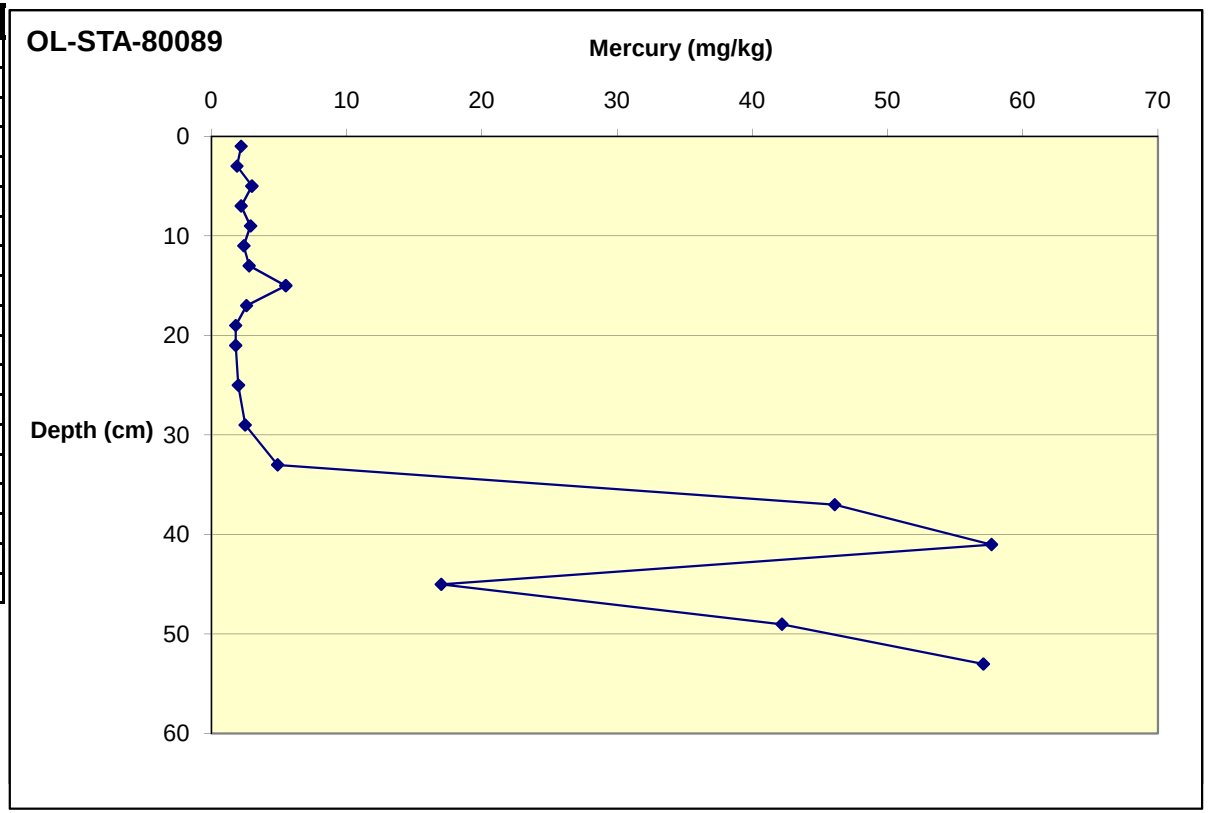
1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.



Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	2.2
2-4 cm	3	1.9
4-6 cm	5	3
6-8 cm	7	2.2
8-10 cm	9	2.9
10-12 cm	11	2.4
12-14 cm	13	2.8
14-16 cm	15	5.5
16-18 cm	17	2.6
18-20 cm	19	1.8
20-22 cm	21	1.8
24-26 cm	25	2
28-30 cm	29	2.5
32-34 cm	33	4.9
36-38 cm	37	46.1
40-42 cm	41	57.7
44-46 cm	45	17
48-50 cm	49	42.2
52-54 cm	53	57.1

Notes:

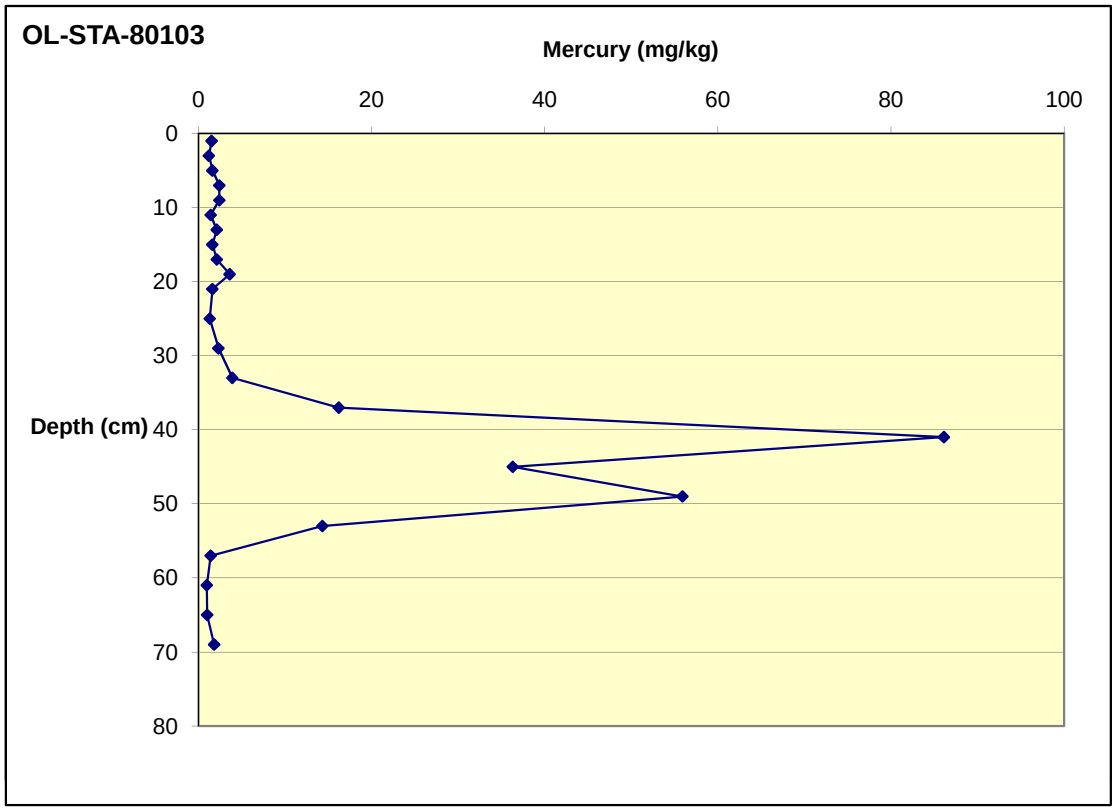
1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.



Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	1.5
2-4 cm	3	1.2
4-6 cm	5	1.6
6-8 cm	7	2.4
8-10 cm	9	2.4
10-12 cm	11	1.4
12-14 cm	13	2.1
14-16 cm	15	1.6
16-18 cm	17	2.1
18-20 cm	19	3.6
20-22 cm	21	1.6
24-26 cm	25	1.3
28-30 cm	29	2.3
32-34 cm	33	3.9
36-38 cm	37	16.2
40-42 cm	41	86.1
44-46 cm	45	36.3
48-50 cm	49	55.9
52-54 cm	53	14.3
56-58 cm	57	1.4
60-62 cm	61	0.95
64-66 cm	65	1
68-70 cm	69	1.8

Notes:

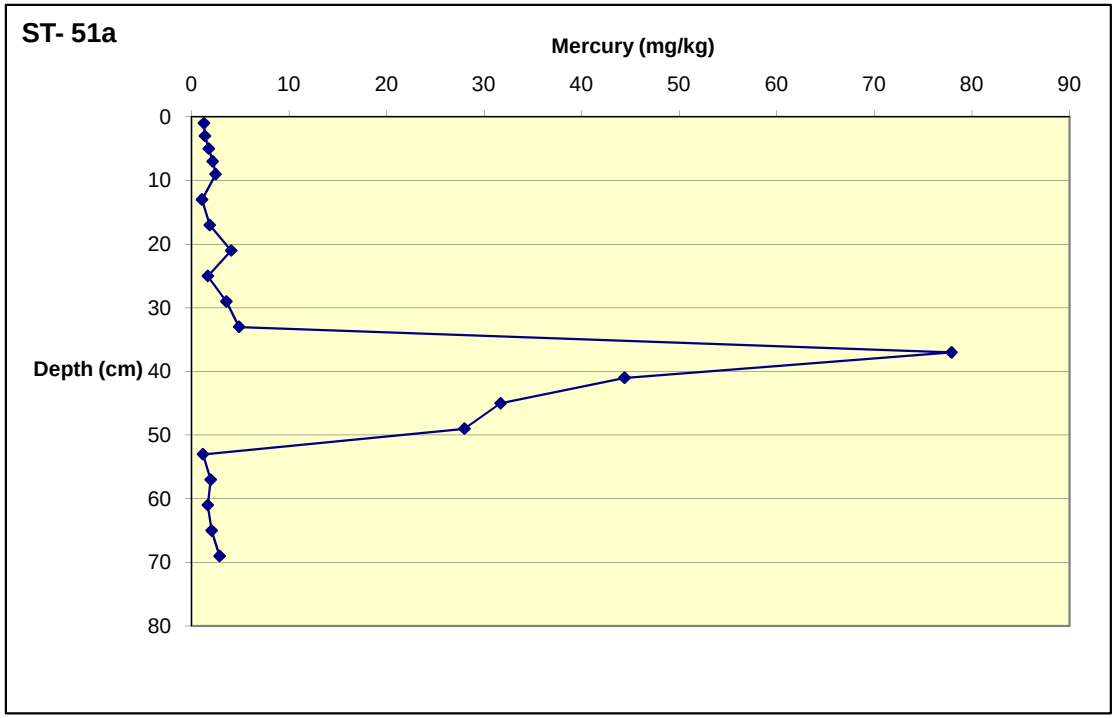
1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.



Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	1.3
2-4 cm	3	1.4
4-6 cm	5	1.8
6-8 cm	7	2.2
8-10 cm	9	2.5
12-14 cm	13	1.1
16-18 cm	17	1.9
20-22 cm	21	4.1
24-26 cm	25	1.7
28-30 cm	29	3.6
32-34 cm	33	4.9
36-38 cm	37	77.9
40-42 cm	41	44.4
44-46 cm	45	31.7
48-50 cm	49	28
52-54 cm	53	1.2
56-58 cm	57	2
60-62 cm	61	1.7
64-66 cm	65	2.1
68-70 cm	69	2.9

Notes:

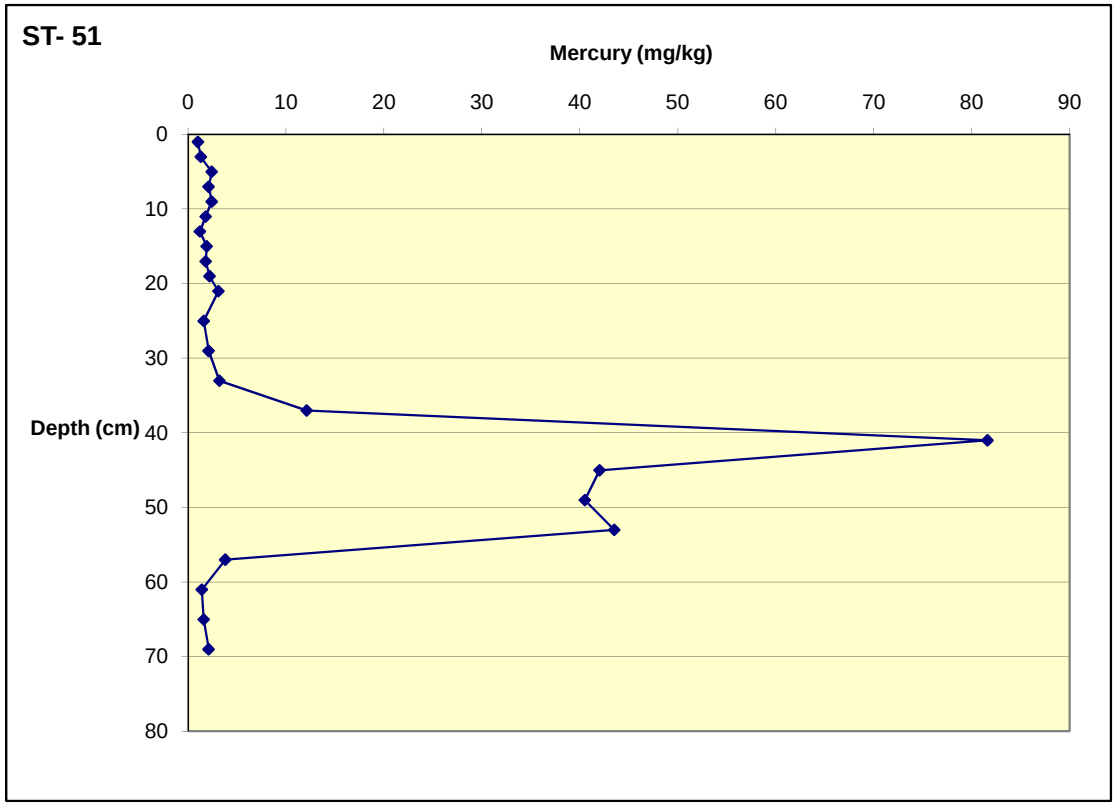
1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.



Sample Depth	Mid_depth (cm)	MERCURY (mg/kg)
0-2 cm	1	1
2-4 cm	3	1.3
4-6 cm	5	2.4
6-8 cm	7	2.1
8-10 cm	9	2.4
10-12 cm	11	1.8
12-14 cm	13	1.2
14-16 cm	15	1.9
16-18 cm	17	1.8
18-20 cm	19	2.2
20-22 cm	21	3.1
24-26 cm	25	1.6
28-30 cm	29	2.1
32-34 cm	33	3.2
36-38 cm	37	12.1
40-42 cm	41	81.6
44-46 cm	45	42
48-50 cm	49	40.5
52-54 cm	53	43.5
56-58 cm	57	3.8
60-62 cm	61	1.4
64-66 cm	65	1.6
68-70 cm	69	2.1

Notes:

1. The mercury concentrations were plotted against the midpoint of the depth interval from which the sample was collected.



ATTACHMENT B

RADIOISOTOPE RESULTS

OL-STA-80068

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Client: Babcock, David

Address:	**Parsons** **290 Elwood Davis Road Suite 312** **Liverpool, N.Y.** **U.S.A. 13088**
Core ID:	**OL-STA-80068**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**DEC-4-08**
Analysis Date(s):	**Feb 2 - May 5, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 9.56 DPM/g observed in the uppermost section (depth 0.0 - 2.0 cm) is about 5.1 times the lowest activity of 1.86 DPM/g in section 16 (extrapolated depth 51 - 55 cm).

The dry bulk density profile is irregular, ranging 0.169 - 0.574 g/cm^3. It gradually increases to 0.502 g/cm^3 with depth until 15 cm, then decreases to 0.278 g/cm^3 at 23 - 27 cm (extrapolated depth), and rises to 0.574 g/cm^3 at 59 - 63 cm (extrapolated depth), and then drops again to 0.370 g/cm^3 at 72 - 74 cm (extrapolated depth) (Page 4). This density profile is unusual compared to most cores which typically have increasing dry bulk density as a function with depth, and suggests that the sediments may be of varying composition throughout the core.

Sediment accumulation rates in this core appear relatively constant (0.1258 - 0.1607 g/cm^2/year) in the upper 5 sections (0 - 11 cm, extrapolated depth) but show a sudden increase to 0.4214 g/cm^2/year in section 6 (11 - 15 cm, extrapolated depth), then drop to 0.1301 g/cm^2/year in section 9 (23 - 27 cm, extrapolated depth), again show another sudden increase to 0.3957 g/cm^2/year in section 11 (31 - 35 cm, extrapolated depth), and then again drop downward (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 10 sections (depth 0 - 30 cm) is significantly above background, with a surface activity of 0.35 DPM/g and increasing to a pronounced maximum of 1.43 DPM/g in the 24 - 26 cm section. The Cs-137 activity then declines gradually with depth (Page 12 & 15). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.67, 1.89, 1.79 and 2.64 DPM/g in sections 4 (depth 6.0 - 8.0 cm), 14 (extrapolated depth 43 - 47 cm), 16 (extrapolated depth 51 - 55 cm) and 23 (extrapolated depth 79 - 82 cm), respectively (Page 8, 9, 10 & 11). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise. The Ra-226 activities measured in section 16 and 23 are similar to the Pb-210 activities of 1.86 and 2.75 DPM/g in the same sections, suggesting that background levels of Pb-210 have been attained, and also that background levels of Pb-210 vary with depth in this core.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not completely satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210 i.e. it contains a complete Pb-210 inventory. Although several different sections could plausibly be assigned to represent uppermost background, section 20 (extrapolated depth 67 - 71 cm) was chosen because it caused the CRS model to most accurately predict the age (2008 - 1963 = 45 years) of the Cs-137 peak (see Page 2). It has been assumed that the background activity of section 20 (2.61 DPM/g) applies to the sections 19 and 18 immediately above, and that the Ra-226 background of 1.79 DPM/g observed in section 16 applies to section 17. The depressed Pb-210 activity of section 16 is attributed to dilution caused by an episodic elevation in sediment accumulation rate.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 4 (depth 6 - 8 cm) can be calculated as: 2.016/14.4 = 0.1400 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 9 at 24 - 26 cm depth (Pages 12 and 15) where maximum Cs-137 activity of 1.43 DPM/g occurred. It is possible that the true Cs-137 maximum occurred in the 22 - 24 cm section or the 26 - 28 cm section which were not analysed. The CRS model indicates that each cm of core section contains about 2 yr of accumulated sediment over the depth interval of 23 - 27 cm and therefore the uncertainty in the CRS date could be 2 cm X 2.15 yr/cm = +/- 4.3 years, or about 4.3 yr / 45 yr X 100 = +/- 10 %.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Date(s) Received: DEC-4-08 **PO/Contract No.: 444540.30010.00**

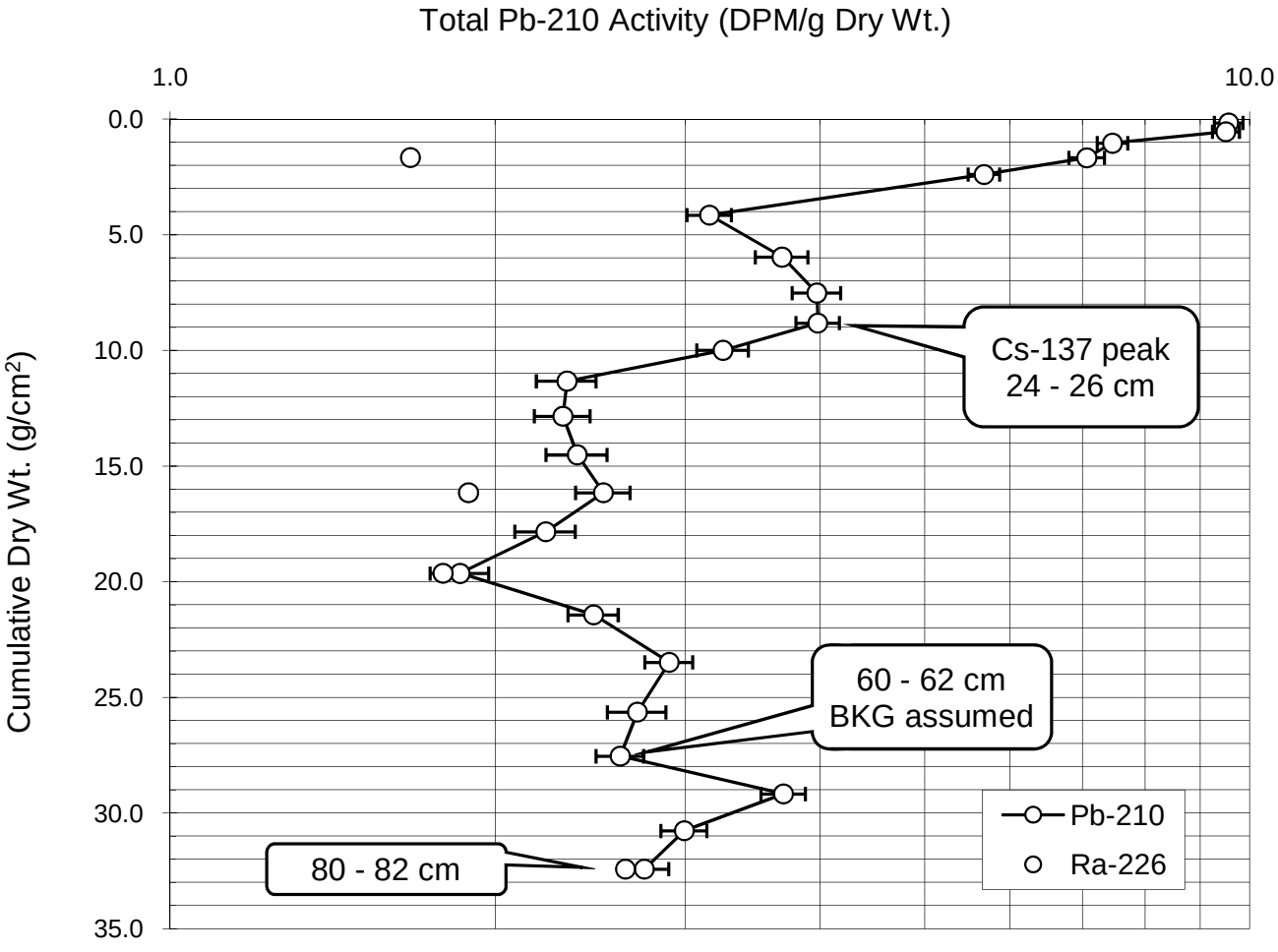
Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrap-olated Upper Section Depth (cm)	Extrap-olated Lower Section Depth (cm)	Dry Wt./ Wet cc. (g/cm^3)	Mass in extrap-olated section (g/cm^2)	Cumul-ative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumul-ative mass in current section (g/cm^2)	Po-209 counts less detector back-ground	Po-210 counts less detector back-ground and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsup-ported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumu-lation Rate ($g/cm^2/yr$)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0697-17 (0-2CM)	0.0	2.0	0.00	2.00	0.169	0.338	0.338	0.169	2457	1140	0.478	60000	**9.56**	0.29	7.89	**2.5**	2.00	2.664	0.1365		
2	OL-0697-18 (2-4CM)	2.0	4.0	2.00	4.00	0.207	0.414	0.752	0.545	2848	1256	0.457	60000	**9.50**	0.27	7.83	**5.8**	4.00	3.246	0.1258		
3	OL-0697-19 (4-6CM)	4.0	6.0	4.00	6.00	0.290	0.579	1.331	1.041	2672	994	0.491	60000	**7.46**	0.24	5.79	**9.6**	6.00	3.355	0.1523		
4	OL-0697-20 (6-8CM)	6.0	8.0	6.00	8.00	0.343	0.686	2.016	1.674	2018	734	0.507	60000	**7.07**	0.27	5.40	**14.4**	8.00	3.699	0.1432		1.67
5	OL-0699-01 (8-10CM)	8.0	10.0	8.00	11.00	0.377	1.131	3.148	2.393	3175	945	0.518	60000	**5.67**	0.19	4.00	**21.4**	11.00	4.530	0.1607		
6	OL-0699-02 (12-14CM)	12.0	14.0	11.00	15.00	0.502	2.006	5.154	4.151	3000	495	0.515	60000	**3.16**	0.15	1.27	**26.2**	15.00	2.548	0.4214		
7	OL-0699-03 (16-18CM)	16.0	18.0	15.00	19.00	0.407	1.629	6.783	5.969	1920	355	0.495	60000	**3.69**	0.21	1.80	**32.7**	19.00	2.931	0.2498		
8	OL-0699-04 (20-22CM)	20.0	22.0	19.00	23.00	0.370	1.479	8.262	7.522	2079	410	0.489	60000	**3.97**	0.21	2.08	**41.3**	23.00	3.080	0.1706		
9	OL-0699-05 (24-26CM)	24.0	26.0	23.00	27.00	0.278	1.112	9.374	8.818	2534	509	0.498	60000	**3.98**	0.18	2.09	**49.9**	27.00	2.326	0.1301	**Cs-137 peak here**	
10	OL-0699-06(28-30CM)	28.0	30.0	27.00	31.00	0.312	1.248	10.622	9.998	2273	371	0.496	60000	**3.25**	0.18	1.36	**58.0**	31.00	1.700	0.1541		
11	OL-0699-07 (32-34CM)	32.0	34.0	31.00	35.00	0.355	1.420	12.042	11.332	2276	244	0.501	60000	**2.33**	0.15	0.44	**61.6**	35.00	0.627	0.3957		
12	OL-0699-08 (36-38CM)	36.0	38.0	35.00	39.00	0.401	1.605	13.647	12.845	2811	327	0.496	60000	**2.31**	0.14	0.42	**66.0**	39.00	0.676	0.3665		
13	OL-0699-09 (40-42CM)	40.0	42.0	39.00	43.00	0.435	1.739	15.386	14.516	2272	275	0.502	60000	**2.38**	0.16	0.49	**72.5**	43.00	0.858	0.2640		
14	OL-0699-10 (44-46CM)	44.0	46.0	43.00	47.00	0.385	1.541	16.927	16.156	2672	339	0.497	60000	**2.52**	0.15	0.63	**82.1**	47.00	0.971	0.1612		1.89
15	OL-0699-11 (48-50CM)	48.0	50.0	47.00	51.00	0.456	1.825	18.752	17.839	2450	281	0.508	60000	**2.23**	0.14	0.44		51.00	0.801			
16	OL-0699-12 (52-54CM)	52.0	54.0	51.00	55.00	0.445	1.781	20.533	19.642	2836	299	0.559	60000	**1.86**	0.12	0.07		55.00	0.118			1.79
17	OL-0699-13 (56-58CM)	56.0	58.0	55.00	59.00	0.451	1.805	22.338	21.436	3112	399	0.513	60000	**2.47**	0.13	0.68		59.00	1.223			
18	OL-0699-14 (60-62CM)	60.0	62.0	59.00	63.00	0.574	2.295	24.633	23.486	2675	429	0.546	60000	**2.90**	0.15	0.29		63.00	0.664			
19	OL-0699-15 (64-66CM)	64.0	66.0	63.00	67.00	0.504	2.015	26.648	25.640	2351	321	0.498	60000	**2.71**	0.17	0.10						
20	OL-0699-16 (68-70CM)	68.0	70.0	67.00	71.00	0.447	1.788	28.436	27.542	3029	460	0.573	60000	**2.61**	0.13	0.00						
21	OL-0714-01 (72-74 CM)	72.0	74.0	71.00	75.00	0.370	1.479	29.915	29.175	2613	493	0.503	60000	**3.70**	0.18							
22	OL-0714-02 (76-78 CM)	76.0	78.0	75.00	79.00	0.428	1.711	31.626	30.770	3070	468	0.502	60000	**2.99**	0.15							
23	OL-0714-03 (80-82 CM)	80.0	82.0	79.00	82.00	0.399	1.197	32.823	32.424	2821	397	0.505	60000	**2.75**	0.15							2.64
Blank	Blank									-1	10											
Blank	Blank									1833	15											
3	OL-0697-19 (4-6CM)					0.290				2672	994	0.491	60000	**7.46**	0.24	5.60						
3 Dup	OL-0697-19 (4-6CM) Dup					0.289				2809	1098	0.516	60000	**7.46**	0.23	5.60						
11	OL-0699-07 (32-34CM)					0.356				2276	244	0.501	60000	**2.12**	0.15	0.26						
11 Dup	OL-0699-07 (32-34CM) Dup					0.354				2393	301	0.487	60000	**2.55**	0.16	0.69						
																Total DPM/cm^2 in core		36.02				

*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

OL-STA-80068



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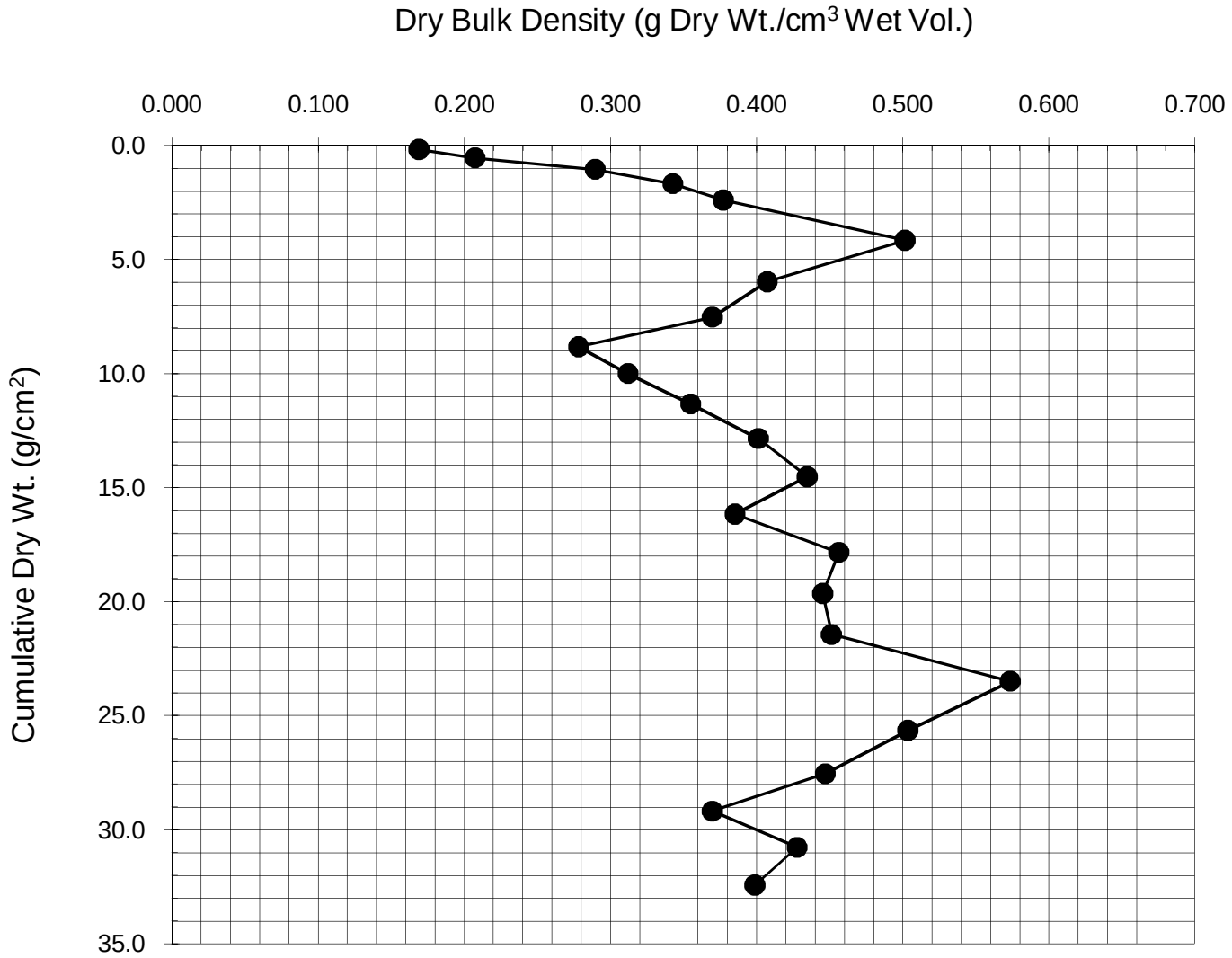
Dry Bulk Density vs. Accumulated Sediment

OL-STA-80068



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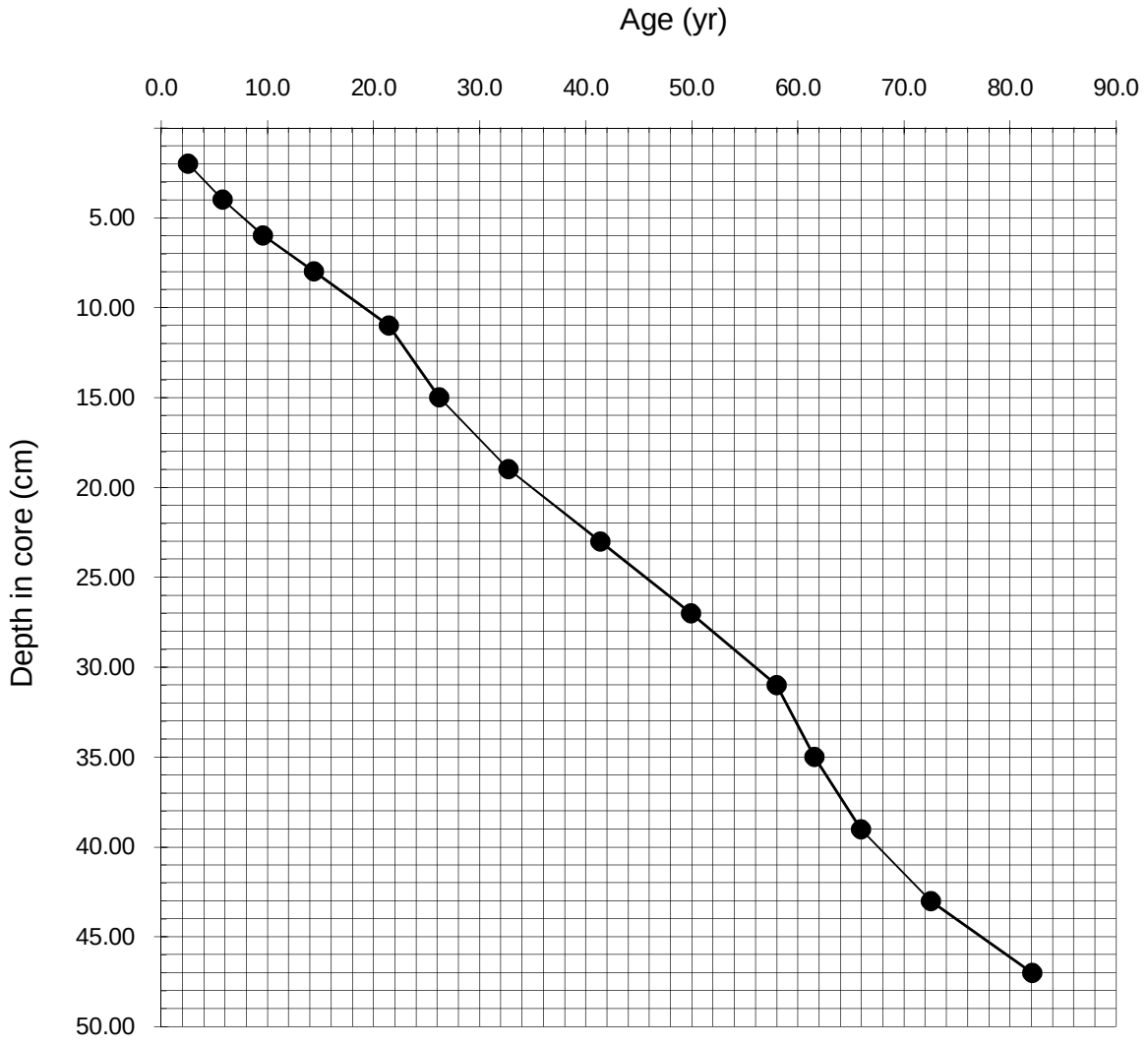
Age (yr) vs. Depth (cm)
CRS Model

OL-STA-80068



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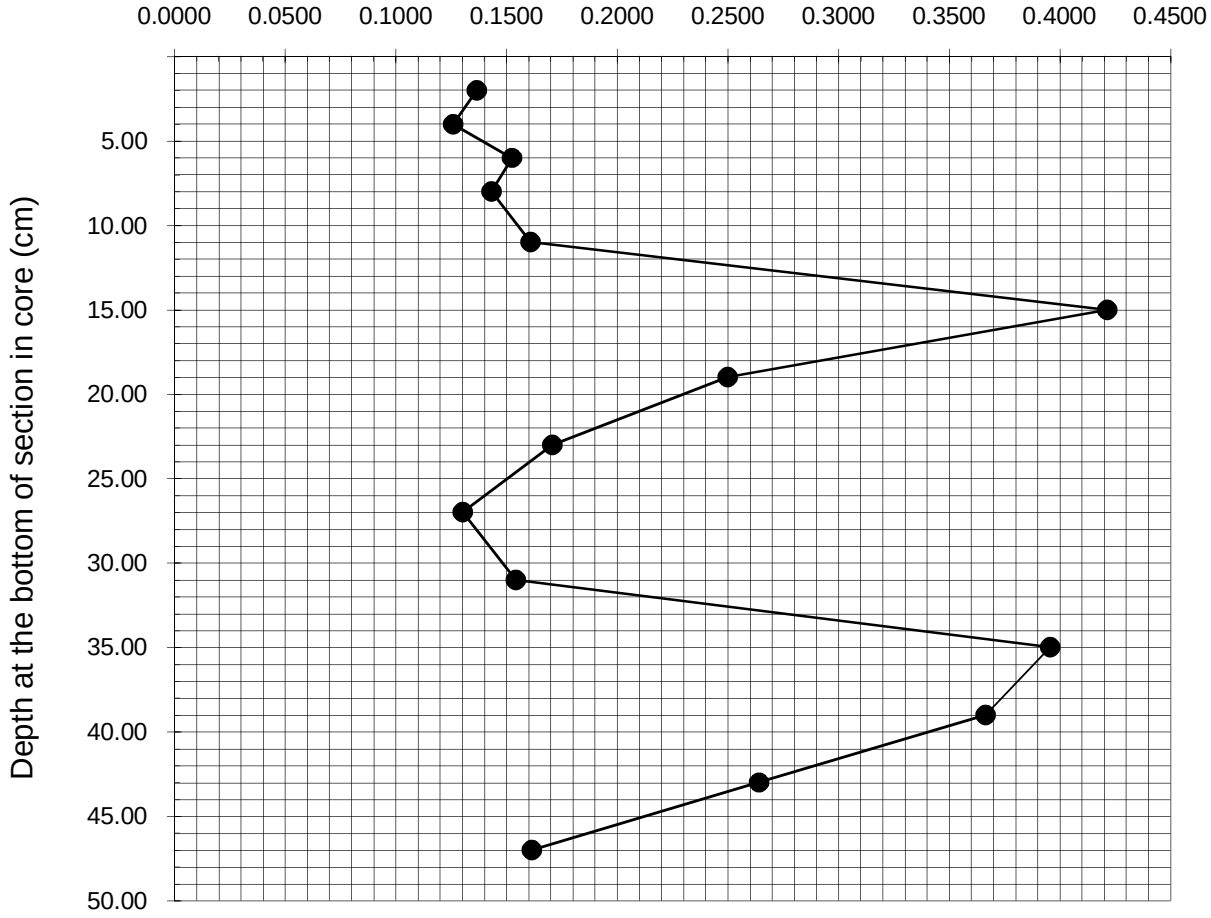
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

OL-STA-80068



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Results of Ra-226 Analysis by Rn-222 Emanation

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Sampling Dates(s): N/A
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Transaction ID: 393
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Date(s) Analysed: Feb 2 - May 5, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
OL-STA-80068	OL-0697-20 (6 - 8 cm)	1.67	0.04
OL-STA-80068	OL-0699-10 (44 - 46 cm)	1.89	0.02
OL-STA-80068	OL-0699-12 (52 - 54 cm)	1.79	0.03
OL-STA-80068	OL-0714-03 (80 - 82 cm)	2.64	0.04

* : See comments section above for discussion.

Core ID	OL-STA-80068										
SAMPLE ID	OL-0697-20 (6 - 8 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.142										
Total Count in Period	5155										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	8	39911	14	7	0	23.95	0.98700	0.91407
	When cell filled	2009	5	2	39935	12	59	0			
	Beginning time of count	2009	5	2	39935	16	33	0			
Counts/min. (gross)	5.16										
CPM less Cell BKG	4.89										
CPM (decay during count corrected)	5.35										
DPM Sample + System (efficiency corrected)	6.18										
DPM Sample	5.71	Error +/	0.1277	DPM							
DPM/g	5.00										
Ra-226 DPM/g	**1.67**	Error +/	0.0373	DPM/g		1 SD			Error % =	2.2	
Ra-226 pCi/g ⟶	0.75										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Core ID	OL-STA-80068										
SAMPLE ID	OL-0699-10 (44 - 46 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	3.076										
Total Count in Period	14533										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	18	8	0	25.79	0.99068	0.92384
	When cell filled	2009	4	6	39909	12	58	26			
	Beginning time of count	2009	4	6	39909	15	8	0			
Counts/min. (gross)	14.53										
CPM less Cell BKG	14.27										
CPM (decay during count corrected)	15.44										
DPM Sample + System (efficiency corrected)	17.83										
DPM Sample	17.44	Error +/	0.1759	DPM							
DPM/g	5.67										
Ra-226 DPM/g	**1.89**	Error +/	0.0191	DPM/g		1 SD			Error % =	1.0	
Ra-226 pCi/g ⟶	0.86										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Core ID	OL-STA-80068										
SAMPLE ID	OL-0699-12 (52 - 54 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.587										
Total Count in Period	7408										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	8	39911	14	5	0	25.25	0.98973	0.92007
	When cell filled	2009	5	3	39936	20	6	0			
	Beginning time of count	2009	5	3	39936	22	48	0			
Counts/min. (gross)	7.41										
CPM less Cell BKG	7.14										
CPM (decay during count corrected)	7.76										
DPM Sample + System (efficiency corrected)	8.97										
DPM Sample	8.51	Error +/	0.1406	DPM							
DPM/g	5.36										
Ra-226 DPM/g	**1.79**	Error +/	0.0295	DPM/g		1 SD			Error % =	1.7	
Ra-226 pCi/g ⟶	0.81										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Core ID	OL-STA-80068										
SAMPLE ID	OL-0714-03 (80 - 82 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.425										
Total Count in Period	9620										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	8	39911	14	2	0	26.19	0.99134	0.92069
	When cell filled	2009	5	4	39937	18	41	47			
	Beginning time of count	2009	5	4	39937	21	18	30			
Counts/min. (gross)	9.62										
CPM less Cell BKG	9.35										
CPM (decay during count corrected)	10.16										
DPM Sample + System (efficiency corrected)	11.74										
DPM Sample	11.29	Error +/	0.1525	DPM							
DPM/g	7.92										
Ra-226 DPM/g	**2.64**	Error +/	0.0357	DPM/g		1 SD			Error % =	1.4	
Ra-226 pCi/g ⟶	1.20										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core OL-STA-80068 0509 Final.xlsm]Ra-226 80 - 82 cm

Results authorised by Dr. Robert J. Flett

Results of Cs-137 Analysis

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Core ID: OL-STA-80068
Date(s) Received: DEC-4-08
Sampling Date(s): N/A
Project:

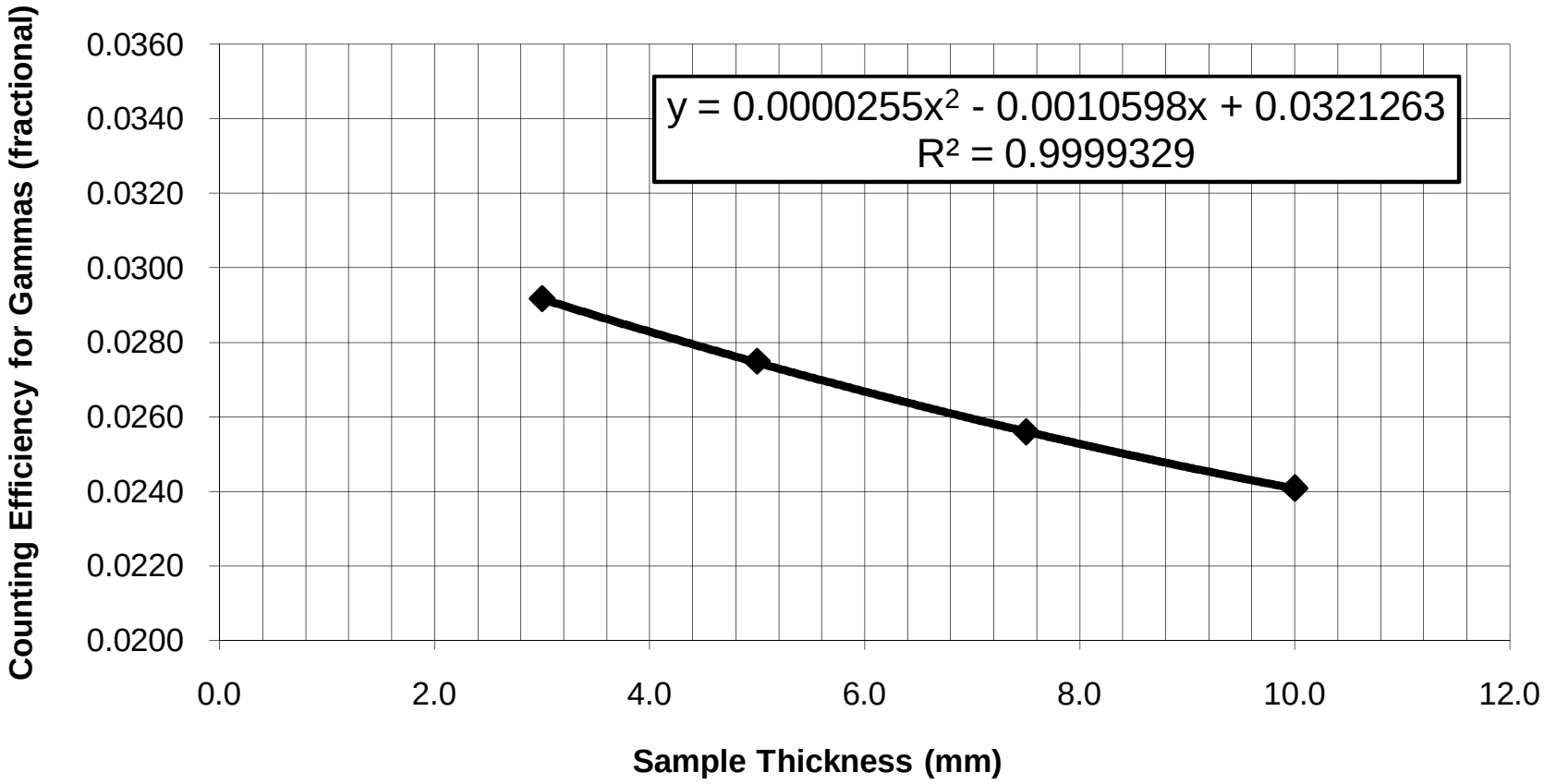
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Feb 2 - May 5, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0697-17 (0-2CM)	0.0	2.0	10	2	2009		109	40	80000	9.471	3.00	0.01	0.0292	0.2958	0.35	0.13	0.16	GMX
OL-0697-18 (2-4CM)	2.0	4.0	10	2	2009		67	27	80000	18.073	5.25	0.00	0.0254	0.1096	0.13	0.05	0.06	GEM
OL-0697-19 (4-6CM)	4.0	6.0	11	2	2009		96	28	80000	27.566	8.00	0.00	0.0235	0.1112	0.13	0.04	0.06	GEM
OL-0697-20 (6-8CM)	6.0	8.0	11	2	2009		109	35	80000	25.645	7.00	0.00	0.0260	0.1228	0.14	0.05	0.07	GMX
OL-0699-01 (8-10CM)	8.0	10.0	3	3	2009		122	26	80000	20.535	6.25	0.00	0.0247	0.1804	0.21	0.04	0.10	GEM
OL-0699-02 (12-14CM)	12.0	14.0	12	2	2009		100	26	80000	36.576	9.75	0.00	0.0222	0.0924	0.11	0.03	0.05	GEM
OL-0699-03 (16-18CM)	16.0	18.0	4	3	2009		188	36	80000	31.692	9.00	0.00	0.0247	0.1805	0.21	0.04	0.10	GMX
OL-0699-04 (20-22CM)	20.0	22.0	12	2	2009		292	43	80000	26.889	7.50	0.01	0.0256	0.3180	0.37	0.06	0.17	GMX
OL-0699-05 (24-26CM)	24.0	26.0	4	3	2009		892	37	80000	22.498	6.50	0.03	0.0245	1.2119	1.43	0.06	0.65	GEM
OL-0699-06(28-30CM)	28.0	30.0	5	3	2009		717	43	80000	26.351	8.00	0.02	0.0253	0.8073	0.95	0.06	0.43	GMX
OL-0699-07 (32-34CM)	32.0	34.0	6	3	2009		35	23	80000	25.198	7.13	0.00	0.0241	0.0432	0.05	0.03	0.02	GEM
OL-0699-08 (36-38CM)	36.0	38.0	13	2	2009		34	31	80000	30.898	9.50	0.00	0.0224	0.0369	0.04	0.04	0.02	GEM
OL-0699-09 (40-42CM)	40.0	42.0	7	3	2009		24	21	80000	22.473	6.63	0.00	0.0245	0.0328	0.04	0.03	0.02	GEM
OL-0699-10 (44-46CM)	44.0	46.0	6	3	2009		86	32	80000	25.585	7.00	0.00	0.0260	0.0971	0.11	0.04	0.05	GMX
OL-0699-11 (48-50CM)	48.0	50.0	7	3	2009		27	32	80000	26.972	8.00	0.00	0.0253	0.0297	0.03	0.04	0.02	GMX
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0699-03 (16-18CM)	16.0	18.0	4	3	2009		188	36	80000	31.692	9.00	0.00	0.0247	0.1805	0.21	0.04	0.10	GMX
OL-0699-03 (16-18CM) Duplicate	16.0	18.0	15	5	2009		189	38	80000	31.692	9.00	0.00	0.0247	0.1814	0.21	0.04	0.10	GMX
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



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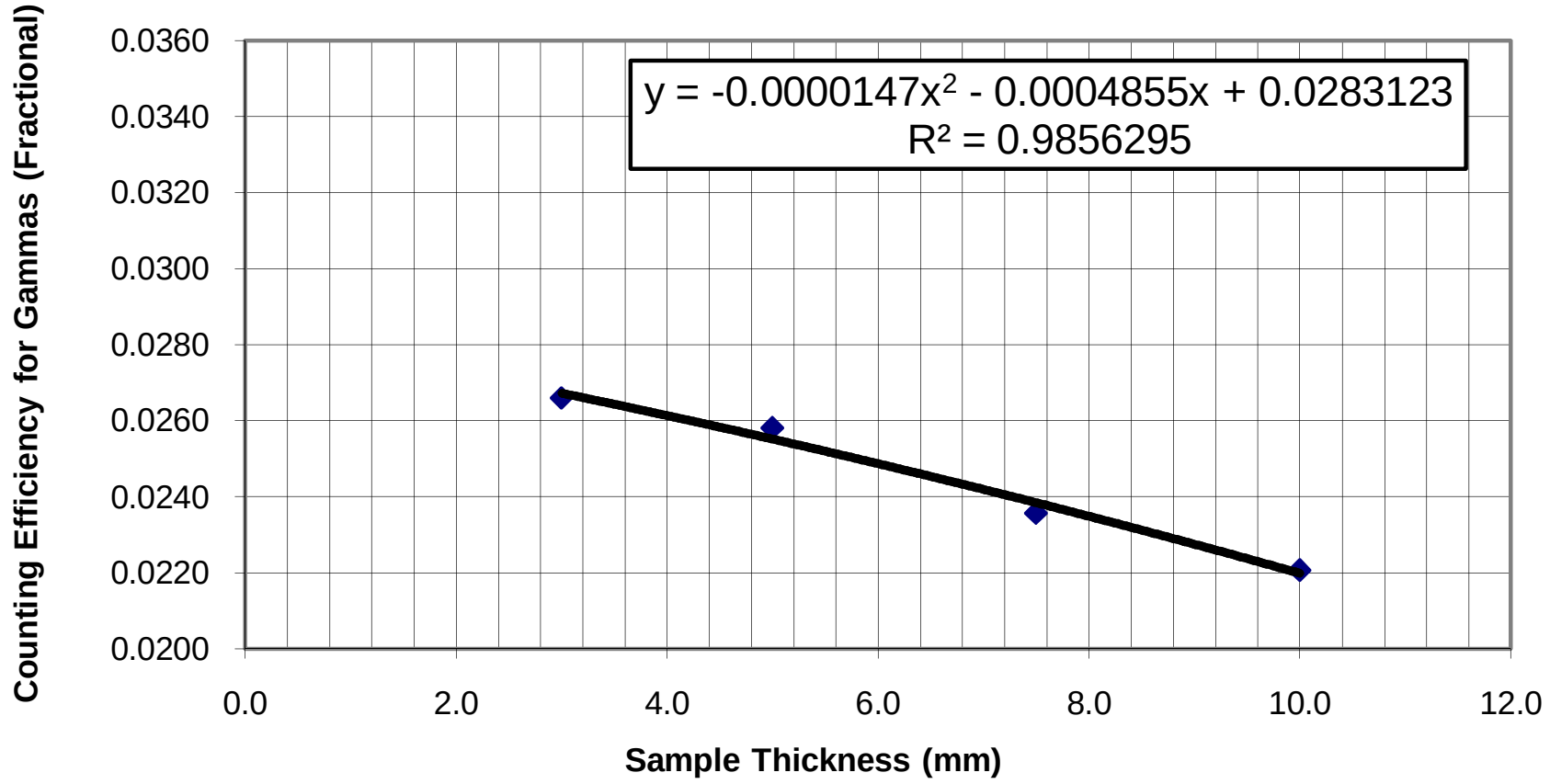
Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core OL-STA-80068 0509

Results of Cs-137 Analysis

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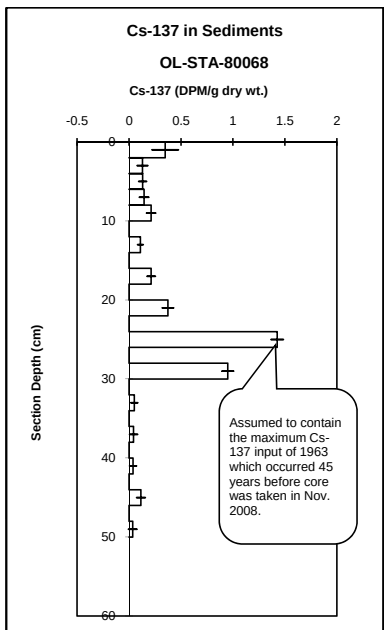
Core ID: OL-STA-80068

Date(s) Received: DEC-4-08
Sampling Date(s): N/A
Project:

Date(s) Analysed: Feb 2 - May 5, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0697-17 (0-2CM)	0.0	2.0	0.35	0.13
2	OL-0697-18 (2-4CM)	2.0	4.0	0.13	0.05
3	OL-0697-19 (4-6CM)	4.0	6.0	0.13	0.04
4	OL-0697-20 (6-8CM)	6.0	8.0	0.14	0.05
5	OL-0699-01 (8-10CM)	8.0	10.0	0.21	0.04
6	OL-0699-02 (12-14CM)	12.0	14.0	0.11	0.03
7	OL-0699-03 (16-18CM)	16.0	18.0	0.21	0.04
8	OL-0699-04 (20-22CM)	20.0	22.0	0.37	0.06
9	OL-0699-05 (24-26CM)	24.0	26.0	1.43	0.06
10	OL-0699-06(28-30CM)	28.0	30.0	0.95	0.06
11	OL-0699-07 (32-34CM)	32.0	34.0	0.05	0.03
12	OL-0699-08 (36-38CM)	36.0	38.0	0.04	0.04
13	OL-0699-09 (40-42CM)	40.0	42.0	0.04	0.03
14	OL-0699-10 (44-46CM)	44.0	46.0	0.11	0.04
15	OL-0699-11 (48-50CM)	48.0	50.0	0.03	0.04
	* : See 'Comments'				



This table must remain open for chart to plot.

Plot Table X Values	Plot Table Y Values
0	0
0.348055	0
0.348055	1
0.475782	1
0.220328	1
0.348055	1
0.348055	2
0	2
0	2
0.12899	2
0.12899	3
0.181734	3
0.076246	3
0.12899	3
0.12899	4
0	4
0	4
0.130821	4
0.130821	5
0.169099	5
0.092543	5
0.130821	5
0.130821	6
0	6
0	6
0	6
0.144492	6
0.144492	7
0.190889	7
0.098096	7
0.144492	7
0.144492	8
0	8
0	8
0.212192	8
0.212192	9
0.256752	9
0.167632	9
0.212192	9
0.212192	10
0	10
0	12
0.108748	12
0.108748	13
0.136512	13
0.080985	13
0.108748	13
0.108748	14
0	14
0	16
0.21234	16
0.21234	17
0.253001	17
0.171679	17
0.21234	17
0.21234	18
0	18
0	20
0.37415	20
0.37415	21
0.429248	21
0.319053	21
0.37415	21
0.37415	22
0	22
0	24
1.425776	24
1.425776	25
1.485659	25
1.365893	25
1.425776	25
1.425776	26
0	26
0	28
0.949811	28
0.949811	28
0.949811	29
1.006773	29
0.892849	29
0.949811	29
0.949811	30
0	30
0	32
0.050837	32
0.050837	33
0.084898	33
0.016776	33
0.050837	33
0.050837	34
0	34
0	36
0.043393	36
0.043393	37
0.082447	37
0.004339	37
0.043393	37
0.043393	38
0	38
0	40
0.038538	40
0.038538	41
0.072451	41
0.004625	41
0.038538	41
0.038538	42
0	42
0	44
0.11427	44
0.11427	45
0.15679	45
0.071751	45
0.11427	45
0.11427	46
0	46
0	48
0.034943	48
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0.076358	49
-0.00647	49
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0.034943	50
0	50

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Sample Information

Project:
Core: OL-STA-80068
Sampling Date(s): N/A
Date(s) Received: DEC-4-08
Analysis Date(s): Feb 2 - May 5, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

OL-STA-80073

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Core ID:	**OL-STA-80073**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**December 4, 2008**
Analysis Date(s):	**Dec. 22, 2008 - Apr. 20, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 8.22 DPM/g observed in the uppermost section (depth 0.0 - 2.0 cm) is about 6.5 times the lowest activity of 1.27 DPM/g in section 36 (extrapolated depth 131 - 135 cm).

The dry bulk density generally increases with depth, ranging 0.205 - 0.814 g/cm^{3}although there are several significant decreases in dry bulk density in the core that suggests the sediments may be of varying composition throughout the core (Page 4).

Sediment accumulation rates show much variability in this core (0.2070 - 2.1261 g/cm^2/year), increasing to 2.1261 g/cm^2/year in section 12 (35 - 39 cm, extrapolated depth), then decreasing to 0.3510 g/cm^2/year in section 19 (63 - 67 cm, extrapolated depth), again increasing to 1.8001 g/cm^2/year in section 26 (91 - 95 cm, extrapolated depth), and then dropping rapidly (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 24 sections (depth 0 - 86 cm), except for the uppermost section, is significantly above background, with an activity in section 2 of 0.30 DPM/g and increasing to a pronounced maximum of 0.68 DPM/g in the 68 - 70 cm section. The Cs-137 activity then declines gradually with depth (Page 12 & 15). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.90, 1.30, 1.26 and 2.29 DPM/g in sections 2 (depth 2.0 - 4.0 cm), 14 (extrapolated depth 43 - 47 cm), 25 (extrapolated depth 87 - 91 cm) and 39 (extrapolated depth 143 - 146 cm), respectively (Page 8, 9, 10 & 11). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise. The Ra-226 activity measured in section 39 is similar to the Pb-210 activity of 2.68 DPM/g in the same section, suggesting that background level of Pb-210 has been attained, and the changing Ra-226 activities also suggest that background levels of Pb-210 vary with depth in this core.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not completely satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210 i.e. it contains a complete Pb-210 inventory. Although several different sections could plausibly be assigned to represent uppermost background, section 34 (extrapolated depth 123 - 127 cm) was chosen because it caused the CRS model to most accurately predict the age (2008 - 1963 = 45 years) of the Cs-137 peak (see Page 2). It has been assumed that the background activity of section 34 (1.51 DPM/g) applies to the sections 26 - 33 immediately above, and that the Ra-226 background of 1.26 DPM/g observed in section 25 applies to sections 23 - 25.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 4 (depth 6 - 8 cm) can be calculated as: 1.955/4.9 = 0.3990 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 20 at 68 - 70 cm depth (Pages 12 and 15) where maximum Cs-137 activity of 0.68 DPM/g occurred. It is possible that the true Cs-137 maximum occurred in the 66 - 68 cm section or the 70 - 72 cm section which were not analysed. The CRS model indicates that each cm of core section contains about 0.6 yr of accumulated sediment over the depth interval of 67 - 71 cm and therefore the uncertainty in the CRS date could be 2 cm X 0.6 yr/cm = +/- 1.2 years, or about 1.2 yr / 45 yr X 100 = +/- 3 %. Total uncertainty is probably greater because of unanalysed sections and unknown processes at work in the core.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y., U.S.A. 13088
Core ID: OL-STA-80073 **Transaction ID:** 393
Date(s) Received: 4-Dec-08 **PO/Contract No.:** 444540.30010.00

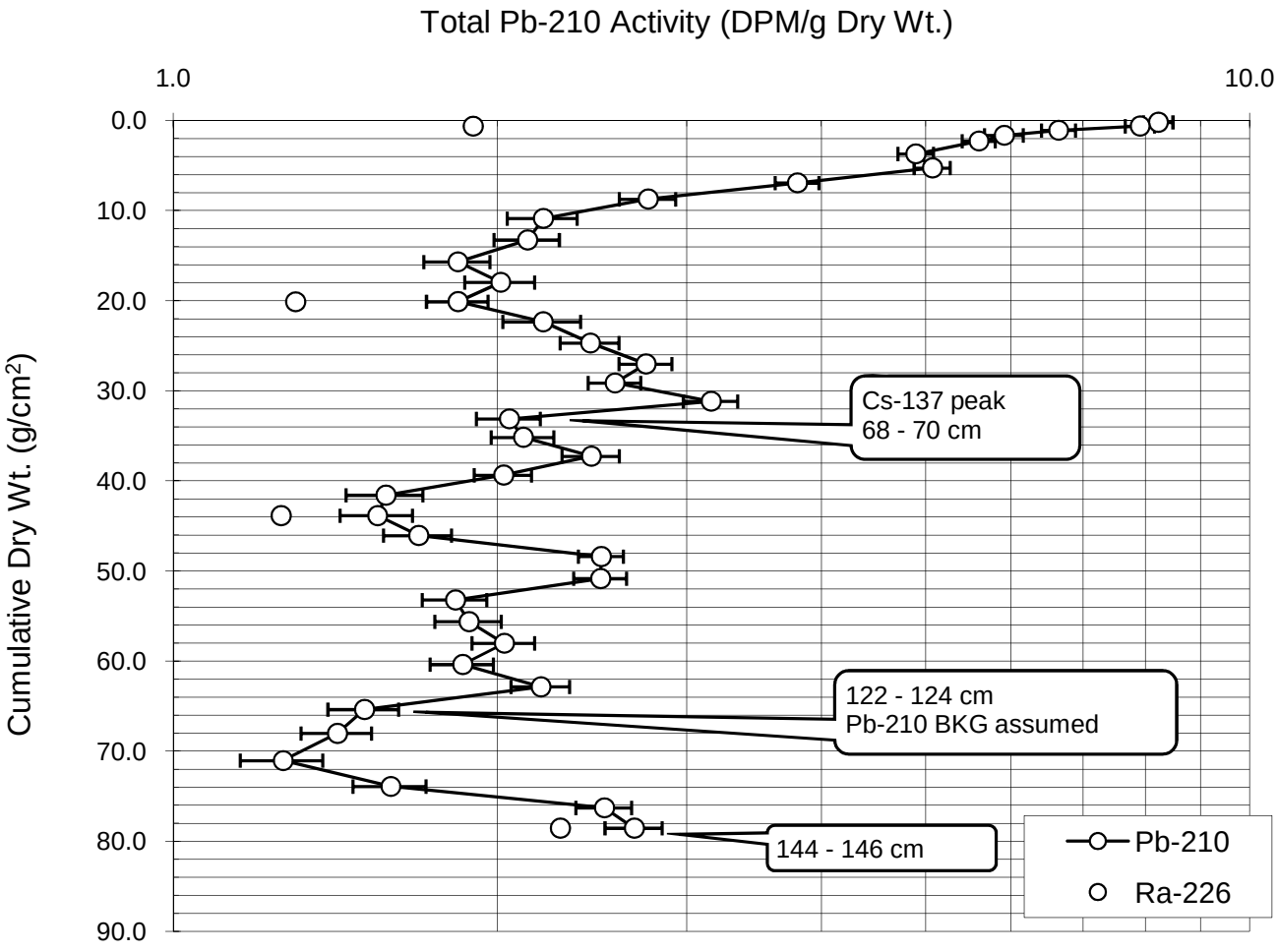
Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrapolated Upper Section Depth (cm)	Extrapolated Lower Section Depth (cm)	Dry Wt./Wet cc. (g/cm^3)	Mass in extrapolated section (g/cm^2)	Cumulative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumulative mass in current section (g/cm^2)	Po-209 counts less detector background	Po-210 counts less detector background and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsupported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumulation Rate (g/cm^2/yr)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0701-01 (0-2 CM)	0.0	2.0	0.00	2.00	0.205	0.410	0.410	0.205	2513	1052	0.506	60000	**8.22**	0.26	6.32	**1.2**	2.0	2.594	0.3432		
2	OL-0701-02 (2-4CM)	2.0	4.0	2.00	4.00	0.224	0.449	0.859	0.635	2613	1094	0.526	60000	**7.91**	0.25	6.01	**2.5**	4.0	2.696	0.3475		1.90
3	OL-0701-03 (4-6 CM)	4.0	6.0	4.00	6.00	0.248	0.495	1.354	1.106	2273	805	0.530	60000	**6.65**	0.24	4.75	**3.7**	6.0	2.349	0.4236		
4	OL-0701-04 (6-8CM)	6.0	8.0	6.00	8.00	0.301	0.601	1.955	1.654	2558	592	0.401	60000	**5.92**	0.25	4.02	**4.9**	8.0	2.414	0.4822		
5	OL-0701-05 (8-10 CM)	8.0	10.0	8.00	11.00	0.342	1.025	2.980	2.297	2906	857	0.523	60000	**5.60**	0.20	3.70	**7.0**	11.0	3.798	0.4966		
6	OL-0701-06 (12-14 CM)	12.0	14.0	11.00	15.00	0.368	1.471	4.451	3.716	2941	740	0.511	60000	**4.90**	0.19	3.00	**9.5**	15.0	4.408	0.5711		
7	OL-0701-07 (16-18 CM)	16.0	18.0	15.00	19.00	0.412	1.646	6.098	5.275	2832	720	0.498	60000	**5.07**	0.20	3.17	**12.9**	19.0	5.224	0.4920		
8	OL-0701-08 (20-22 CM)	20.0	22.0	19.00	23.00	0.421	1.683	7.781	6.939	2542	499	0.513	60000	**3.80**	0.18	1.90	**15.1**	23.0	3.200	0.7527		
9	OL-0701-09 (24-26 CM)	24.0	26.0	23.00	27.00	0.476	1.904	9.684	8.732	4901	340	0.499	60000	**2.76**	0.17	1.46	**17.2**	27.0	2.784	0.9151		
10	OL-0701-10 (28-30 CM)	28.0	30.0	27.00	31.00	0.599	2.396	12.081	10.883	2527	242	0.431	60000	**2.21**	0.16	0.91	**18.9**	31.0	2.175	1.3898		
11	OL-0701-11 (32-34 CM)	32.0	34.0	31.00	35.00	0.591	2.364	14.445	13.263	2410	265	0.513	60000	**2.13**	0.15	0.83	**20.6**	35.0	1.972	1.4346		
12	OL-0701-12 (36-38 CM)	36.0	38.0	35.00	39.00	0.628	2.511	16.956	15.700	2775	267	0.515	60000	**1.84**	0.13	0.54	**21.8**	39.0	1.353	2.1261		
13	OL-0701-13 (40-42 CM)	40.0	42.0	39.00	43.00	0.507	2.027	18.983	17.969	2211	250	0.508	60000	**2.02**	0.15	0.72	**23.1**	43.0	1.449	1.5410		
14	OL-0701-14 (44-46 CM)	44.0	46.0	43.00	47.00	0.567	2.268	21.251	20.117	3002	279	0.499	60000	**1.84**	0.12	0.54	**24.2**	47.0	1.223	1.9660		1.30
15	OL-0701-15 (48-50 CM)	48.0	50.0	47.00	51.00	0.545	2.180	23.430	22.340	1581	178	0.502	60000	**2.21**	0.18	0.91	**26.2**	51.0	1.977	1.1141		
16	OL-0701-16 (52-54 CM)	52.0	54.0	51.00	55.00	0.634	2.535	25.965	24.698	2657	296	0.448	60000	**2.44**	0.15	1.14	**29.3**	55.0	2.891	0.8191		
17	OL-0701-17 (56-58 CM)	56.0	58.0	55.00	59.00	0.531	2.122	28.087	27.026	2720	357	0.471	60000	**2.75**	0.16	1.45	**32.9**	59.0	3.076	0.5805		
18	OL-0701-18 (60-62 CM)	60.0	62.0	59.00	63.00	0.525	2.099	30.186	29.137	2807	359	0.495	60000	**2.57**	0.14	1.27	**36.5**	63.0	2.672	0.5909		
19	OL-0701-19 (64-66 CM)	64.0	66.0	63.00	67.00	0.491	1.965	32.151	31.168	2192	335	0.475	60000	**3.16**	0.18	1.86	**42.1**	67.0	3.656	0.3510		
20	OL-0701-20 (68-70 CM)	68.0	70.0	67.00	71.00	0.484	1.938	34.089	33.120	2714	255	0.452	60000	**2.05**	0.14	0.75	**44.6**	71.0	1.458	0.7642	**Cs-137 peak here**	
21	OL-0703-01 (72-74 CM)	72.0	74.0	71.00	75.00	0.536	2.144	36.233	35.161	2235	261	0.544	60000	**2.12**	0.14	0.82	**47.9**	75.0	1.747	0.6440		
22	OL-0703-02 (76-78 CM)	76.0	78.0	75.00	79.00	0.516	2.063	38.296	37.264	2410	306	0.510	60000	**2.45**	0.15	1.15	**53.1**	79.0	2.365	0.4017		
23	OL-0703-03 (80-82 CM)	80.0	82.0	79.00	83.00	0.532	2.129	40.425	39.361	2544	309	0.590	60000	**2.03**	0.12	0.77	**57.2**	83.0	1.634	0.5196		
24	OL-0703-04 (84-86 CM)	84.0	86.0	83.00	87.00	0.580	2.320	42.745	41.585	2546	208	0.510	60000	**1.58**	0.13	0.32	**59.2**	87.0	0.734	1.1450		
25	OL-0703-05 (88-90 CM)	88.0	90.0	87.00	91.00	0.553	2.214	44.959	43.852	2599	206	0.502	60000	**1.55**	0.12	0.29	**61.1**	91.0	0.638	1.1829		1.26
26	OL-0703-06 (92-94 CM)	92.0	94.0	91.00	95.00	0.552	2.210	47.168	46.063	2626	231	0.512	60000	**1.69**	0.12	0.18	**62.3**	95.0	0.399	1.8001		
27	OL-0703-07 (96-98 CM)	96.0	98.0	95.00	99.00	0.612	2.447	49.615	48.392	2845	482	0.668	60000	**2.50**	0.12	0.99	**71.0**	99.0	2.419	0.2828		
28	OL-0714-04 (100-102 CM)	100.0	102.0	99.00	103.00	0.612	2.447	52.062	50.839	2824	360	0.502	60000	**2.50**	0.14	0.99	**82.8**	103.0	2.410	0.2070		
29	OL-0714-05 (104-106 CM)	104.0	106.0	103.00	107.00	0.573	2.292	54.354	53.208	2680	252	0.507	60000	**1.83**	0.13	0.32	**87.4**	107.0	0.731	0.4922		
30	OL-0714-06 (108-110 CM)	108.0	110.0	107.00	111.00	0.633	2.534	56.888	55.621	2511	239	0.497	60000	**1.88**	0.13	0.37	**94.7**	111.0	0.946	0.3503		
31	OL-0714-07 (112-114 CM)	112.0	114.0	111.00	115.00	0.567	2.269	59.157	58.022	2513	262	0.507	60000	**2.03**	0.14	0.52		115.0	1.180			
32	OL-0714-08 (116-118 CM)	116.0	118.0	115.00	119.00	0.608	2.431	61.588	60.372	2736	260	0.503	60000	**1.86**	0.13	0.35		119.0	0.845			
33	OL-0714-09 (120-122 CM)	120.0	122.0	119.00	123.00	0.629	2.515	64.103	62.846	2899	324	0.502	60000	**2.20**	0.14	0.69		123.0	1.727			
34	OL-0714-10 (124-126 CM)	124.0	126.0	123.00	127.00	0.632	2.530	66.633	65.368	2851	217	0.498	60000	**1.51**	0.11	0.00		127.0	0.00			
35	OL-0714-11 (128-130CM)	128.0	130.0	127.00	131.00	0.693	2.772	69.405	68.019	2973	221	0.516	60000	**1.42**	0.11							
36	OL-0714-12 (132-134 CM)	132.0	134.0	131.00	135.00	0.814	3.254	72.659	71.032	2543	165	0.503	60000	**1.27**	0.11							
37	OL-0714-13 (136-138 CM)	136.0	138.0	135.00	139.00	0.621	2.485	75.144	73.901	2455	205	0.517	60000	**1.59**	0.12							
38	OL-0714-14 (140-142 CM)	140.0	142.0	139.00	143.00	0.566	2.265	77.409	76.276	2731	350	0.501	60000	**2.52**	0.15							
39	OL-0714-15 (144-146 CM)	144.0	146.0	143.00	146.00	0.563	1.688	79.097	78.535	2355	327	0.496	60000	**2.68**	0.16							2.29
Blank	Blank									5	27											
Blank	Blank									1257	19											
Blank	Blank									2238	6											
3	OL-0701-03 (4-6 CM)					0.246																
3 Dup	OL-0701-03 (4-6 CM) Dup					0.249																
11	OL-0701-11 (32-34 CM)					0.590																
11 Dup	OL-0701-11 (32-34 CM) Dup					0.592																
4	OL-0701-04 (6-8CM)									2558	592	0.401	60000	**5.74**	0.25							
4 Dup	OL-0701-04 (6-8CM) Dup									3007	760	0.414	60000	**6.07**	0.23							
13	OL-0701-13 (40-42 CM)									2211	250	0.508	60000	**2.18**	0.15							
13 Dup	OL-0701-13 (40-42 CM) Dup									1953	207	0.570	60000	**1.82**	0.15							
18	OL-0701-18 (60-62 CM)									2807	359	0.495	60000	**2.55**	0.14							
18 Dup	OL-0701-18 (60-62 CM) Dup									2479	348	0.532	60000	**2.60**	0.15							
39	OL-0714-15 (144-146 CM)									2355	327	0.496	60000	**2.76**	0.16							
39 Dup	OL-0714-15 (144-146 CM) Dup									2920	439	0.507	60000	**2.92**	0.15							
																Total DPM/cm^2 in core		71.14				

*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

OL-STA-80073



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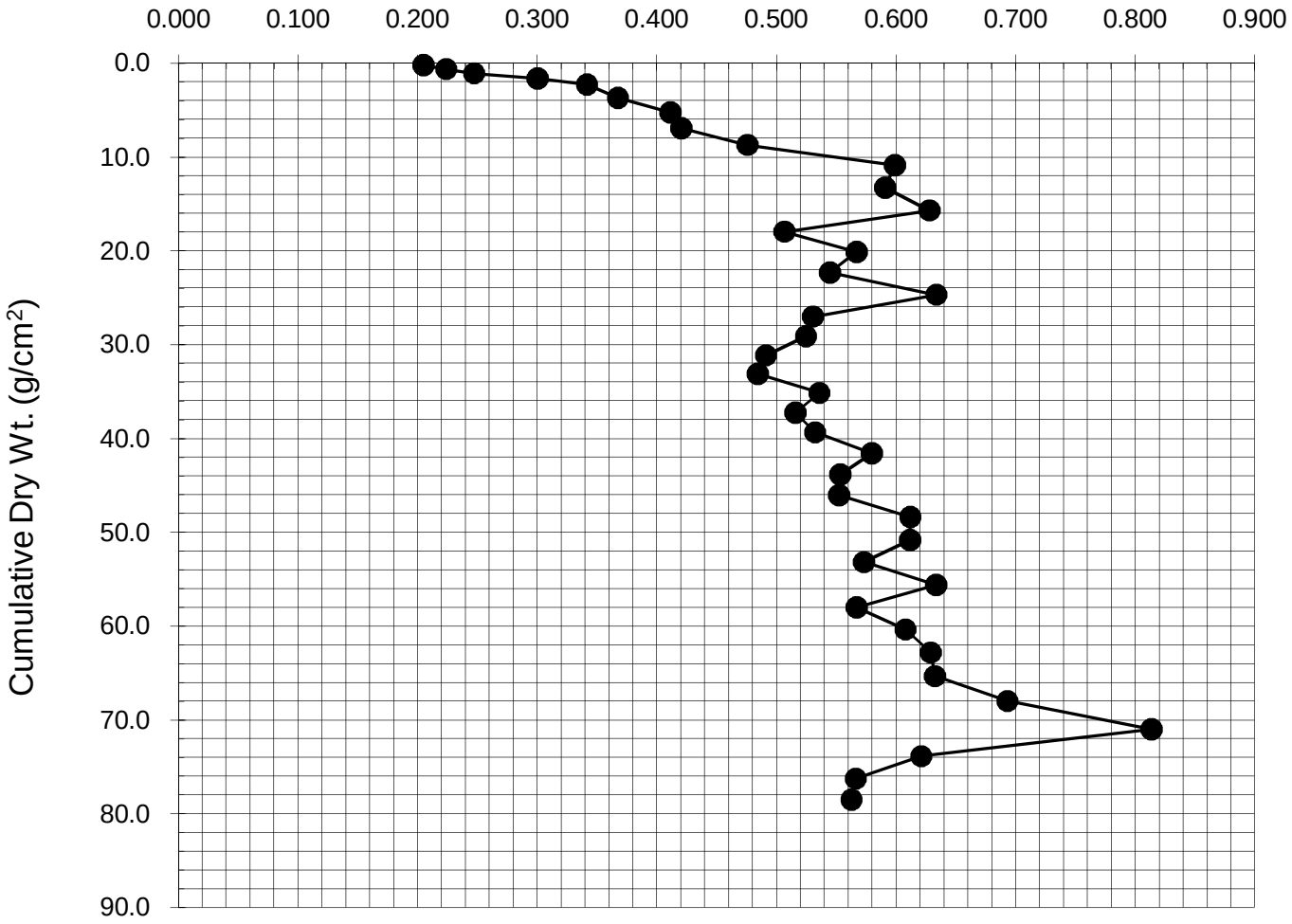
Dry Bulk Density vs. Accumulated Sediment

OL-STA-80073



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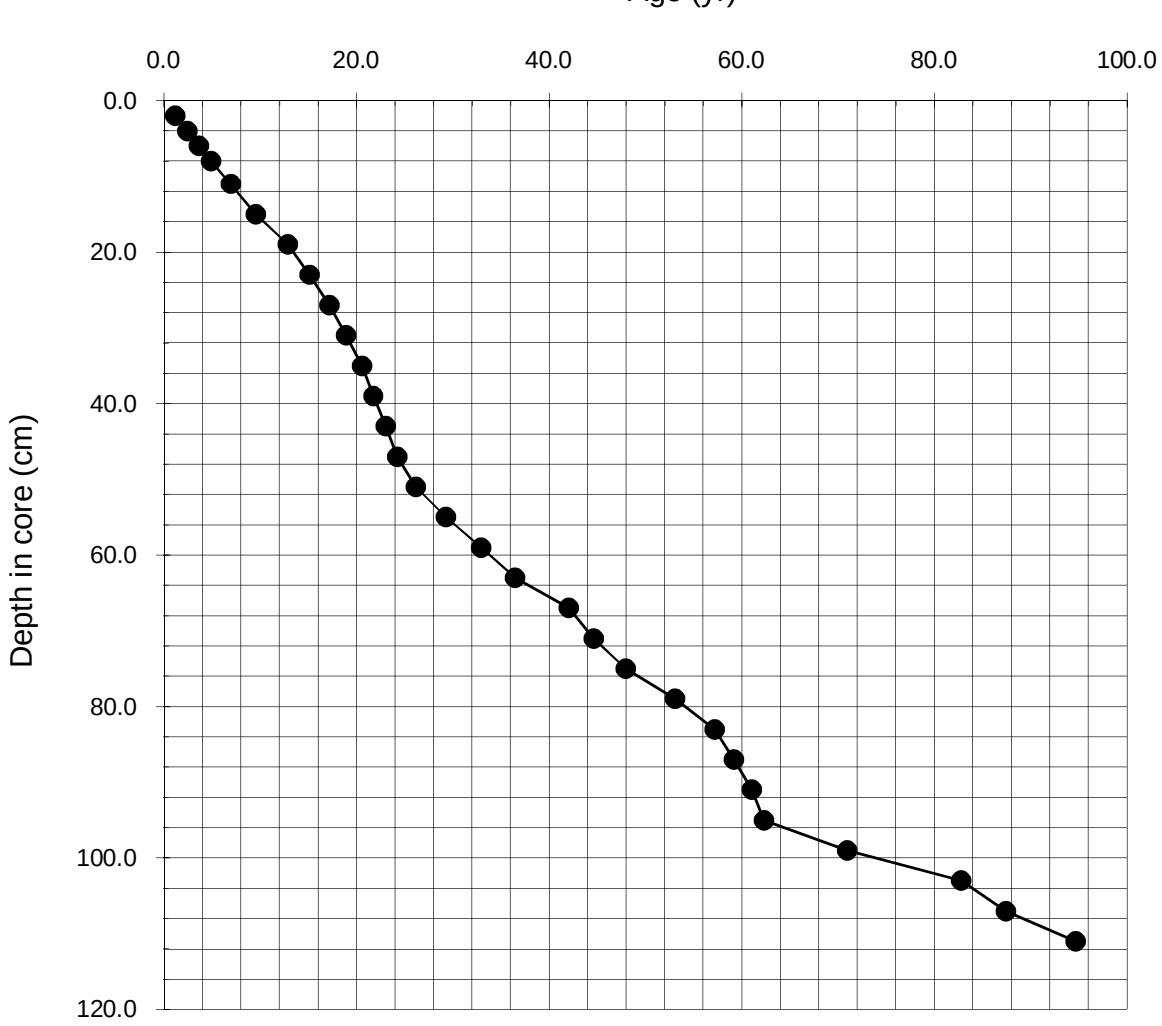
Age (yr) vs. Depth (cm)
CRS Model

OL-STA-80073



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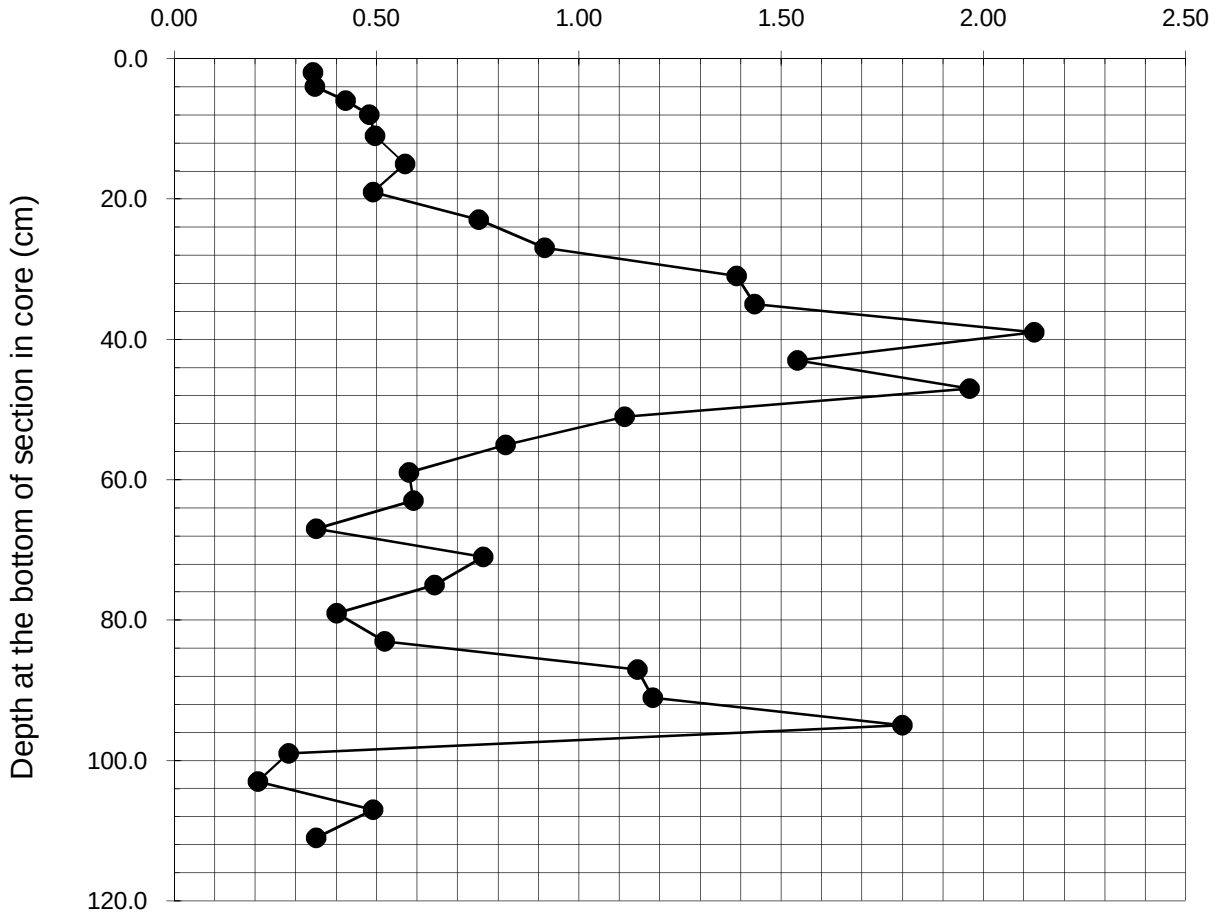
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

OL-STA-80073



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Results of Ra-226 Analysis by Rn-222 Emanation

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y., U.S.A. 13088

Core ID: OL-STA-80073
Date(s) Received: 4-Dec-08
Sampling Dates(s): N/A
Project:

Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Dec. 22, 2008 - Apr. 20, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
OL-STA-80073	OL-0701-02 (2 - 4 cm)	1.90	0.03
OL-STA-80073	OL-0701-14 (44-46 cm)	1.30	0.02
OL-STA-80073	OL-0703-05 (80-90 cm)	1.26	0.03
OL-STA-80073	OL-0714-15 (144-146 cm)	2.29	0.03

* : See comments section above for discussion.

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80073										
SAMPLE ID	OL-0701-02 (2 - 4 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.987										
Total Count in Period	9296										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	15	37	0	15.99	0.94491	0.92507
	When cell filled	2009	3	27	39899	15	20	0			
	Beginning time of count	2009	3	27	39899	17	19	0			
Counts/min. (gross)	9.30										
CPM less Cell BKG	9.03										
CPM (decay during count corrected)	9.76										
DPM Sample + System (efficiency corrected)	11.27										
DPM Sample	11.34	Error +/	0.1544	DPM							
DPM/g	5.71										
Ra-226 DPM/g	**1.90**	Error +/	0.0259	DPM/g		1 SD			Error % =	1.4	
Ra-226 pCi/g →	0.86										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80073										
SAMPLE ID	OL-0701-14 (44-46 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.981										
Total Count in Period	6598										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	15	36	0	16.89	0.95323	0.92483
	When cell filled	2009	3	28	39900	12	59	0			
	Beginning time of count	2009	3	28	39900	15	0	0			
Counts/min. (gross)	6.60										
CPM less Cell BKG	6.33										
CPM (decay during count corrected)	6.85										
DPM Sample + System (efficiency corrected)	7.90										
DPM Sample	7.71	Error +/	0.1379	DPM							
DPM/g	3.89										
Ra-226 DPM/g	**1.30**	Error +/	0.0232	DPM/g		1 SD			Error % =	1.8	
Ra-226 pCi/g →	0.59										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80073										
SAMPLE ID	OL-0703-05 (80-90 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.488										
Total Count in Period	4678										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	6	39909	18	57	0	11.78	0.88188	0.92437
	When cell filled	2009	4	18	39921	13	42	0			
	Beginning time of count	2009	4	18	39921	15	47	0			
Counts/min. (gross)	4.68										
CPM less Cell BKG	4.41										
CPM (decay during count corrected)	4.77										
DPM Sample + System (efficiency corrected)	5.52										
DPM Sample	5.63	Error +/	0.1295	DPM							
DPM/g	3.79										
Ra-226 DPM/g	**1.26**	Error +/	0.0290	DPM/g		1 SD			Error % =	2.3	
Ra-226 pCi/g →	0.57										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80073										
SAMPLE ID	OL-0714-15 (144-146 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.731										
Total Count in Period	9270										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										

		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	6	39909	18	58	0	12.75	0.90085	0.92460
	When cell filled	2009	4	19	39922	12	53	0			
	Beginning time of count	2009	4	19	39922	14	56	0			

Counts/min. (gross)	9.27										
CPM less Cell BKG	9.00										
CPM (decay during count corrected)	9.74										
DPM Sample + System (efficiency corrected)	11.26										
DPM Sample	11.89	Error +/	0.1589	DPM							
DPM/g	6.87										
Ra-226 DPM/g	**2.29**	Error +/	0.0306	DPM/g		1 SD			Error % =	1.3	
Ra-226 pCi/g →	1.04										

Chemist Name	X. Hu / R. Flett
PMT High Voltage +ve	778
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch. #s	28-1023
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	4

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20-Apr-09

Results authorised by Dr. Robert J. Flett

Results of Cs-137 Analysis

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y., U.S.A. 13088

Core ID: OL-STA-80073
Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

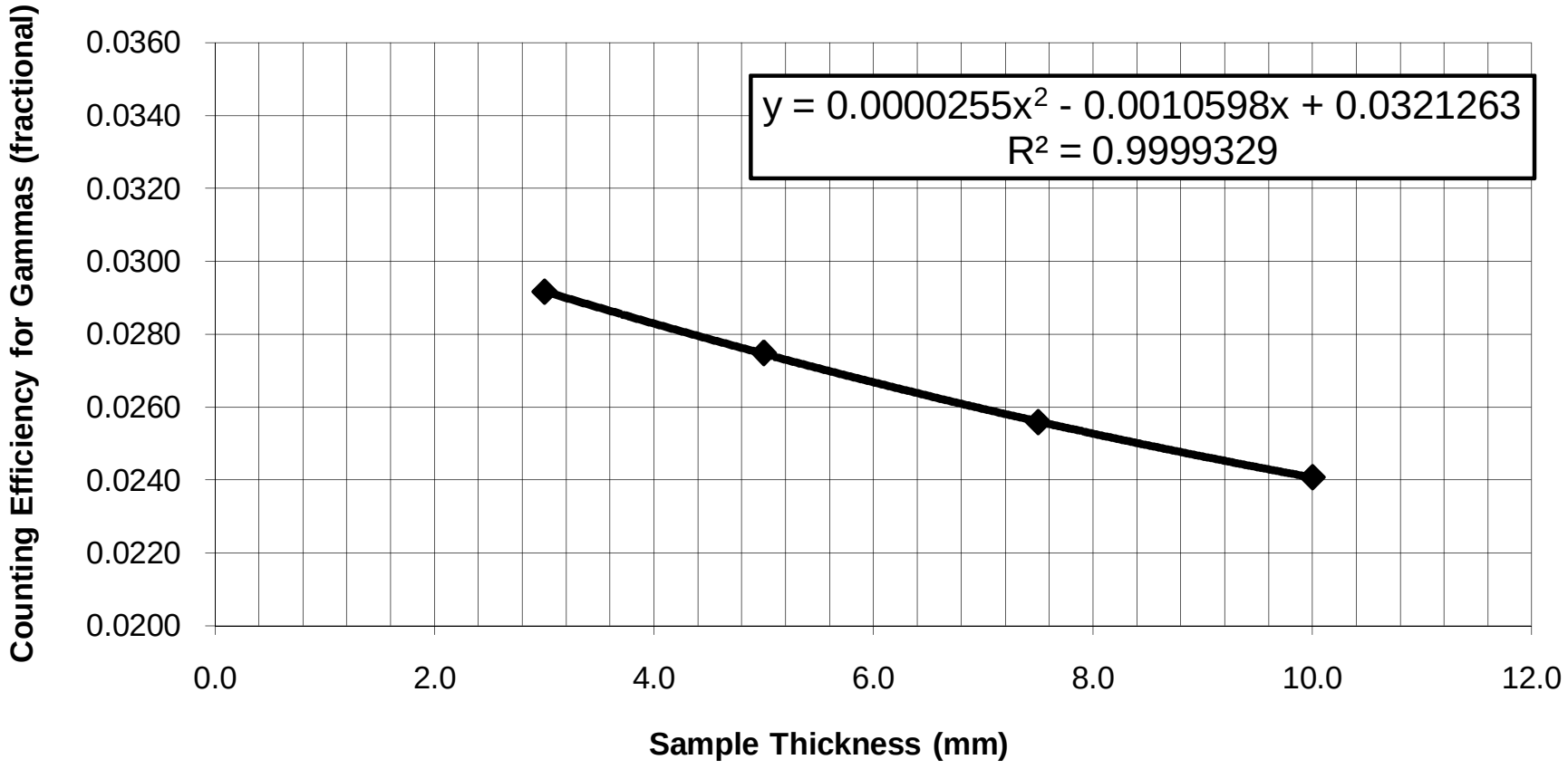
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Dec. 22, 2008 - Apr. 20, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0701-01 (0-2 CM)	0.0	2.0	30	12	2008		7	53	80000	5.495	2.00	0.00	0.0301	0.0317	0.04	0.28	0.02	GMX
OL-0701-02 (2-4 CM)	2.0	4.0	31	12	2008		194	45	80000	21.971	6.67	0.01	0.0262	0.2529	0.30	0.07	0.13	GMX
OL-0701-03 (4-6 CM)	4.0	6.0	1	1	2009		79	48	80000	23.028	7.00	0.00	0.0260	0.0991	0.12	0.07	0.05	GMX
OL-0701-04 (6-8 CM)	6.0	8.0	2	1	2009		204	46	80000	28.883	8.00	0.01	0.0253	0.2096	0.25	0.06	0.11	GMX
OL-0701-05 (8-10 CM)	8.0	10.0	2	1	2009		250	36	80000	31.577	9.50	0.01	0.0224	0.2654	0.31	0.04	0.14	GEM
OL-0701-06 (12-14 CM)	12.0	14.0	4	1	2009		199	44	80000	18.836	5.50	0.01	0.0271	0.2927	0.34	0.08	0.16	GMX
OL-0701-07 (16-18 CM)	16.0	18.0	4	1	2009		131	34	80000	27.827	8.60	0.00	0.0231	0.1532	0.14	0.05	0.06	GEM
OL-0701-08 (20-22 CM)	20.0	22.0	5	1	2009		127	48	80000	22.853	6.50	0.00	0.0263	0.1584	0.19	0.07	0.08	GMX
OL-0701-09 (24-26 CM)	24.0	26.0	5	1	2009		105	30	80000	25.999	7.50	0.00	0.0238	0.1270	0.15	0.04	0.07	GEM
OL-0701-10 (28-30 CM)	28.0	30.0	6	1	2009		51	45	80000	21.839	6.00	0.00	0.0267	0.0656	0.08	0.07	0.03	GMX
OL-0701-11 (32-34 CM)	32.0	34.0	6	1	2009		35	23	80000	26.991	8.30	0.00	0.0233	0.0418	0.05	0.03	0.02	GEM
OL-0701-12 (36-38 CM)	36.0	38.0	14	1	2009		65	29	80000	21.219	6.00	0.00	0.0249	0.0924	0.11	0.05	0.05	GEM
OL-0701-13 (40-42 CM)	40.0	42.0	14	1	2009		72	35	80000	19.783	5.00	0.00	0.0275	0.0994	0.12	0.06	0.05	GMX
OL-0701-14 (44-46 CM)	**44.0**	**46.0**	**21**	**1**	**2009**		**127**	**34**	**80000**	**19.447**	**5.00**	**0.00**	**0.0275**	**0.1783**	**0.21**	**0.06**	**0.09**	**GMX**
OL-0701-15 (48-50 CM)	48.0	50.0	22	1	2009		144	31	80000	27.978	7.40	0.00	0.0239	0.1614	0.19	0.04	0.09	GEM
OL-0701-16 (52-54 CM)	52.0	54.0	22	1	2009		114	37	80000	24.786	7.00	0.00	0.0260	0.1329	0.16	0.05	0.07	GMX
OL-0701-17 (56-58 CM)	56.0	58.0	23	1	2009		133	33	80000	22.660	6.00	0.00	0.0249	0.1770	0.21	0.05	0.09	GEM
OL-0701-18 (60-62 CM)	60.0	62.0	23	1	2009		271	38	80000	18.508	5.00	0.01	0.0275	0.3999	0.47	0.07	0.21	GMX
OL-0701-19 (64-66 CM)	64.0	66.0	24	1	2009		271	33	80000	25.506	7.00	0.01	0.0242	0.3294	0.39	0.05	0.18	GEM
OL-0701-20 (68-70 CM)	68.0	70.0	24	1	2009		509	43	80000	24.592	6.00	0.02	0.0267	0.5817	0.68	0.06	0.31	GMX
OL-0703-01 (72-74 CM)	72.0	74.0	11	3	2009		303	40	80000	27.093	7.83	0.01	0.0254	0.3303	0.39	0.05	0.18	GMX
OL-0703-02 (76-78 CM)	76.0	78.0	11	3	2009		286	28	80000	22.231	6.83	0.01	0.0243	0.3968	0.47	0.05	0.21	GEM
OL-0703-03 (80-82 CM)	80.0	82.0	13	3	2009		216	34	80000	23.529	7.00	0.01	0.0242	0.2846	0.33	0.05	0.15	GEM
OL-0703-04 (84-86 CM)	84.0	86.0	13	3	2009		105	37	80000	24.477	7.38	0.00	0.0257	0.1252	0.15	0.05	0.07	GMX
OL-0703-05 (88-90 CM)	88.0	90.0	14	3	2009		70	28	80000	27.968	8.75	0.00	0.0229	0.0818	0.10	0.04	0.04	GEM
OL-0703-06 (92-94 CM)	92.0	94.0	14	3	2009		-2	36	80000	22.334	6.75	0.00	0.0261	-0.0026	0.00	0.05	0.00	GMX
OL-0703-07 (96-98 CM)	96.0	98.0	25	3	2009		69	33	80000	27.220	8.88	0.00	0.0247	0.0769	0.09	0.04	0.04	GMX
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0701-07 (16-18 CM)	16.0	18.0	4	1	2009		131	34	80000	27.827	8.60	0.00	0.0231	0.1532	0.18	0.05	0.08	GEM
OL-0701-07 (16-18 CM) Duplicate	16.0	18.0	16	5	2009		72	32	80000	27.827	8.60	0.00	0.0231	0.0842	0.10	0.04	0.04	GEM
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

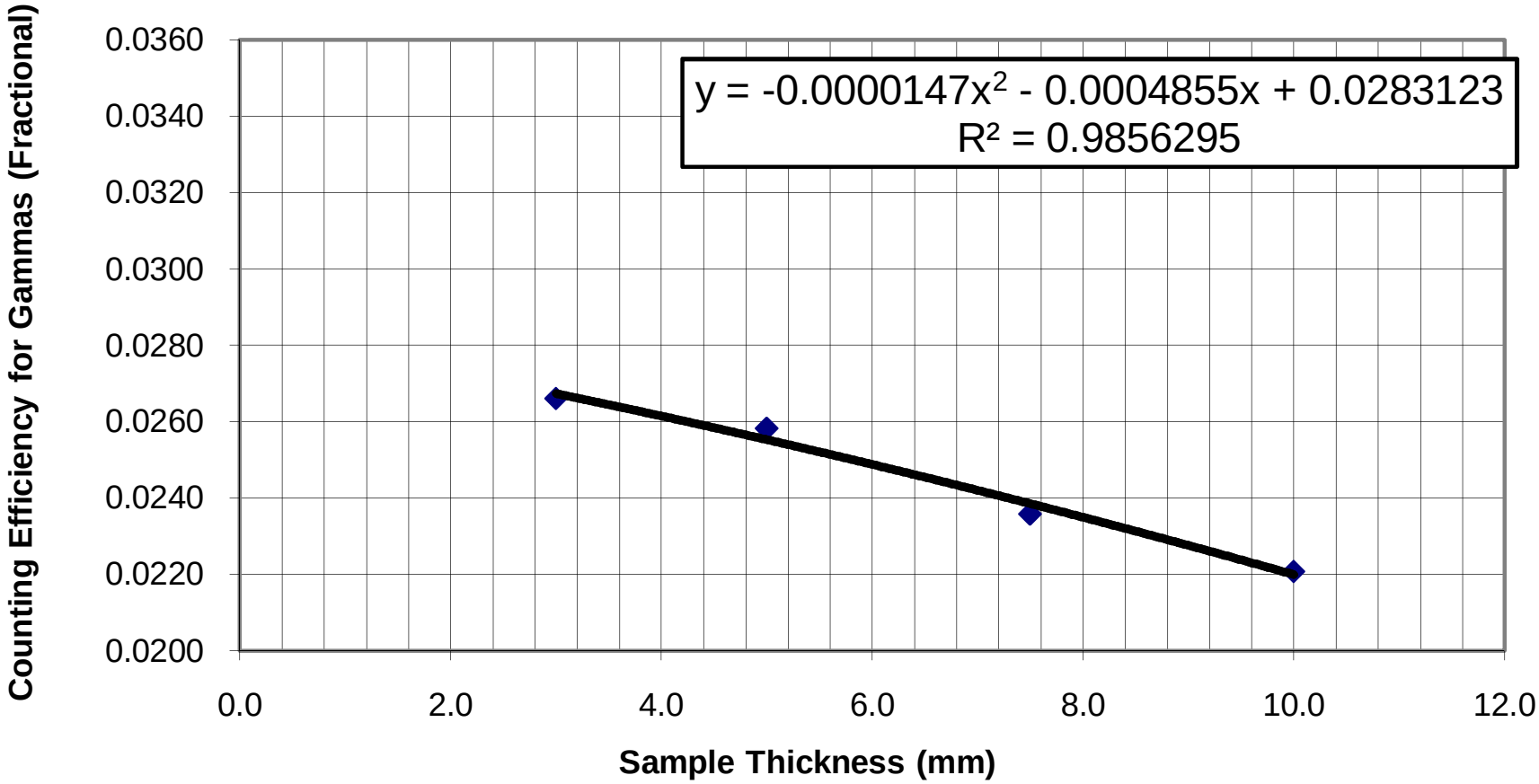
* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core OL-STA-80073 0509

Results of Cs-137 Analysis

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Client: Babcock, David

Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y., U.S.A. 13088

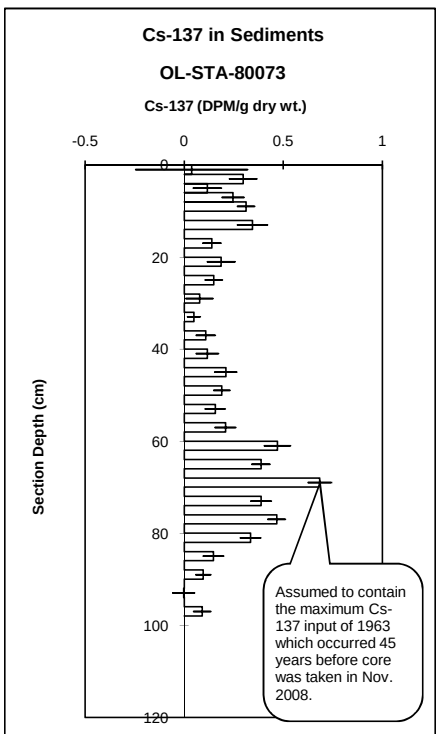
Core ID: OL-STA-80073

Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

Date(s) Analysed: Dec. 22, 2008 - Apr. 20, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0701-01 (0-2 CM)	0.00	2.00	0.04	0.28
2	OL-0701-02 (2-4 CM)	2.00	4.00	0.30	0.07
3	OL-0701-03 (4-6 CM)	4.00	6.00	0.12	0.07
4	OL-0701-04 (6-8 CM)	6.00	8.00	0.25	0.06
5	OL-0701-05 (8-10 CM)	8.00	10.00	0.31	0.04
6	OL-0701-06 (12-14 CM)	12.00	14.00	0.34	0.08
7	OL-0701-07 (16-18 CM)	16.00	18.00	0.14	0.05
8	OL-0701-08 (20-22 CM)	20.00	22.00	0.19	0.07
9	OL-0701-09 (24-26 CM)	24.00	26.00	0.15	0.04
10	OL-0701-10 (28-30 CM)	28.00	30.00	0.08	0.07
11	OL-0701-11 (32-34 CM)	32.00	34.00	0.05	0.03
12	OL-0701-12 (36-38 CM)	36.00	38.00	0.11	0.05
13	OL-0701-13 (40-42 CM)	40.00	42.00	0.12	0.06
14	OL-0701-14 (44-46 CM)	44.00	46.00	0.21	0.06
15	OL-0701-15 (48-50 CM)	48.00	50.00	0.19	0.04
16	OL-0701-16 (52-54 CM)	52.00	54.00	0.16	0.05
17	OL-0701-17 (56-58 CM)	56.00	58.00	0.21	0.05
18	OL-0701-18 (60-62 CM)	60.00	62.00	0.47	0.07
19	OL-0701-19 (64-66 CM)	64.00	66.00	0.39	0.05
20	OL-0701-20 (68-70 CM)	68.00	70.00	0.68	0.06
21	OL-0703-01 (72-74 CM)	72.00	74.00	0.39	0.05
22	OL-0703-02 (76-78 CM)	76.00	78.00	0.47	0.05
23	OL-0703-03 (80-82 CM)	80.00	82.00	0.33	0.05
24	OL-0703-04 (84-86 CM)	84.00	86.00	0.15	0.05
25	OL-0703-05 (88-90 CM)	88.00	90.00	0.10	0.04
26	OL-0703-06 (92-94 CM)	92.00	94.00	0.00	0.05
27	OL-0703-07 (96-98 CM)	96.00	98.00	0.09	0.04
	* : See 'Comments'				



This table must remain open for chart to plot.	Plot Table X Values	Plot Table Y Values
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	-0.24533	1
	0.037332	1
	0.037332	2
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	0	2
	0.297481	2
	0.297481	3
	0.366485	3
	0.228478	3
	0.297481	3
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	0.116625	4
	0.116625	5
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Sample Information

Project:
Core: OL-STA-80073
Sampling Date(s): N/A
Date(s) Received: December 4, 2008
Analysis Date(s): Dec. 22, 2008 - Apr. 20, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

OL-STA-80076

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Core ID:	**OL-STA-80076**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**December 4, 2008**
Analysis Date(s):	**Jan. 19 - May 2, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 10.30 DPM/g observed in section 3 (depth 4.0 - 6.0 cm) is about 5.4 times the lowest activity of 1.91 DPM/g in section 17 (extrapolated depth 55- 59 cm).

The dry bulk density profile is irregular, ranging 0.224 - 0.562 g/cm^3. It gradually increases to 0.480 g/cm^3 with depth until 23 cm, then decreases to 0.256 g/cm^3 at 35 - 39 cm (extrapolated depth), and then generally increases with depth (Page 4). This density profile is unusual compared to most cores which typically have increasing dry bulk density as a function with depth, and suggests that the sediments may be of varying composition throughout the core.

Sediment accumulation rates show much variability in this core (0.1674 - 2.9126 g/cm^2/year), showing a sudden increase to 2.9126 g/cm^2/year in section 17 (55 - 59 cm, extrapolated depth), then decreasing to 0.2349 g/cm^2/year in section 19 (63 - 67 cm, extrapolated depth), again increasing to 1.7567 g/cm^2/year in section 22 (75 - 79 cm, extrapolated depth), and then dropping rapidly (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 14 sections (depth 0 - 46 cm) is significantly above background, with a surface activity of 0.28 DPM/g and increasing to a pronounced maximum of 2.09 DPM/g in the 36 - 38 cm section. The Cs-137 activity then declines gradually with depth (Page 12 & 15). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.66, 1.81, 1.89 and 2.80 DPM/g in sections 4 (depth 6.0 - 8.0 cm), 14 (extrapolated depth 43 - 47 cm), 23 (extrapolated depth 79 - 83 cm), and 27 (extrapolated depth 95 - 98 cm), respectively (Page 8, 9, 10 & 11). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise. The Ra-226 activity measured in section 27 is similar to the Pb-210 activity of 3.03 DPM/g in the same section, suggesting that background level of Pb-210 has been attained, and the changing Ra-226 activities also suggest that background levels of Pb-210 vary with depth in this core.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not completely satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210 i.e. it contains a complete Pb-210 inventory. Although several different sections could plausibly be assigned to represent uppermost background, section 27 (extrapolated depth 95 - 98 cm) was chosen because it caused the CRS model to most accurately predict the age (2008 - 1963 = 45 years) of the Cs-137 peak (see Page 2). It has been assumed that the background activity of section 27 (3.03 DPM/g) applies to section 27 itself, and that the Ra-226 background of 1.89 DPM/g observed in section 23 applies to sections 20 - 26.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 4 (depth 6 - 8 cm) can be calculated as: 1.958/8.8 = 0.2225 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 12 at 36 - 38 cm depth (Pages 12 and 15) where maximum Cs-137 activity of 2.09 DPM/g occurred. It is possible that the true Cs-137 maximum occurred in the 34 - 36 cm section or the 38 - 40 cm section which were not analysed. The CRS model indicates that each cm of core section contains about 1 yr of accumulated sediment over the depth interval of 35 - 39 cm and therefore the uncertainty in the CRS date could be 2 cm X 1.28 yr/cm = +/- 2.6 years, or about 2.6 yr / 45 yr X 100 = +/- 6%.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Core ID: OL-STA-80076 **Transaction ID: 393**

Date(s) Received: 4-Dec-08 **PO/Contract No.: 444540.30010.00**

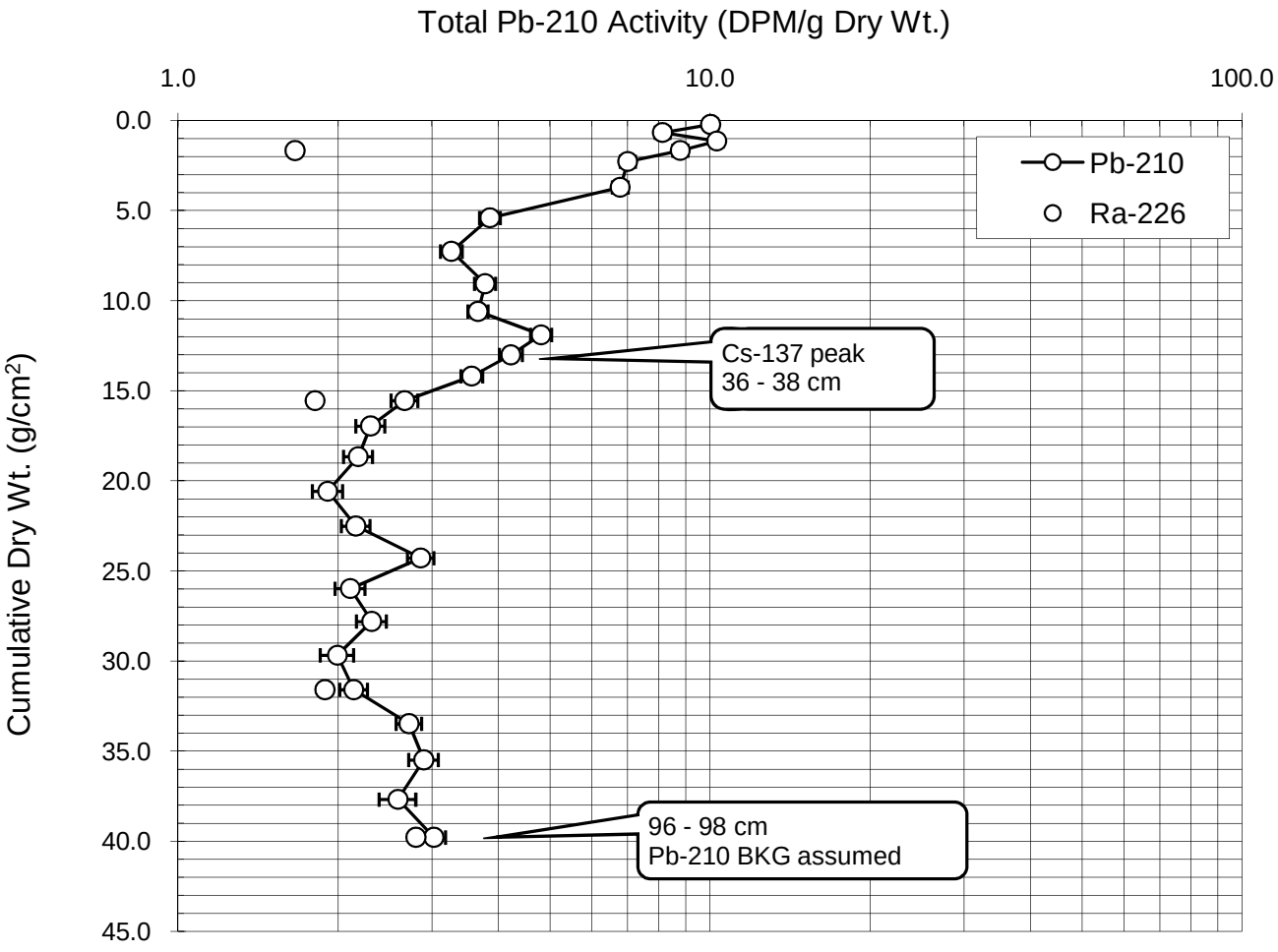
Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrap-olated Upper Section Depth (cm)	Extrap-olated Lower Section Depth (cm)	Dry Wt./ Wet cc. (g/cm^3)	Mass in extrap-olated section (g/cm^2)	Cumul-ative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumul-ative mass in current section (g/cm^2)	Po-209 counts less detector back-ground	Po-210 counts less detector back-ground and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsup-ported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumu-lation Rate ($g/cm^2/yr$)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0709-08 (0-2CM)	0.0	2.0	0.00	2.00	0.224	0.447	0.447	0.224	2193	1247	0.560	60000	**10.04**	0.29	8.38	**2.0**	2.0	3.744	0.2243		
2	OL-0709-09 (2-4CM)	2.0	4.0	2.00	4.00	0.229	0.458	0.905	0.676	2780	1038	0.453	60000	**8.15**	0.26	6.49	**3.7**	4.0	2.968	0.2735		
3	OL-0709-10 (4-6CM)	4.0	6.0	4.00	6.00	0.240	0.480	1.385	1.145	2649	1375	0.498	60000	**10.30**	0.28	8.64	**6.2**	6.0	4.147	0.1925		
4	OL-0709-11 (6-8CM)	6.0	8.0	6.00	8.00	0.287	0.574	1.958	1.671	2513	998	0.446	60000	**8.80**	0.29	7.14	**8.8**	8.0	4.094	0.2151		1.66
5	OL-0709-12 (8-10CM)	8.0	10.0	8.00	11.00	0.322	0.966	2.924	2.280	2746	971	0.498	60000	**7.01**	0.23	5.35	**12.5**	11.0	5.165	0.2601		
6	OL-0709-13 (12-14CM)	12.0	14.0	11.00	15.00	0.395	1.580	4.504	3.714	2958	930	0.458	60000	**6.78**	0.23	5.12	**19.4**	15.0	8.092	0.2307		
7	OL-0709-14 (16-18CM)	16.0	18.0	15.00	19.00	0.451	1.804	6.307	5.405	2742	485	0.475	60000	**3.86**	0.18	2.20	**23.4**	19.0	3.965	0.4538		
8	OL-0709-15 (20-22CM)	20.0	22.0	19.00	23.00	0.480	1.919	8.226	7.267	2935	439	0.492	60000	**3.27**	0.15	1.61	**26.8**	23.0	3.082	0.5533		
9	OL-0709-16 (24-26CM)	24.0	26.0	23.00	27.00	0.417	1.668	9.894	9.060	2819	559	0.518	60000	**3.78**	0.17	2.12	**31.3**	27.0	3.532	0.3708		
10	OL-0709-17 (28-30CM)	28.0	30.0	27.00	31.00	0.351	1.403	11.298	10.596	3050	571	0.504	60000	**3.66**	0.16	2.00	**35.4**	31.0	2.814	0.3427		
11	OL-0709-18 (32-34CM)	32.0	34.0	31.00	35.00	0.300	1.200	12.498	11.898	2157	521	0.495	60000	**4.81**	0.22	3.00	**41.6**	35.0	3.606	0.1952		
12	OL-0709-19 (36-38CM)	36.0	38.0	35.00	39.00	0.256	1.025	13.523	13.010	1991	442	0.519	60000	**4.23**	0.21	2.42	**46.6**	39.0	2.477	0.2039	**Cs-137 peak here**	
13	OL-0709-20 (40-42CM)	40.0	42.0	39.00	43.00	0.335	1.340	14.862	14.192	2675	499	0.516	60000	**3.57**	0.17	1.76	**52.2**	43.0	2.354	0.2376		
14	OL-0711-01 (44-46CM)	44.0	46.0	43.00	47.00	0.344	1.374	16.236	15.549	2521	336	0.493	60000	**2.67**	0.16	0.86	**55.5**	47.0	1.179	0.4236		1.81
15	OL-0711-02 (48-50CM)	48.0	50.0	47.00	51.00	0.361	1.443	17.679	16.958	2726	298	0.469	60000	**2.30**	0.14	0.49	**57.6**	51.0	0.710	0.6795		
16	OL-0711-03 (52-54CM)	52.0	54.0	51.00	55.00	0.490	1.961	19.641	18.660	2517	298	0.536	60000	**2.18**	0.14	0.37	**59.9**	55.0	0.730	0.8378		
17	OL-0711-04 (56-58CM)	56.0	58.0	55.00	59.00	0.468	1.873	21.514	20.577	2894	281	0.501	60000	**1.91**	0.12	0.10	**60.6**	59.0	0.191	2.9126		
18	OL-0711-05 (60-62CM)	60.0	62.0	59.00	63.00	0.496	1.984	23.498	22.506	2778	301	0.496	60000	**2.16**	0.13	0.35	**63.0**	63.0	0.693	0.8121		
19	OL-0711-06 (64-66CM)	64.0	66.0	63.00	67.00	0.393	1.574	25.071	24.284	2389	372	0.537	60000	**2.86**	0.16	1.05	**69.7**	67.0	1.652	0.2349		
20	OL-0711-07 (68-70CM)	68.0	70.0	67.00	71.00	0.453	1.811	26.882	25.977	2674	286	0.501	60000	**2.11**	0.14	0.22	**71.6**	71.0	0.395	0.9880		
21	OL-0714-16 (72-74 CM)	72.0	74.0	71.00	75.00	0.458	1.833	28.715	27.799	2589	304	0.500	60000	**2.31**	0.15	0.42	**75.5**	75.0	0.776	0.4657		
22	OL-0714-17 (76-78 CM)	76.0	78.0	75.00	79.00	0.479	1.914	30.629	29.672	2493	253	0.501	60000	**1.99**	0.14	0.10	**76.6**	79.0	0.199	1.7567		
23	OL-0714-18 (80-82 CM)	80.0	82.0	79.00	83.00	0.478	1.911	32.540	31.585	2965	326	0.506	60000	**2.14**	0.13	0.25	**79.4**	83.0	0.478	0.6867		1.89
24	OL-0714-19 (84-86 CM)	84.0	86.0	83.00	87.00	0.467	1.869	34.409	33.475	2707	374	0.500	60000	**2.72**	0.15	0.83	**90.5**	87.0	1.550	0.1674		
25	OL-0714-20 (88-90 CM)	88.0	90.0	87.00	91.00	0.535	2.141	36.550	35.479	1911	281	0.500	60000	**2.90**	0.19	1.01		91.0	2.159			
26	OL-0715-01 (92-94 CM)	92.0	94.0	91.00	95.00	0.562	2.248	38.798	37.674	1457	191	0.498	60000	**2.59**	0.21	0.70		95.0	1.578			
27	OL-O715-02 (96-98 CM)	96.0	98.0	95.00	98.00	0.492	1.475	40.273	39.782	2615	428	0.532	60000	**3.03**	0.15	0.00		98.0	0.000			2.80
Blank	Blank									6	10											
Blank	Blank									2426	6											
3	OL-0709-10 (4-6CM)					0.240																
3 Dup	OL-0709-10 (4-6CM) DUP					0.240																
11	OL-0709-18 (32-34CM)					0.300																
11 Dup	OL-0709-18 (32-34CM) Dup					0.300																
7	OL-0709-14 (16-18CM)									2742	485	0.475	60000	**3.67**	0.18							
7 Dup	OL-0709-14 (16-18CM) Dup									2616	580	0.541	60000	**4.04**	0.18							
8	OL-0709-15 (20-22CM) Dup									2752	447	0.494	60000	**3.24**	0.17							
8 Dup	OL-0709-15 (20-22CM) Dup									2499	421	0.504	60000	**3.29**	0.17							
																Total DPM/cm^2 in core		62.33				

*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

OL-STA-80076



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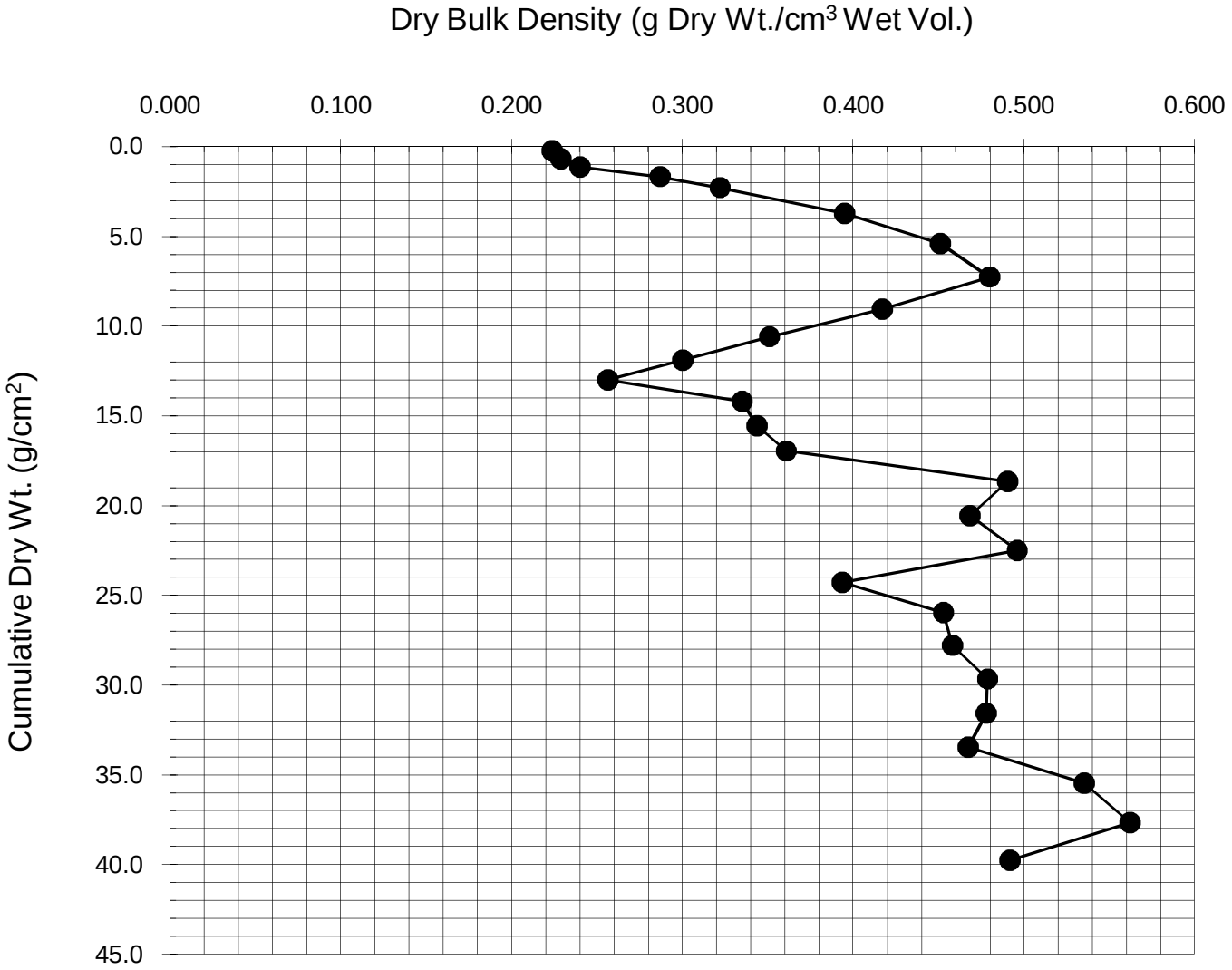
Dry Bulk Density vs. Accumulated Sediment

OL-STA-80076



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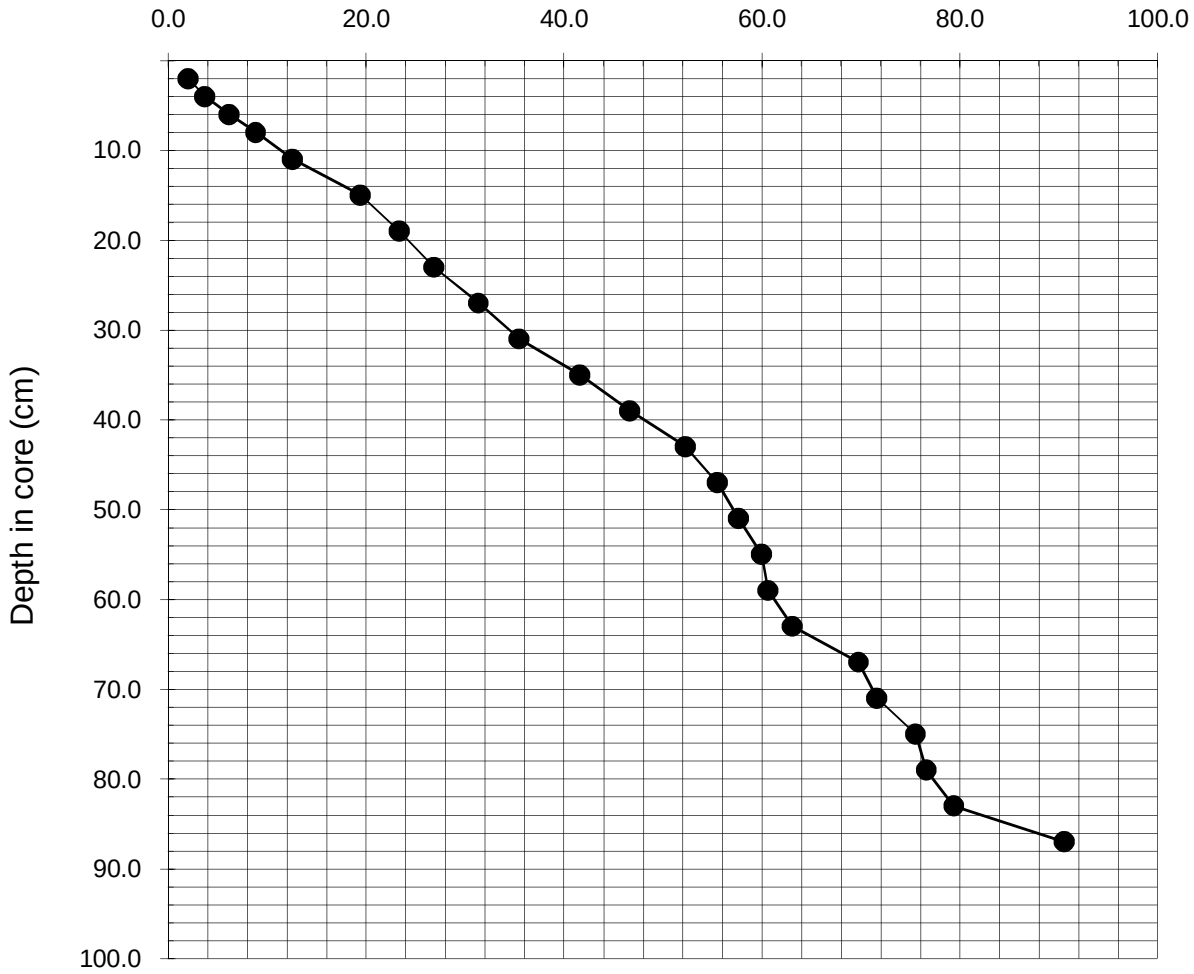
Age (yr) vs. Depth (cm)
CRS Model

OL-STA-80076



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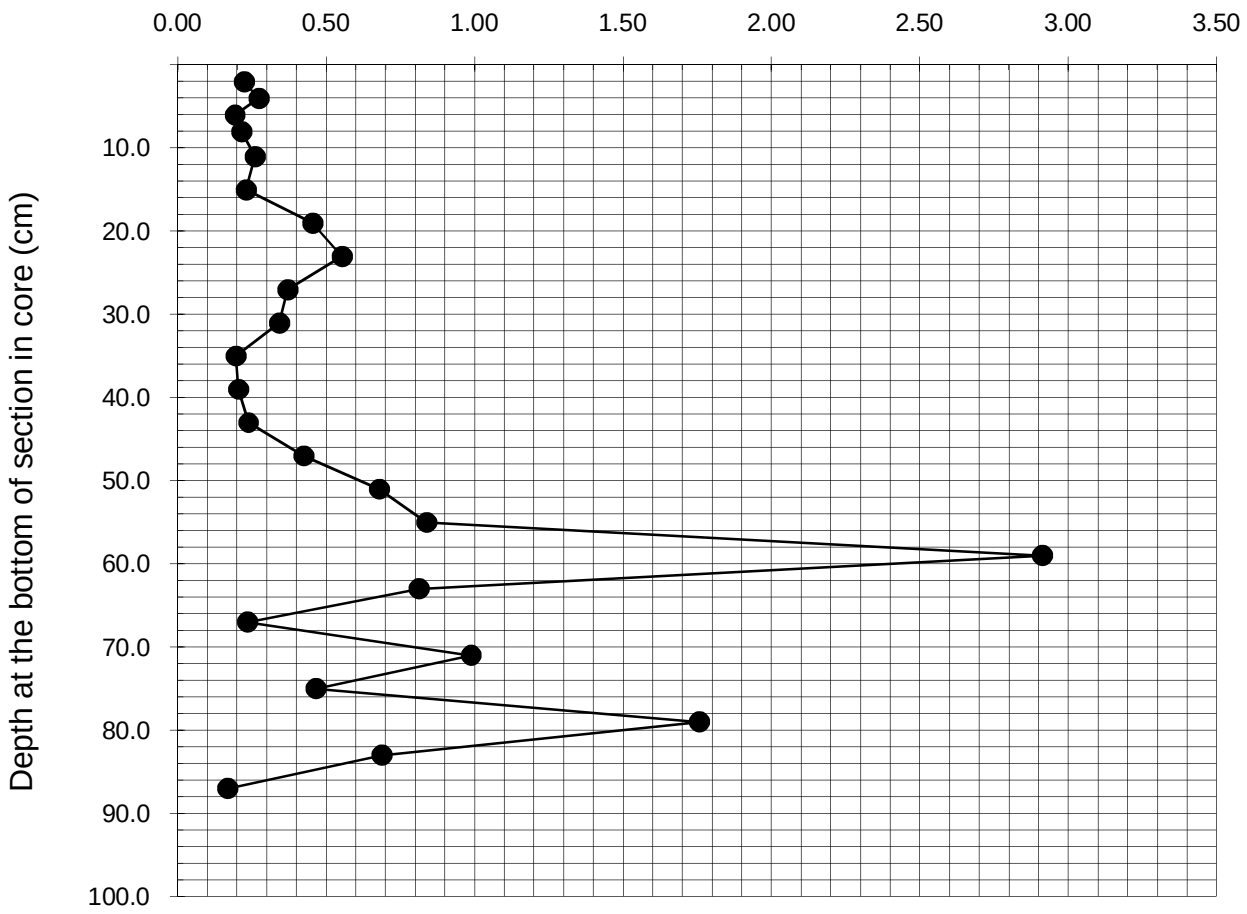
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

OL-STA-80076



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Results of Ra-226 Analysis by Rn-222 Emanation

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y. U.S.A. 13088

Core ID: OL-STA-80076
Date(s) Received: 4-Dec-08
Sampling Dates(s): N/A
Project:

Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 19 - May 2, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
OL-STA-80076	OL-0709-11 (6 - 8 cm)	1.66	0.02
OL-STA-80076	OL-0711-01 (44 - 46 cm)	1.81	0.04
OL-STA-80076	OL-0714-18 (80 - 82 cm)	1.89	0.03
OL-STA-80076	OL-0715-02 (96 - 98 cm)	2.80	0.03

* : See comments section above for discussion.

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80076														
SAMPLE ID	OL-0709-11 (6 - 8 cm)														
Lucas Cell No.	3														
Number of days since Rn board last run	1														
Sediment dry mass (g)	1.993														
Total Count in Period	8522														
Cell BKG count (cpm)	0.267														
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551														
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866														
Count duration (minutes)	1000														

		Year	Month	Day		Hour	Min	Sec	serial no.	serial No total	Difference Days)	Hr. difference	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	18	13	0	000000.75903	039883.75903	000021.98056	527.5333	21.98	0.98141	0.92472
	When cell filled	2009	4	2	39905	17	45	0	000000.73958	039905.73958	000000.08472	2.033333			
	Beginning time of count	2009	4	2	39905	19	47	0	000000.82431	039905.82431	#VALUE!	16.66667			
											Length of Count (days)	half count period (days)			
Counts/min. (gross)	8.52										0.69444	0.34722			
CPM less Cell BKG	8.26														
CPM (decay during count corrected)	8.93														
DPM Sample + System (efficiency corrected)	10.31														
DPM Sample	9.94	Error +/	0.1470	DPM											
DPM/g	4.99														
Ra-226 DPM/g	**1.66**	Error +/	0.0246	DPM/g		1 SD							Error % =	1.5	
Ra-226 pCi/g →	0.75														

Chemist Name	X. Hu / R. Flett
PMT High Voltage +ve	778
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch. #s	28-1023
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	4

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3-Apr-09

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80076										
SAMPLE ID	OL-0711-01 (44 - 46 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.159										
Total Count in Period	5623										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	18	0	0	21.88	0.98108	0.92146
	When cell filled	2009	4	29	39932	15	13	0			
	Beginning time of count	2009	4	29	39932	17	43	0			
Counts/min. (gross)	5.62										
CPM less Cell BKG	5.36										
CPM (decay during count corrected)	5.81										
DPM Sample + System (efficiency corrected)	6.72										
DPM Sample	6.29	Error +/	0.1305	DPM							
DPM/g	5.43										
Ra-226 DPM/g	**1.81**	Error +/	0.0375	DPM/g		1 SD			Error % =	2.1	
Ra-226 pCi/g ⟶	0.82										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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30-Apr-09

Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80076										
SAMPLE ID	OL-0714-18 (80 - 82 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.762										
Total Count in Period	8520										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	17	58	0	22.82	0.98405	0.91857
	When cell filled	2009	4	30	39933	13	45	0			
	Beginning time of count	2009	4	30	39933	16	40	0			
Counts/min. (gross)	8.52										
CPM less Cell BKG	8.25										
CPM (decay during count corrected)	8.98										
DPM Sample + System (efficiency corrected)	10.39										
DPM Sample	10.00	Error +/	0.1474	DPM							
DPM/g	5.67										
Ra-226 DPM/g	**1.89**	Error +/	0.0279	DPM/g		1 SD			Error % =	1.5	
Ra-226 pCi/g →	0.86										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	OL-STA-80076										
SAMPLE ID	OL-0715-02 (96 - 98 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.819										
Total Count in Period	12762										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	17	57	0	23.79	0.98661	0.92486
	When cell filled	2009	5	1	39934	12	51	15			
	Beginning time of count	2009	5	1	39934	14	52	0			
Counts/min. (gross)	12.76										
CPM less Cell BKG	12.50										
CPM (decay during count corrected)	13.51										
DPM Sample + System (efficiency corrected)	15.62										
DPM Sample	15.27	Error +/	0.1682	DPM							
DPM/g	8.40										
Ra-226 DPM/g	**2.80**	Error +/	0.0308	DPM/g		1 SD			Error % =	1.1	
Ra-226 pCi/g →	1.27										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Results of Cs-137 Analysis

Flett Research Ltd.

440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7

Fax/Phone (204) 667-2505

E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons,
290 Elwood Davis Road, Suite 312,
Liverpool, N.Y.
U.S.A. 13088

Core ID: OL-STA-80076
Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

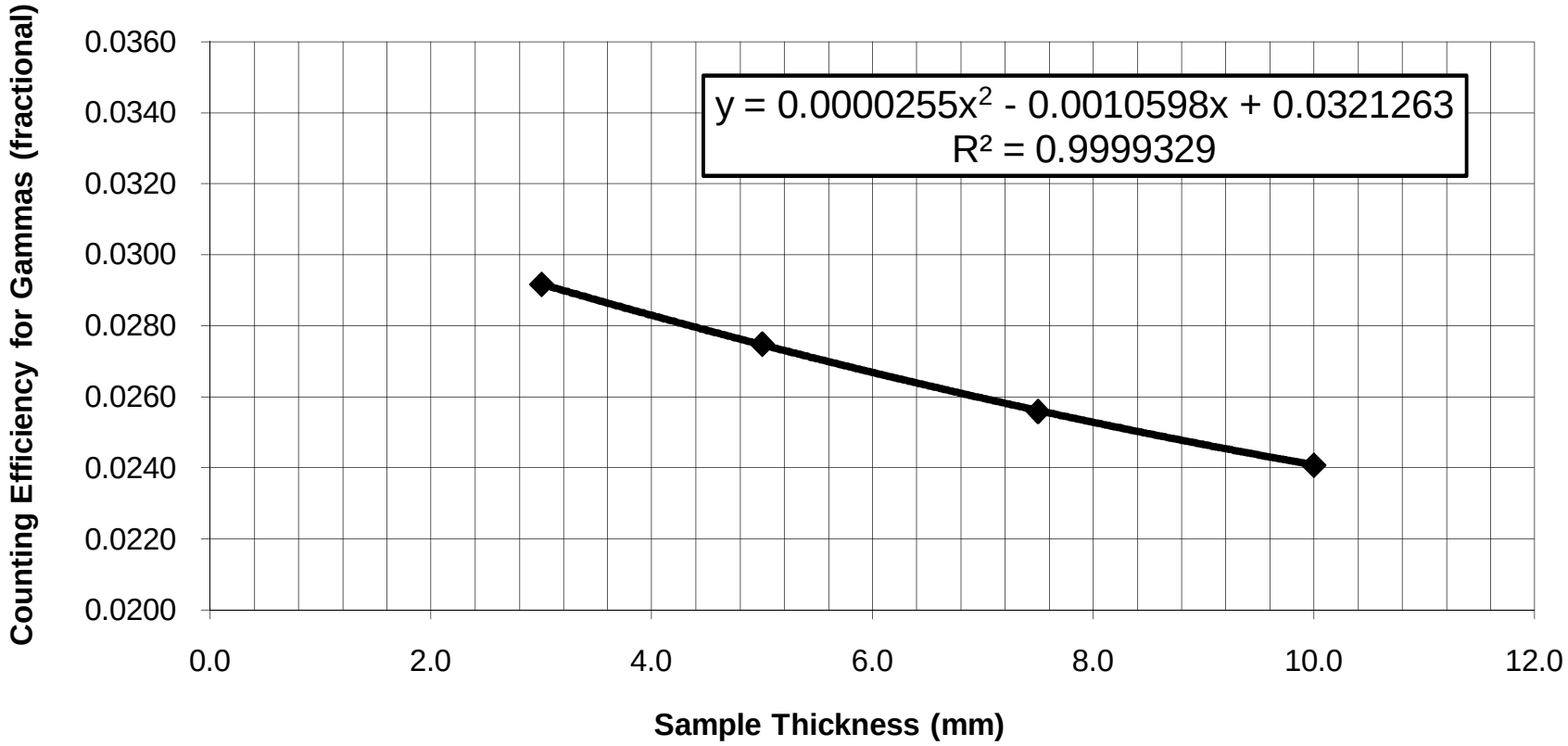
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 19 - May 2, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0709-08 (0-2CM)	0.0	2.0	3	2	2009		177	34	80000	20.948	6.12	0.01	0.0266	0.2383	0.28	0.05	0.13	GMX
OL-0709-09 (2-4CM)	2.0	4.0	2	2	2009		91	31	80000	17.612	5.00	0.00	0.0255	0.1519	0.18	0.06	0.08	GEM
OL-0709-10 (4-6CM)	4.0	6.0	3	2	2009		64	25	80000	17.440	5.00	0.00	0.0255	0.1079	0.13	0.05	0.06	GEM
OL-0709-11 (6-8CM)	6.0	8.0	4	2	2009		113	41	80000	24.315	7.00	0.00	0.0260	0.1343	0.16	0.06	0.07	GMX
OL-0709-12 (8-10CM)	8.0	10.0	25	2	2009		129	38	80000	24.933	7.50	0.00	0.0256	0.1515	0.18	0.05	0.08	GMX
OL-0709-13 (12-14CM)	12.0	14.0	4	2	2009		147	33	80000	33.494	9.50	0.00	0.0224	0.1471	0.17	0.04	0.08	GEM
OL-0709-14 (16-18CM)	16.0	18.0	25	2	2009		99	26	80000	29.869	8.50	0.00	0.0231	0.1075	0.16	0.03	0.07	GEM
OL-0709-15 (20-22CM)	20.0	22.0	5	2	2009		196	38	80000	33.122	9.50	0.00	0.0244	0.1822	0.21	0.04	0.10	GMX
OL-0709-16 (24-26CM)	24.0	26.0	22	2	2009		216	28	80000	26.527	7.33	0.01	0.0240	0.2548	0.30	0.04	0.14	GEM
OL-0709-17 (28-30CM)	28.0	30.0	27	2	2009		263	33	80000	26.792	8.00	0.01	0.0253	0.2913	0.34	0.04	0.16	GMX
OL-0709-18 (32-34CM)	32.0	34.0	23	2	2009		448	50	80000	22.410	7.00	0.01	0.0260	0.5777	0.68	0.08	0.31	GMX
OL-0709-19 (36-38CM)	36.0	38.0	5	2	2009		1308	47	80000	23.025	7.25	0.04	0.0240	1.7737	2.09	0.07	0.94	GEM
OL-0709-20 (40-42CM)	40.0	42.0	23	2	2009		669	35	80000	24.458	7.67	0.02	0.0237	0.8647	1.02	0.05	0.46	GEM
OL-07011-01 (44-46CM)	44.0	46.0	24	2	2009		152	37	80000	25.670	7.75	0.00	0.0254	0.1746	0.21	0.05	0.09	GMX
OL-07011-02 (48-50CM)	48.0	50.0	24	2	2009		49	24	80000	22.410	7.00	0.00	0.0242	0.0678	0.08	0.04	0.04	GEM
OL-07011-03 (52-54CM)	52.0	54.0	9	3	2009		38	23	80000	21.796	6.00	0.00	0.0249	0.0526	0.06	0.04	0.03	GEM
OL-07011-04 (56-58CM)	56.0	58.0	9	3	2009		6	38	80000	31.299	8.63	0.00	0.0249	0.0058	0.01	0.04	0.00	GMX
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0709-14 (16-18CM)	16.0	18.0	25	2	2009		99	26	80000	29.869	8.50	0.00	0.0231	0.1075	0.13	0.03	0.06	GEM
OL-0709-14 (16-18CM) Duplicate	16.0	18.0	17	5	2009		150	32	80000	29.869	8.50	0.00	0.0231	0.1629	0.19	0.04	0.09	GEM
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



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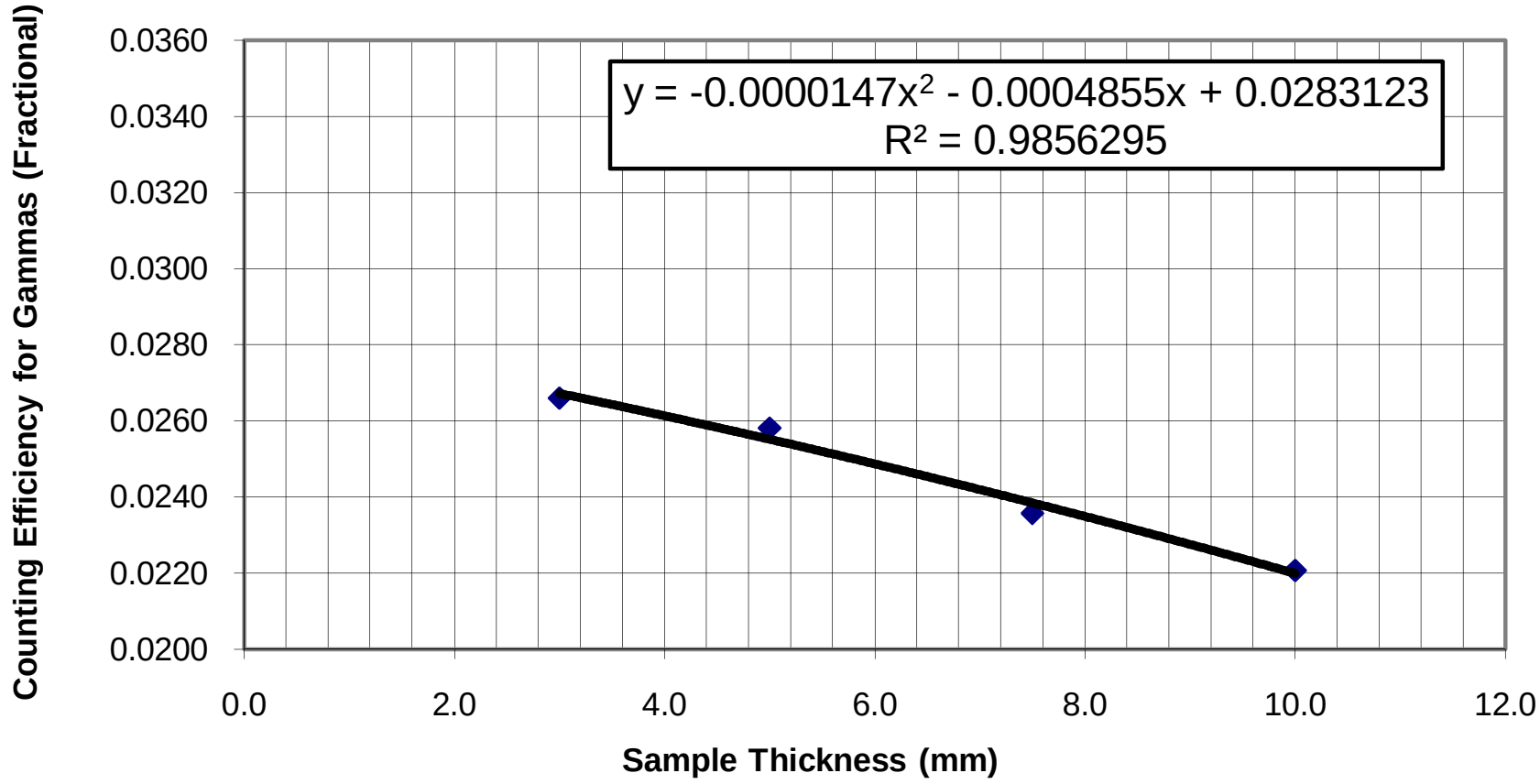
Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



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Results of Cs-137 Analysis

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Client: Babcock, David

Address: Parsons,
290 Elwood Davis Road, Suite 312,
Liverpool, N.Y.
U.S.A. 13088

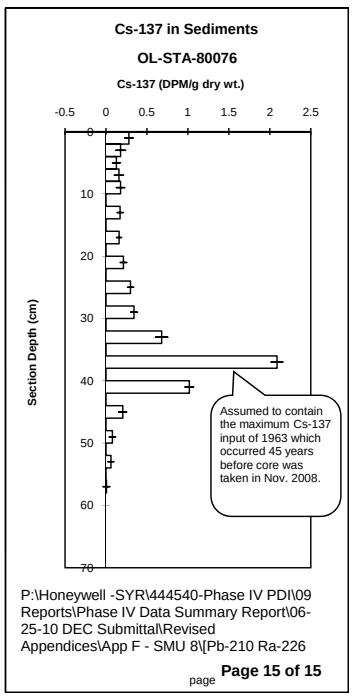
Core ID: OL-STA-80076

Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

Date(s) Analysed: Jan. 19 - May 2, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0709-08 (0-2CM)	0.0	2.0	0.28	0.05
2	OL-0709-09 (2-4CM)	2.0	4.0	0.18	0.06
3	OL-0709-10 (4-6CM)	4.0	6.0	0.13	0.05
4	OL-0709-11 (6-8CM)	6.0	8.0	0.16	0.06
5	OL-0709-12 (8-10CM)	8.0	10.0	0.18	0.05
6	OL-0709-13 (12-14CM)	12.0	14.0	0.17	0.04
7	OL-0709-14 (16-18CM)	16.0	18.0	0.16	0.03
8	OL-0709-15 (20-22CM)	20.0	22.0	0.21	0.04
9	OL-0709-16 (24-26CM)	24.0	26.0	0.30	0.04
10	OL-0709-17 (28-30CM)	28.0	30.0	0.34	0.04
11	OL-0709-18 (32-34CM)	32.0	34.0	0.68	0.08
12	OL-0709-19 (36-38CM)	36.0	38.0	2.09	0.07
13	OL-0709-20 (40-42CM)	40.0	42.0	1.02	0.05
14	OL-07011-01 (44-46CM)	44.0	46.0	0.21	0.05
15	OL-07011-02 (48-50CM)	48.0	50.0	0.08	0.04
16	OL-07011-03 (52-54CM)	52.0	54.0	0.06	0.04
17	OL-07011-04 (56-58CM)	56.0	58.0	0.01	0.04
	* : See 'Comments' section above for discussion.				



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This table must remain open for chart to plot.	Plot Table X Values	Plot Table Y Values
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	0.280345	1
	0.334197	1
	0.226494	1
	0.280345	1
	0.280345	2
	0	2
	0	2
	0.178661	2
	0.178661	3
	0.239916	3
	0.117406	3
	0.178661	3
	0.178661	4
	0	4
	0	4
	0.126891	4
	0.126891	5
	0.175783	5
	0.077998	5
	0.126891	5
	0.126891	6
	0	6
	0	6
	0.157988	6
	0.157988	7
	0.215311	7
	0.100665	7
	0.157988	7
	0.157988	8
	0	8
	0	8
	0.17826	8
	0.17826	9
	0.23077	9
	0.125749	9
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	0.17826	10
	0	10
	0	12
	0.173071	12
	0.173071	13
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	0.13469	13
	0.173071	13
	0.173071	14
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	0	16
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	0.192881	17
	0.127119	17
	0.16	17
	0.16	18
	0	18
	0	20
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	0.172816	21
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	0.214379	22
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	0	24
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	0.2998	25
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	0.2998	26
	0	26
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	0	34
	0	36
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	2.161205	37
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	2.086702	37
	2.086702	38
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	0	40
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	0.07974	48
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	0.07974	49
	0.07974	50
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	0.006799	57
	0.006799	58
	0	58

Contact Information

ID	Client	Organization	Contract/ PO Reference	EndDate	Contact	Contact Phone	Contact Address	Contact E-mail
393	Babcock, David	Parsons Engineering of New York, Inc	444540.30010.00		David Babcock		Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y. U.S.A. 13088	David.Babcock@parsons.com

Sample Information

Project:
Core: OL-STA-80076
Sampling Date(s): N/A
Date(s) Received: December 4, 2008
Analysis Date(s): Jan. 19 - May 2, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

OL-STA-80089

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Core ID:	**OL-STA-80089**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**12/4/2008, 3/20/2009**
Analysis Date(s):	**Feb. 2 - Apr. 6, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	**Onondaga Lake**

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 8.43 DPM/g observed in the uppermost section (depth 0.0 - 2.0 cm) is about 3.7 times the lowest activity of 2.29 DPM/g in the bottom section (section 16, extrapolated depth 51 - 54 cm).

The dry bulk densities of this core increase with depth until 19 - 23 cm (extrapolated depth) from 0.248 to 0.508 g/cm^3, and decrease to 0.252 g/cm^3 at 39 - 43 cm (extrapolated depth), and then rise to 0.334 g/cm^3 at 51 - 54 cm (extrapolated depth) (Page 4). This density profile is unusual compared to most cores which typically have increasing dry bulk density as a function with depth, and suggests that the sediments may be of varying composition throughout the core.

The sediment accumulation rate in this core exhibits some variability (0.2110 - 0.4707 g/cm^2/year) (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 15 sections (depth 0 - 50 cm) is significantly above background, with a surface activity of 0.36 DPM/g and increasing to maximum of 1.72 DPM/g in the 40 - 42 cm section. The Cs-137 activity then declines gradually with depth (Page 11 & 14). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.40, 2.43 and 1.66 DPM/g in section 3 (depth 4.0 - 6.0 cm), 14 (extrapolated depth 43 - 47 cm) and 16 (extrapolated depth 51 - 54 cm), respectively (Page 8, 9 & 10). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise. The Ra-226 activities measured in three depths indicate that the background Pb-210 activity level has not been achieved in this core, and also that the background Pb-210 level of this core changes with depth.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. Although significant variation in the sediment accumulation rate is apparent, the linear regression model was applied to the upper 10 sections of the profile. The linear model predicted an age for the Cs-137 peak which was much too old and therefore the use of this model was abandoned for the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210. Since the second assumption is not satisfied in this core (background has not been achieved - Pages 2 & 3), it is not normally possible to apply the CRS model. However, in this core it is possible to calibrate the CRS model against the Cs-137 peak, and therefore allow the CRS model to be used. The total atmospheric Pb-210 (DPM/cm^2), required in the CRS model calculation, has been chosen (60 DPM/cm^2) such that the CRS model predicts the Cs-137 peak to have an age between 43.7 and 48.4 years, a range that includes the expected Cs-137 peak age of 45 years (Page 2). With the CRS model calibrated, it has been used to calculate ages at the bottom of all sections in the core.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 3 (depth 4.0 - 6.0 cm) can be calculated as: 1.629/6.2 = 0.2627 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

The CRS model dates are directly dependant upon the 45 year age assigned to the Cs-137 peak. Although dates predicted by the CRS model are indirect, they do accomodate the changing sediment accumulation rate and therefore are preferred over a dates derived simply from a linear interpolation of age based solely upon the age of the Cs-137 peak.

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 13 at 40 - 42 cm depth (Pages 13 & 16) where maximum Cs-137 activity occurred. It is possible that the true Cs-137 maximum occurred in the 38 - 40 cm section or the 42 - 44 section which were not analyzed. The CRS model indicates that each cm of core section contains about 1.2 yr of accumulated sediment over the depth interval of 39 - 43 cm and therefore the uncertainty in the CRS date could be 2 cm x 1.2 yr/cm = +/- 2.4 years, or about 2.4 yr / 45 yr x 100 = +/- 5%. Total uncertainty is probably greater because of unanalysed sections and unknown processes at work in the core.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Client: Babcock, David

Address: Parsons 290 Elwood Davis Road Suite 312 Liverpool, N.Y. U.S.A. 13088

Core ID: OL-STA-80089 **Transaction ID: 393**

Date(s) Received: 12/4/2008, 3/20/20(**PO/Contract No.: 444540.30010.00**

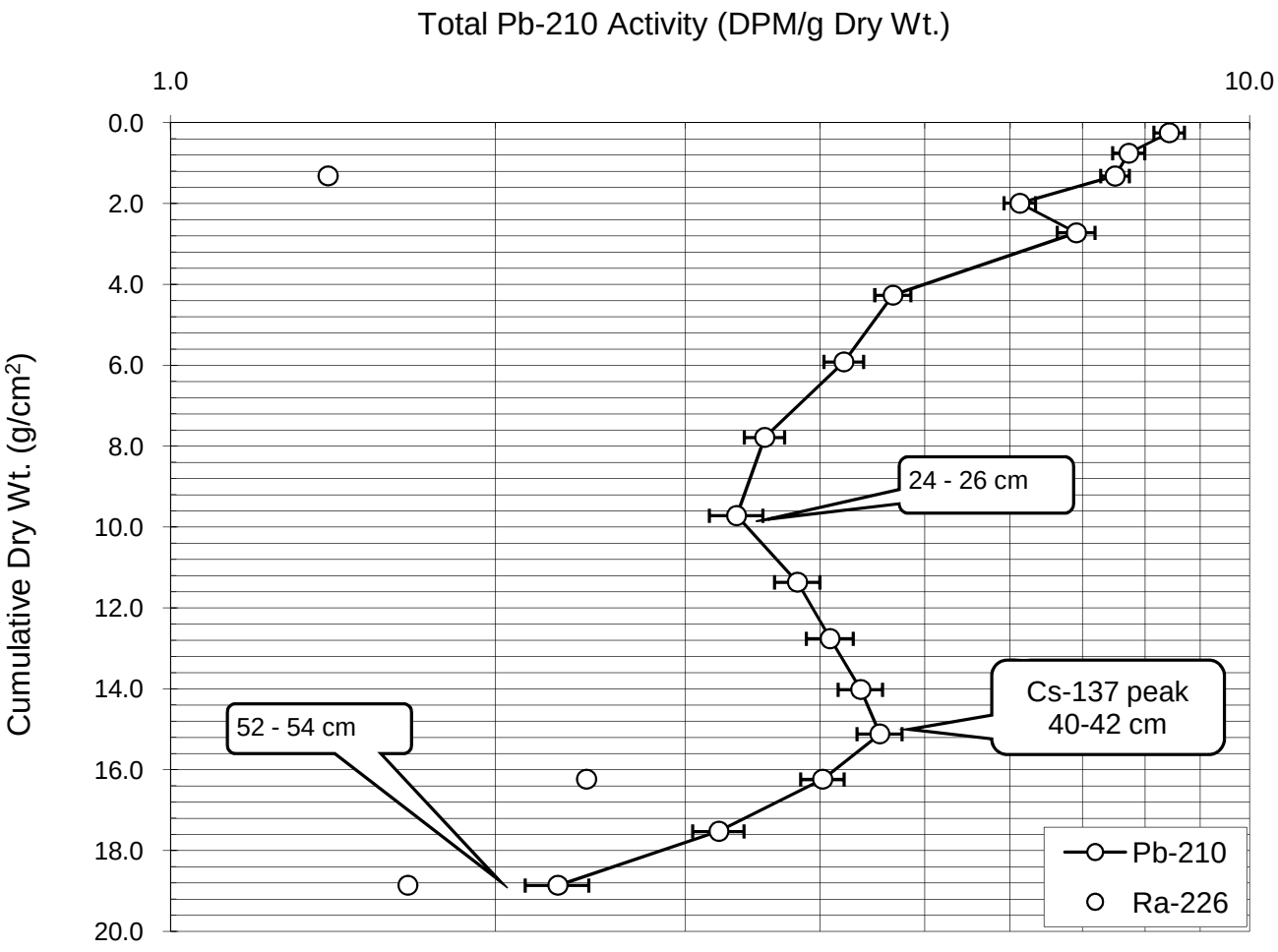
Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrap-olated Upper Section Depth (cm)	Extrap-olated Lower Section Depth (cm)	Dry Wt./ Wet cc. (g/cm^3)	Mass in extrap-olated section (g/cm^2)	Cumul-ative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumul-ative mass in current section (g/cm^2)	Po-209 counts less detector back-ground	Po-210 counts less detector back-ground and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsup-ported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumu-lation Rate ($g/cm^2/yr$)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0697-01 (0-2CM)	0.0	2.0	0.00	2.00	0.248	0.497	0.497	0.248	2246	985	0.513	60000	**8.43**	0.27	7.03	**1.9**	2.00	3.490	0.2576		
2	OL-0697-02 (2-4CM)	2.0	4.0	2.00	4.00	0.254	0.508	1.005	0.751	2542	901	0.452	60000	**7.73**	0.26	6.33	**3.8**	4.00	3.218	0.2696		
3	OL-0697-03 (4-6CM)	4.0	6.0	4.00	6.00	0.312	0.624	1.629	1.317	2863	1032	0.494	60000	**7.51**	0.23	6.11	**6.2**	6.00	3.810	0.2615		1.40
4	OL-0697-04 (6-8CM)	6.0	8.0	6.00	8.00	0.360	0.719	2.348	1.989	2991	937	0.504	60000	**6.13**	0.21	4.73	**8.5**	8.00	3.398	0.3141		
5	OL-0697-05 (8-10CM)	8.0	10.0	8.00	11.00	0.372	1.117	3.466	2.721	1898	660	0.498	60000	**6.91**	0.28	5.51	**13.1**	11.00	6.157	0.2422		
6	OL-0697-06 (12-14CM)	12.0	14.0	11.00	15.00	0.399	1.597	5.062	4.264	3083	726	0.498	60000	**4.67**	0.18	3.27	**17.6**	15.00	5.226	0.3537		
7	OL-0697-07 (16-18CM)	16.0	18.0	15.00	19.00	0.426	1.704	6.766	5.914	2711	603	0.523	60000	**4.21**	0.18	2.81	**22.4**	19.00	4.787	0.3568		
8	OL-0697-08 (20-22CM)	20.0	22.0	19.00	23.00	0.508	2.032	8.798	7.782	2255	586	0.720	60000	**3.55**	0.15	2.15	**27.5**	23.00	4.376	0.3992		
9	OL-0697-09 (24-26CM)	24.0	26.0	23.00	27.00	0.460	1.839	10.637	9.718	2057	343	0.493	60000	**3.35**	0.19	1.95	**32.3**	27.00	3.581	0.3783		
10	OL-0697-10 (28-30CM)	28.0	30.0	27.00	31.00	0.364	1.456	12.093	11.365	2490	468	0.488	60000	**3.81**	0.18	1.38	**35.4**	31.00	2.013	0.4707		
11	OL-0697-11 (32-34CM)	32.0	34.0	31.00	35.00	0.334	1.335	13.429	12.761	2148	442	0.498	60000	**4.09**	0.20	1.66	**39.2**	35.00	2.212	0.3530		
12	OL-0697-12 (36-38CM)	36.0	38.0	35.00	39.00	0.296	1.185	14.614	14.021	2300	515	0.506	60000	**4.36**	0.21	1.93	**43.7**	39.00	2.290	0.2663		Cs-137 peak
13	OL-0697-13 (40-42CM)	40.0	42.0	39.00	43.00	0.252	1.008	15.622	15.118	2024	469	0.504	60000	**4.54**	0.22	2.11	**48.4**	43.00	2.131	0.2110		
14	OL-0697-14 (44-46CM)	44.0	46.0	43.00	47.00	0.309	1.237	16.859	16.240	2662	539	0.498	60000	**4.02**	0.19	1.59	**53.6**	47.00	1.969	0.2402		2.43
15	OL-0697-15 (48-50CM)	48.0	50.0	47.00	51.00	0.334	1.335	18.193	17.526	2270	374	0.506	60000	**3.22**	0.18	1.56	**60.1**	51.00	2.087	0.2040		
16	OL-0697-16 (52-54CM)	52.0	54.0	51.00	54.00	0.334	1.002	19.195	18.861	2163	257	0.512	60000	**2.29**	0.15	0.63	**62.4**	54.00	0.627	0.4436		1.66
Blank	Blank									-5	16											
Blank	Blank									1622	22											
3	OL-0697-03 (4-6CM)					0.312				2863	1032	0.494	60000	**7.20**	0.23							
3 Dup	OL-0697-03 (4-6CM) Dup					0.312				1990	847	0.537	60000	**7.82**	0.28							
																Total DPM/cm^2 in core		60.00				
																Avg. Sediment Accum. Rate in Sect. 1-16						0.3076

*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

OL-STA-80089



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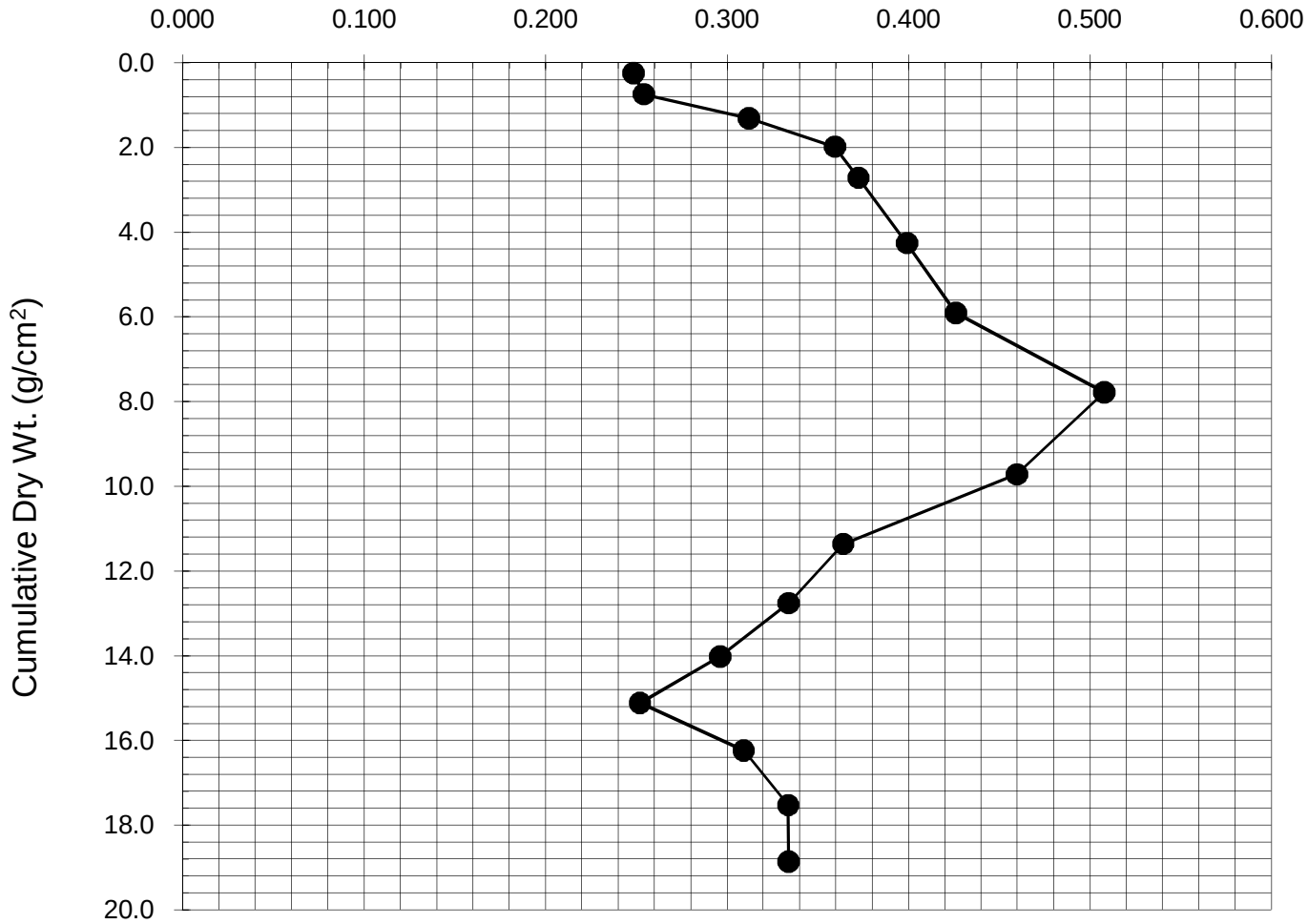
Dry Bulk Density vs. Accumulated Sediment

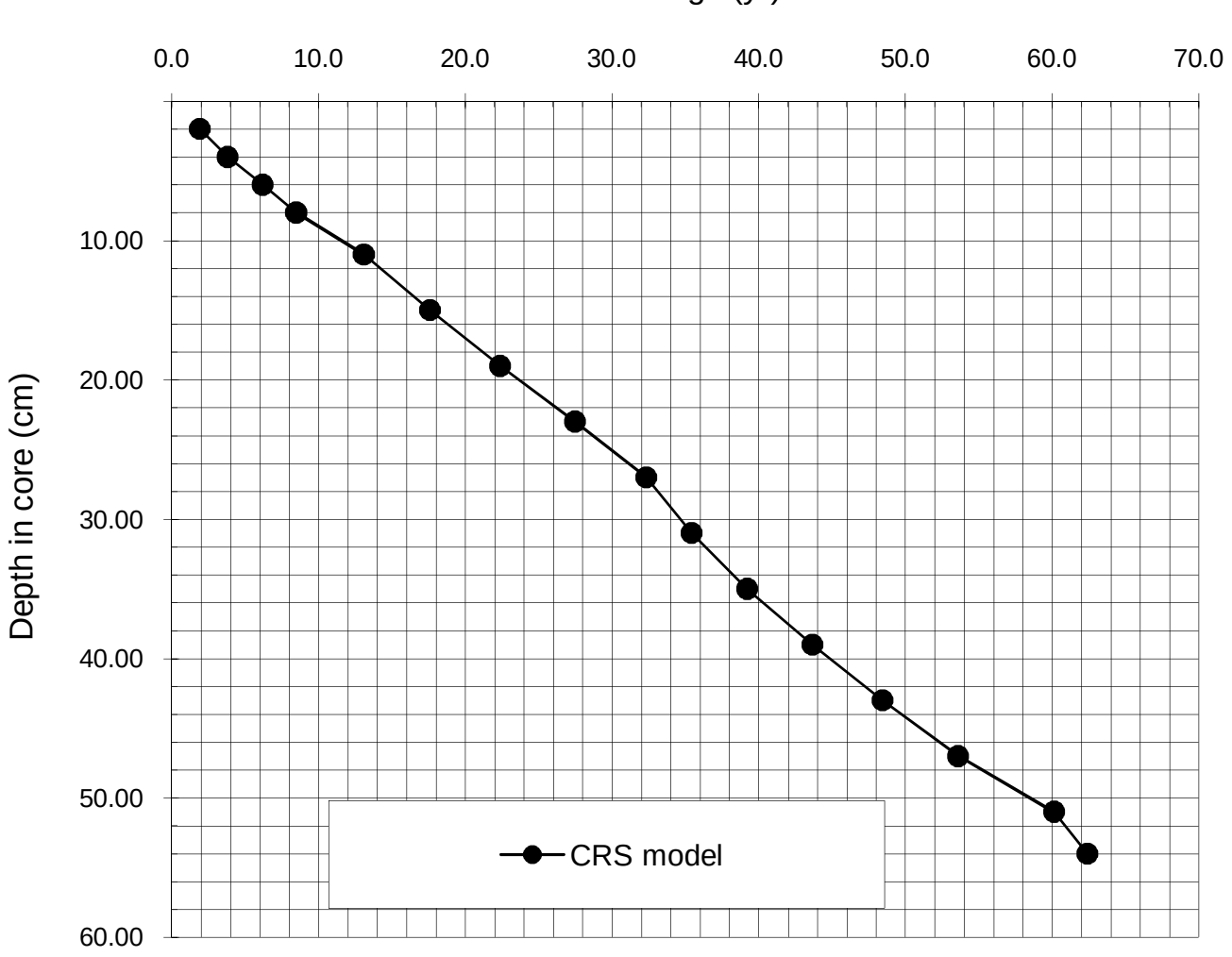
OL-STA-80089



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core OL-STA-80089 0509

Age (yr) vs. Depth (cm)
CRS Model

OL-STA-80089



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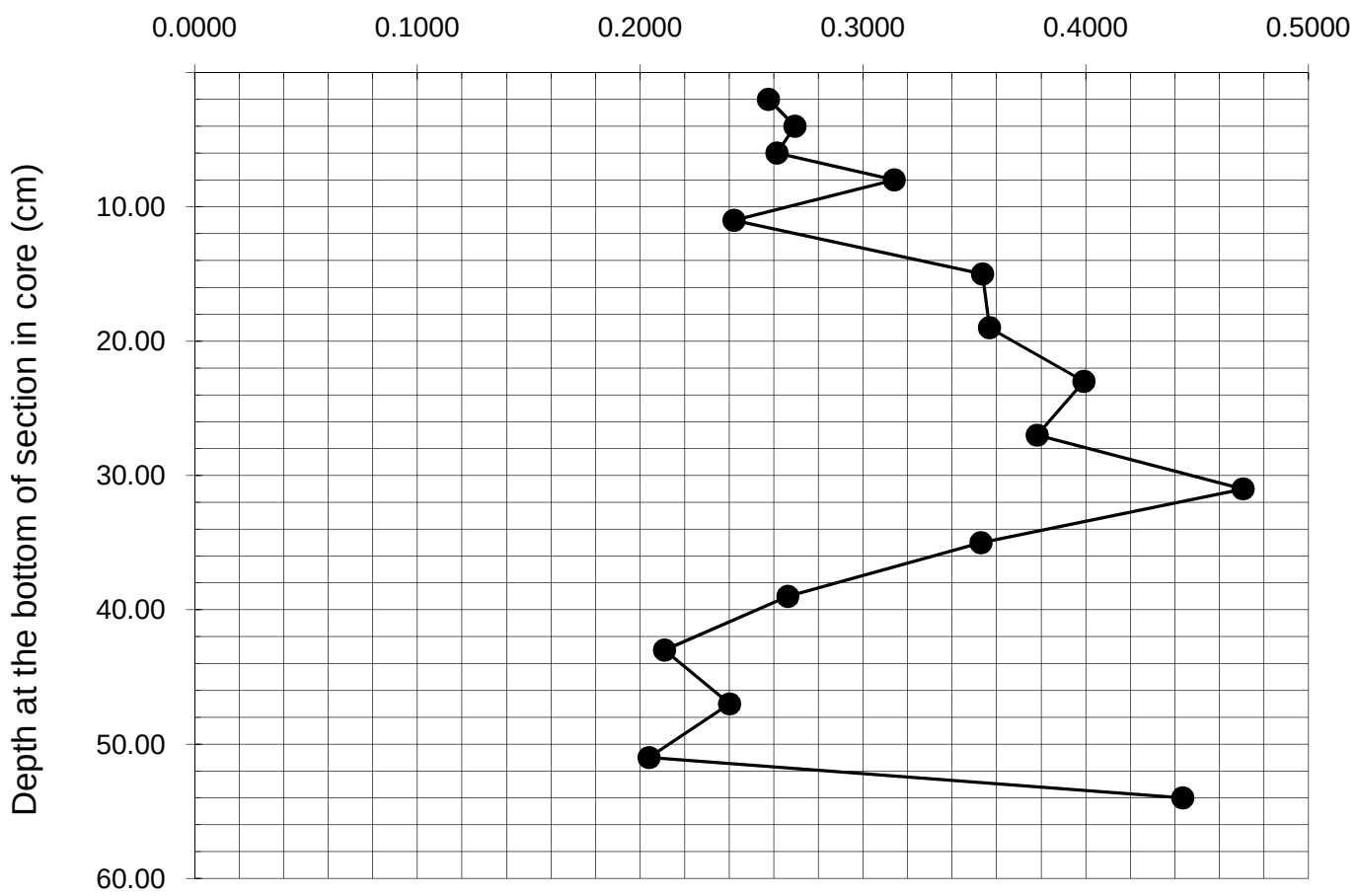
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

OL-STA-80089



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Results of Ra-226 Analysis by Rn-222 Emanation

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons 290 Elwood Davis Road Suite 312 Liverpool, N.Y. U.S.A. 13088

Core ID: OL-STA-80089
Date(s) Received: 12/4/2008, 3/20/2009
Sampling Dates(s): N/A
Project: Onondaga Lake

Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Feb. 2 - Apr. 6, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
OL-STA-80089	OL-0697-03 (4 - 6 cm)	1.40	0.02
OL-STA-80089	OL-0697-14 (44 - 46 cm)	2.43	0.03
OL-STA-80089	OL-0697-16 (52 - 54 cm)	1.66	0.02

* : See comments section above for discussion.

Radium Analysis by Rn-222 Emanation												
Core ID	OL-STA-80089											
SAMPLE ID	OL-0697-03 (4 - 6 cm)											
Lucas Cell No.	3											
Number of days since Rn board last run	1											
Sediment dry mass (g)	2.005											
Total Count in Period	7363											
Cell BKG count (cpm)	0.267											
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551											
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866											
Count duration (minutes)	1000											
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction	
	When sample last stripped	2009	3	11	39883	16	59	0	22.94	0.98438	0.92495	
	When cell filled	2009	4	3	39906	15	32	0				
	Beginning time of count	2009	4	3	39906	17	32	0				
Counts/min. (gross)	7.36											
CPM less Cell BKG	7.10											
CPM (decay during count corrected)	7.67											
DPM Sample + System (efficiency corrected)	8.86											
DPM Sample	8.44	Error +/	0.1403	DPM								
DPM/g	4.21											
Ra-226 DPM/g	**1.40**	Error +/	0.0233	DPM/g		1 SD			Error % =	1.7		
Ra-226 pCi/g →	0.63											
Chemist Name	X. Hu / R. Flett											
PMT High Voltage +ve	778											
HV Power supply	Spectrum Technologies											
Alpha Counter	Spectrum Technologies											
Region of Interest Ch. #s	28-1023											
PMT	6655A - #1											
Preamp	Canberra 2007P tube base											
Amp Gain	4											
P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Co												
4-Apr-09												
Page 8 of 14												

Radium Analysis by Rn-222 Emanation												
Core ID	OL-STA-80089											
SAMPLE ID	OL-0697-14 (44 - 46 cm)											
Lucas Cell No.	3											
Number of days since Rn board last run	1											
Sediment dry mass (g)	2.004											
Total Count in Period	12269											
Cell BKG count (cpm)	0.267											
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551											
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866											
Count duration (minutes)	1000											
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction	
	When sample last stripped	2009	3	11	39883	16	57	0	23.89	0.98685	0.92448	
	When cell filled	2009	4	4	39907	14	16	0				
	Beginning time of count	2009	4	4	39907	16	20	0				
Counts/min. (gross)	12.27											
CPM less Cell BKG	12.00											
CPM (decay during count corrected)	12.98											
DPM Sample + System (efficiency corrected)	14.99											
DPM Sample	14.63	Error +/	0.1657	DPM								
DPM/g	7.30											
Ra-226 DPM/g	**2.43**	Error +/	0.0276	DPM/g		1 SD			Error % =	1.1		
Ra-226 pCi/g →	1.10											
Chemist Name	X. Hu / R. Flett											
PMT High Voltage +ve	778											
HV Power supply	Spectrum Technologies											
Alpha Counter	Spectrum Technologies											
Region of Interest Ch. #s	28-1023											
PMT	6655A - #1											
Preamp	Canberra 2007P tube base											
Amp Gain	4											

Results authorised by Dr. Robert J. Flett

Radium Analysis by Rn-222 Emanation												
Core ID	OL-STA-80089											
SAMPLE ID	OL-0697-16 (52 - 54 cm)											
Lucas Cell No.	3											
Number of days since Rn board last run	1											
Sediment dry mass (g)	2.014											
Total Count in Period	8625											
Cell BKG count (cpm)	0.267											
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551											
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866											
Count duration (minutes)	1000											
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction	
	When sample last stripped	2009	3	11	39883	18	10	0	24.75	0.98876	0.92460	
	When cell filled	2009	4	5	39908	12	14	0				
	Beginning time of count	2009	4	5	39908	14	17	0				
Counts/min. (gross)	8.63											
CPM less Cell BKG	8.36											
CPM (decay during count corrected)	9.04											
DPM Sample + System (efficiency corrected)	10.44											
DPM Sample	10.00	Error +/	0.1469	DPM								
DPM/g	4.97											
Ra-226 DPM/g	**1.66**	Error +/	0.0243	DPM/g		1 SD			Error % =	1.5		
Ra-226 pCi/g ⟶	0.75											
Chemist Name	X. Hu / R. Flett											
PMT High Voltage +ve	778											
HV Power supply	Spectrum Technologies											
Alpha Counter	Spectrum Technologies											
Region of Interest Ch. #s	28-1023											
PMT	6655A - #1											
Preamp	Canberra 2007P tube base											
Amp Gain	4											
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6-Apr-09												
Page 10 of 14												

Results authorised by Dr. Robert J. Flett

Results of Cs-137 Analysis

Flett Research Ltd.

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Client: Babcock, David

Address: Parsons
290 Elwood Davis Road Suite 312
Liverpool, N.Y.
U.S.A. 13088

Core ID: OL-STA-80089
Date(s) Received: 12/4/2008, 3/20/2009
Sampling Date(s): N/A
Project: Onondaga Lake

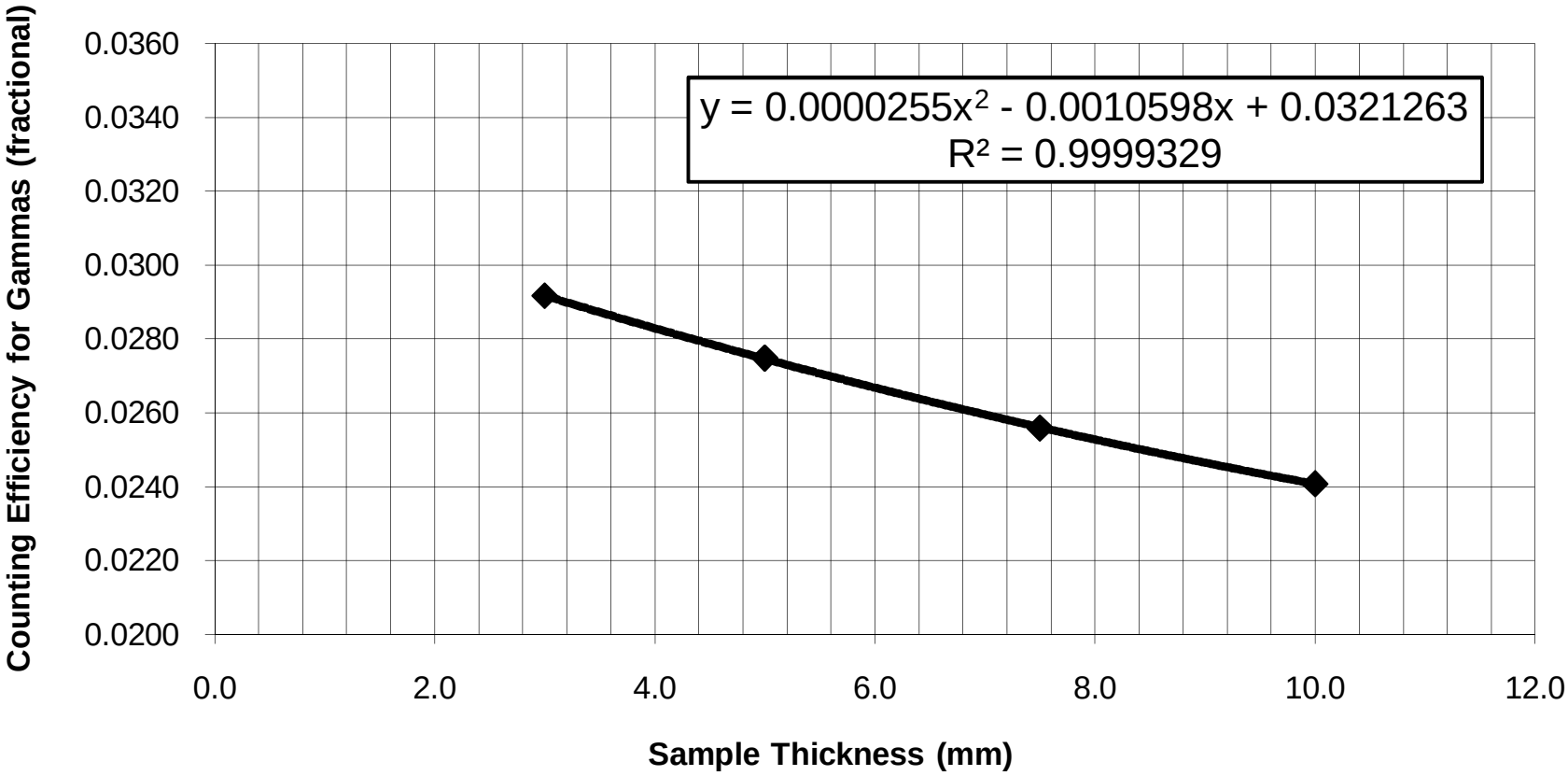
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Feb. 2 - Apr. 6, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0697-01 (0-2CM)	0.0	2.0	6	2	2009		97	30	80000	8.742	2.80	0.01	0.0268	0.3101	0.36	0.11	0.17	GEM
OL-0697-02 (2-4CM)	2.0	4.0	6	2	2009		151	44	80000	21.210	6.17	0.01	0.0266	0.2011	0.24	0.07	0.11	GMX
OL-0697-03 (4-6CM)	4.0	6.0	7	2	2009		72	43	80000	16.496	5.00	0.00	0.0275	0.1192	0.14	0.08	0.06	GMX
OL-0697-04 (6-8CM)	6.0	8.0	7	2	2009		146	31	80000	24.809	7.50	0.00	0.0238	0.1851	0.22	0.05	0.10	GEM
OL-0697-05 (8-10CM)	8.0	10.0	26	2	2009		183	25	80000	24.643	6.75	0.01	0.0244	0.2286	0.27	0.04	0.12	GEM
OL-0697-06 (12-14CM)	12.0	14.0	9	2	2009		87	40	80000	21.297	6.00	0.00	0.0267	0.1148	0.14	0.06	0.06	GMX
OL-0697-07 (16-18CM)	16.0	18.0	28	2	2009		117	26	80000	21.846	6.25	0.00	0.0247	0.1626	0.16	0.04	0.07	GEM
OL-0697-08 (20-22CM)	20.0	22.0	8	2	2009		112	28	80000	35.315	10.00	0.00	0.0220	0.1082	0.13	0.03	0.06	GEM
OL-0697-09 (24-26CM)	24.0	26.0	27	2	2009		157	36	80000	27.983	8.00	0.00	0.0235	0.1791	0.21	0.05	0.10	GEM
OL-0697-10 (28-30CM)	28.0	30.0	28	2	2009		270	31	80000	31.779	9.00	0.01	0.0247	0.2585	0.30	0.03	0.14	GMX
OL-0697-11 (32-34CM)	32.0	34.0	1	3	2009		247	29	80000	24.808	7.67	0.01	0.0237	0.3147	0.37	0.04	0.17	GEM
OL-0697-12 (36-38CM)	36.0	38.0	9	2	2009		494	37	80000	29.563	9.00	0.01	0.0228	0.5508	0.65	0.05	0.29	GEM
OL-0697-13 (40-42CM)	40.0	42.0	1	3	2009		1037	49	80000	20.164	6.38	0.04	0.0264	1.4610	1.72	0.08	0.78	GMX
OL-0697-14 (44-46CM)	44.0	46.0	2	3	2009		1048	49	80000	31.595	9.25	0.02	0.0245	1.0153	1.19	0.06	0.54	GMX
OL-0697-15 (48-50CM)	48.0	50.0	2	3	2009		513	34	80000	30.436	9.00	0.01	0.0228	0.5556	0.65	0.04	0.30	GEM
OL-0697-16 (52-54CM)	52.0	54.0	3	3	2009		38	36	80000	24.195	6.50	0.00	0.0263	0.0448	0.05	0.05	0.02	GMX
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0697-07 (16-18CM)	16.0	18.0	28	2	2009		117	26	80000	21.846	6.25	0.00	0.0247	0.1626	0.19	0.04	0.09	GEM
OL-0697-07 (16-18CM) Duplicate	16.0	18.0	15	5	2009		82	67	80000	21.846	6.25	0.00	0.0247	0.1140	0.13	0.11	0.06	GEM
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



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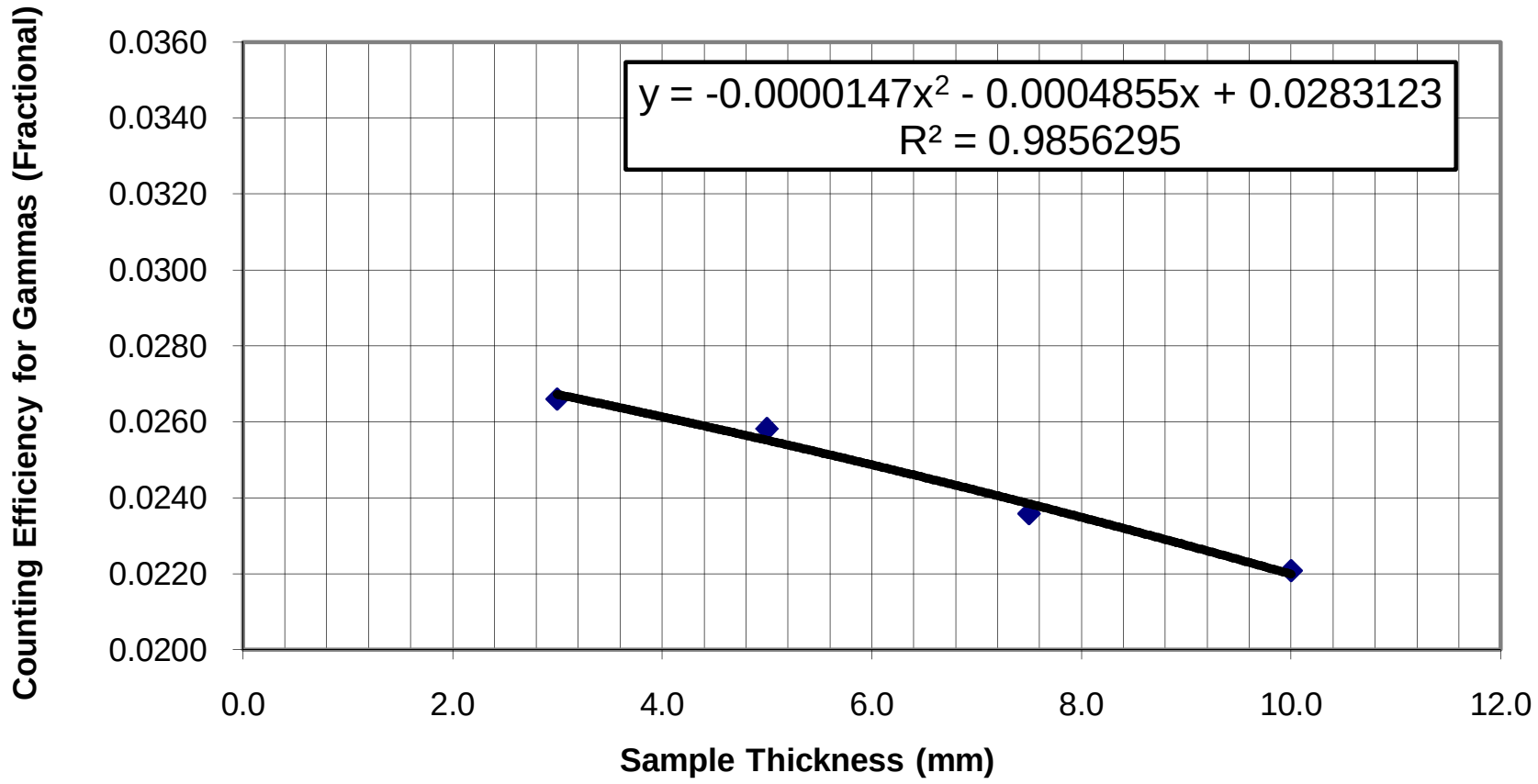
Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



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Results of Cs-137 Analysis

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Core ID: OL-STA-80089

Date(s) Received: 12/4/2008, 3/20/2009
Sampling Date(s): N/A
Project: Onondaga Lake

Date(s) Analysed: Feb. 2 - Apr. 6, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0697-01 (0-2CM)	0.0	2.0	0.36	0.11
2	OL-0697-02 (2-4CM)	2.0	4.0	0.24	0.07
3	OL-0697-03 (4-6CM)	4.0	6.0	0.14	0.08
4	OL-0697-04 (6-8CM)	6.0	8.0	0.22	0.05
5	OL-0697-05 (8-10CM)	8.0	10.0	0.27	0.04
6	OL-0697-06 (12-14CM)	12.0	14.0	0.14	0.06
7	OL-0697-07 (16-18CM)	16.0	18.0	0.16	0.04
8	OL-0697-08 (20-22CM)	20.0	22.0	0.13	0.03
9	OL-0697-09 (24-26CM)	24.0	26.0	0.21	0.05
10	OL-0697-10 (28-30CM)	28.0	30.0	0.30	0.03
11	OL-0697-11 (32-34CM)	32.0	34.0	0.37	0.04
12	OL-0697-12 (36-38CM)	36.0	38.0	0.65	0.05
13	OL-0697-13 (40-42CM)	40.0	42.0	1.72	0.08
14	OL-0697-14 (44-46CM)	44.0	46.0	1.19	0.06
15	OL-0697-15 (48-50CM)	48.0	50.0	0.65	0.04
16	OL-0697-16 (52-54CM)	52.0	54.0	0.05	0.05
	* : See 'Comments'				

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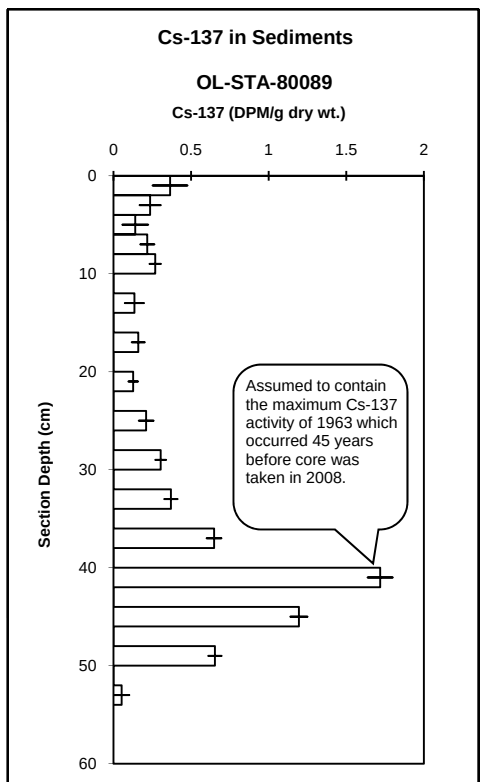

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This table must remain open for chart to plot.	Plot Table X Values	Plot Table Y Values
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	0.251975	1
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	0	2
	0	2
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	0.236543	3
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	0.236543	3
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	0	4
	0	4
	0.140229	4
	0.140229	5
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	0.140229	6
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0	54

Contact Information

ID	Client	Organization	Contract/ PO Reference	EndDate	Contact	Contact Phone	Contact Address	Contact E-mail
393	Babcock, David	Parsons Engineering of New York, Inc	444540.30010.00		David Babcock		Parsons 290 Elwood Davis Road Suite 312 Liverpool, N.Y. U.S.A. 13088	David.Babcock@parsons.com

Sample Information

Project: Onondaga Lake
Core: OL-STA-80089
Sampling Date(s): N/A
Date(s) Received: 12/4/2008, 3/20/2009
Analysis Date(s): Feb. 2 - Apr. 6, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

OL-STA-80103

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Client: Babcock, David

Address:	**Parsons ,** **290 Elwood Davis Road, Suite 312,** **Liverpool, N.Y.** **U.S.A. 13088**
Core ID:	**OL-STA-80103**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**December 4, 2008**
Analysis Date(s):	**Jan. 14 - Apr. 29, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 9.06 DPM/g observed in section 3 (depth 4.0 - 6.0 cm) is about 5.2 times the lowest activity of 1.74 DPM/g in section 19 (extrapolated depth 63 - 67 cm).

The dry bulk density profile is irregular, ranging 0.247 - 0.585 g/cm^3. It gradually increases to 0.507 g/cm^3 with depth until 27 cm, then decreases to 0.321 g/cm^3 at 39 - 43 cm (extrapolated depth), and then generally increases with depth (Page 4). This density profile is unusual compared to most cores which typically have increasing dry bulk density as a function with depth, and suggests that the sediments may be of varying composition throughout the core.

Sediment accumulation rates in this core appear relatively constant (0.2276 - 0.3130 g/cm^2/year) in the upper 7 sections (0 - 19 cm, extrapolated depth) but rapidly increase to 0.8058 g/cm^2/year in section 9 (23 - 27 cm, extrapolated depth), then drop to 0.2445 g/cm^2/year in section 13 (39 - 43 cm, extrapolated depth), and fluctuate downward (0.1918 - 0.3057 g/cm^2/year) (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 14 sections (depth 0 - 46 cm) is significantly above background, with a surface activity of 0.19 DPM/g and increasing to a pronounced maximum of 1.40 DPM/g in the 40 - 42 cm section. The Cs-137 activity then declines gradually with depth (Page 12 & 15). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.94, 1.92, 1.33 and 2.80 DPM/g in sections 1 (depth 0.0 - 2.0 cm), 10 (extrapolated depth 27 - 31 cm), 15 (extrapolated depth 47 - 51 cm) and 27 (extrapolated depth 95 - 98 cm), respectively (Page 8, 9, 10 & 11). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise.The Ra-226 activity measured in section 27 is similar to the Pb-210 activity of 2.79 DPM/g in the same section, suggesting that background level of Pb-210 has been attained, and the changing Ra-226 activities also suggest that background levels of Pb-210 vary with depth in this core.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not completely satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210 i.e. it contains a complete Pb-210 inventory. Although several different sections could plausibly be assigned to represent uppermost background, section 23 (extrapolated depth 79 - 83 cm) was chosen because it caused the CRS model to most accurately predict the age (2008 - 1963 = 45 years) of the Cs-137 peak (see Page 2). It has been assumed that the background activity of section 23 (1.78 DPM/g) applies to the sections 21 and 22 immediately above, and that the Ra-226 background of 1.33 DPM/g observed in section 15 applies to sections 15 - 20.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 4 (depth 6 - 8 cm) can be calculated as: 2.177/8.4 = 0.2592 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 13 at 40 - 42 cm depth (Pages 12 and 15) where maximum Cs-137 activity of 1.40 DPM/g occurred. It is possible that the true Cs-137 maximum occurred in the 38 - 40 cm section or the 42 - 44 cm section which were not analysed. The CRS model indicates that each cm of core section contains about 1.33 yr of accumulated sediment over the depth interval of 39 - 43 cm and therefore the uncertainty in the CRS date could be 2 cm X 1.33 yr/cm = 2.7 years, or about 2.7 yr / 45 yr X 100 = +/- 6 %.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Address: Parsons , 290 Elwood Davis Road, Suite 312, Liverpool, N.Y. U.S.A. 13088

Core ID: OL-STA-80103 **Transaction ID: 393**

Date(s) Received: 4-Dec-08 **PO/Contract No.: 444540.30010.00**

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrapolated Upper Section Depth (cm)	Extrapolated Lower Section Depth (cm)	Dry Wt./ Wet cc. (g/cm^3)	Mass in extrapolated section (g/cm^2)	Cumulative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumulative mass in current section (g/cm^2)	Po-209 counts less detector background	Po-210 counts less detector background and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsupported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumulation Rate ($g/cm^2/yr$)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0707-08 (0-2CM)	0.0	2.0	0.00	2.00	0.283	0.565	0.565	0.283	2739	1158	0.466	60000	**9.02**	0.27	7.08	**2.2**	2.0	4.003	0.2577		1.94
2	OL-0707-09 (2-4CM)	2.0	4.0	2.00	4.00	0.256	0.512	1.077	0.821	2890	1163	0.537	60000	**7.45**	0.22	5.51	**3.8**	4.0	2.824	0.3118		
3	OL-0707-10 (4-6CM)	4.0	6.0	4.00	6.00	0.247	0.494	1.571	1.324	2776	1206	0.486	60000	**9.06**	0.26	7.12	**6.0**	6.0	3.517	0.2276		
4	OL-0707-11 (6-8CM)	6.0	8.0	6.00	8.00	0.303	0.606	2.177	1.874	2383	993	0.529	60000	**7.83**	0.25	5.89	**8.4**	8.0	3.570	0.2563		
5	OL-0707-12 (8-10CM)	8.0	10.0	8.00	11.00	0.327	0.980	3.158	2.504	2985	999	0.485	60000	**6.80**	0.22	4.86	**11.8**	11.0	4.764	0.2840		
6	OL-0707-13 (12-14CM)	12.0	14.0	11.00	15.00	0.375	1.499	4.656	3.907	2906	917	0.539	60000	**5.82**	0.20	3.88	**16.6**	15.0	5.817	0.3130		
7	OL-0707-14 (16-18CM)	16.0	18.0	15.00	19.00	0.417	1.669	6.326	5.491	2751	803	0.523	60000	**5.50**	0.20	3.56	**22.4**	19.0	5.942	0.2898		
8	OL-0707-15 (20-22CM)	20.0	22.0	19.00	23.00	0.486	1.943	8.268	7.297	2897	567	0.514	60000	**3.79**	0.17	1.85	**26.4**	23.0	3.587	0.4793		
9	OL-0707-16 (24-26CM)	24.0	26.0	23.00	27.00	0.507	2.027	10.296	9.282	2948	432	0.493	60000	**2.93**	0.15	0.99	**28.9**	27.0	2.010	0.8058		
10	OL-0707-17 (28-30CM)	28.0	30.0	27.00	31.00	0.464	1.854	12.150	11.223	2579	350	0.417	60000	**3.21**	0.18	1.29	**32.2**	31.0	2.389	0.5667		1.92
11	OL-0707-18 (32-34CM)	32.0	34.0	31.00	35.00	0.393	1.572	13.722	12.936	2468	398	0.517	60000	**3.18**	0.16	1.26	**35.2**	35.0	1.981	0.5257		
12	OL-0707-19 (36-38CM)	36.0	38.0	35.00	39.00	0.365	1.461	15.183	14.453	2948	514	0.438	60000	**3.96**	0.18	2.04	**40.3**	39.0	2.982	0.2864		
13	OL-0707-20 (40-42CM)	40.0	42.0	39.00	43.00	0.321	1.283	16.466	15.824	2763	533	0.481	60000	**3.96**	0.18	2.04	**45.6**	43.0	2.612	0.2445	**Cs-137 peak here**	
14	OL-0709-01 (44-46CM)	44.0	46.0	43.00	47.00	0.434	1.735	18.201	17.333	1606	318	0.593	60000	**3.29**	0.20	1.37	**51.2**	47.0	2.384	0.3057		
15	OL-0709-02 (48-50 CM)	48.0	50.0	47.00	51.00	0.410	1.640	19.841	19.021	2479	323	0.499	60000	**2.58**	0.15	1.25	**57.1**	51.0	2.051	0.2810		1.33
16	OL-0709-03 (52-54 CM)	52.0	54.0	51.00	55.00	0.368	1.474	21.315	20.578	2591	330	0.507	60000	**2.50**	0.15	1.17	**62.9**	55.0	1.721	0.2507		
17	OL-0709-04 (56-58CM)	56.0	58.0	55.00	59.00	0.510	2.039	23.354	22.334	2757	347	0.494	60000	**2.51**	0.14	1.18	**73.6**	59.0	2.412	0.1922		
18	OL-0709-05 (60-62CM)	60.0	62.0	59.00	63.00	0.542	2.167	25.521	24.437	2366	257	0.493	60000	**2.17**	0.15	0.84	**84.8**	63.0	1.829	0.1918		
19	OL-0709-06 (64-66CM)	64.0	66.0	63.00	67.00	0.549	2.196	27.717	26.619	2875	247	0.489	60000	**1.74**	0.12	0.41	**92.2**	67.0	0.891	0.2977		
20	OL-0709-07 (68-70CM)	68.0	70.0	67.00	71.00	0.480	1.919	29.637	28.677	2422	247	0.505	60000	**2.01**	0.15	0.68		71.0	1.305			
21	OL-0715-03(72-74CM)	72.0	74.0	71.00	75.00	0.412	1.648	31.285	30.461	2666	374	0.520	60000	**2.66**	0.15	0.88		75.0	1.454			
22	OL-0715-04 (76-78CM)	76.0	78.0	75.00	79.00	0.488	1.952	33.237	32.261	2849	307	0.495	60000	**2.14**	0.14	0.36		79.0	0.696			
23	OL-0715-05 (80-82CM)	80.0	82.0	79.00	83.00	0.451	1.803	35.040	34.139	2463	231	0.520	60000	**1.78**	0.13	0.00		83.0	0.00			
24	OL-0715-06 (84-86CM)	84.0	86.0	83.00	87.00	0.502	2.009	37.049	36.045	2646	304	0.534	60000	**2.12**	0.13							
25	OL-0715-07 (88-90CM)	88.0	90.0	87.00	91.00	0.484	1.934	38.984	38.016	2936	376	0.526	60000	**2.41**	0.13							
26	OL-0715-08 92-94 CM)	92.0	94.0	91.00	95.00	0.585	2.341	41.324	40.154	2296	305	0.501	60000	**2.60**	0.16							
27	OL-0715-09 (96-98 CM)	96.0	98.0	95.00	98.00	0.527	1.581	42.906	42.378	3098	447	0.510	60000	**2.79**	0.14							2.80
Blank	Blank									-2	7											
Blank	Blank									1784	13											
3	OL-0707-10 (4-6CM)					0.247				2776	1206	0.486	60000	**8.89**	0.26							
3 Dup	OL-0707-10 (4-6CM) Dup					0.247				2731	1313	0.518	60000	**9.23**	0.26							
11	OL-0707-18 (32-34CM)					0.393				2468	398	0.517	60000	**3.07**	0.16							
11 Dup	OL-0707-18 (32-34CM) Dup					0.393				2250	372	0.496	60000	**3.29**	0.18							
																Total DPM/cm^2 in core		60.74				

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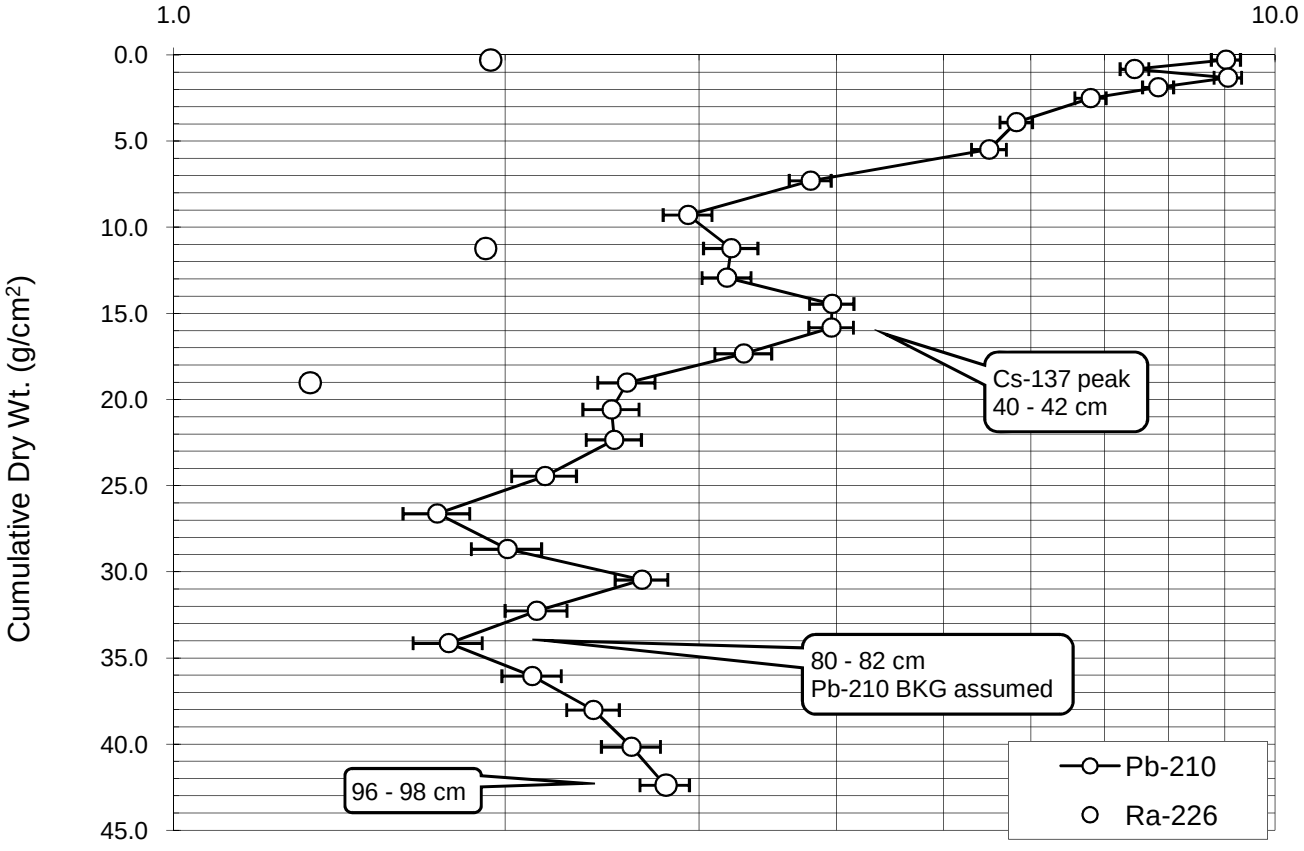
*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

OL-STA-80103



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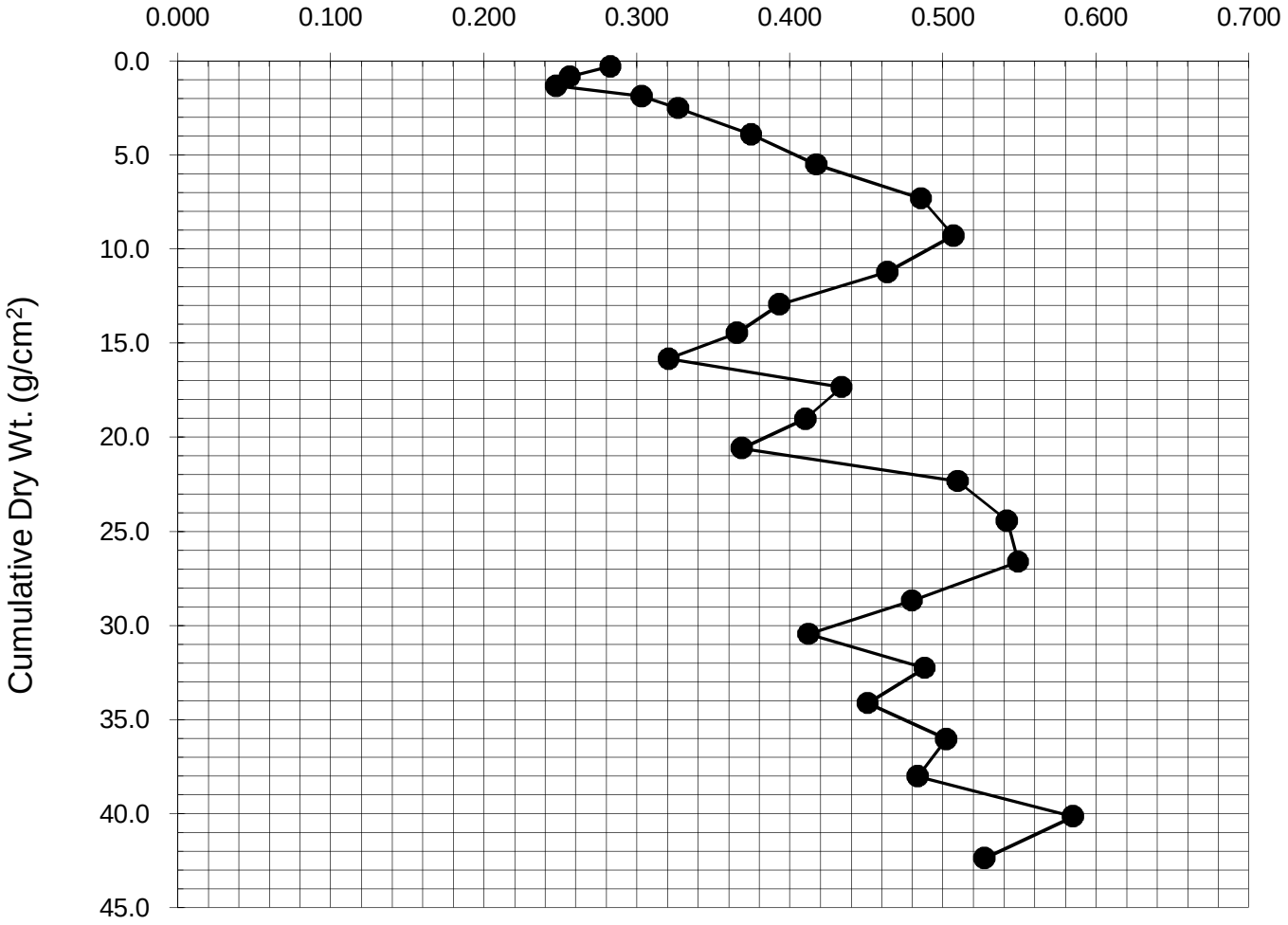
Dry Bulk Density vs. Accumulated Sediment

OL-STA-80103



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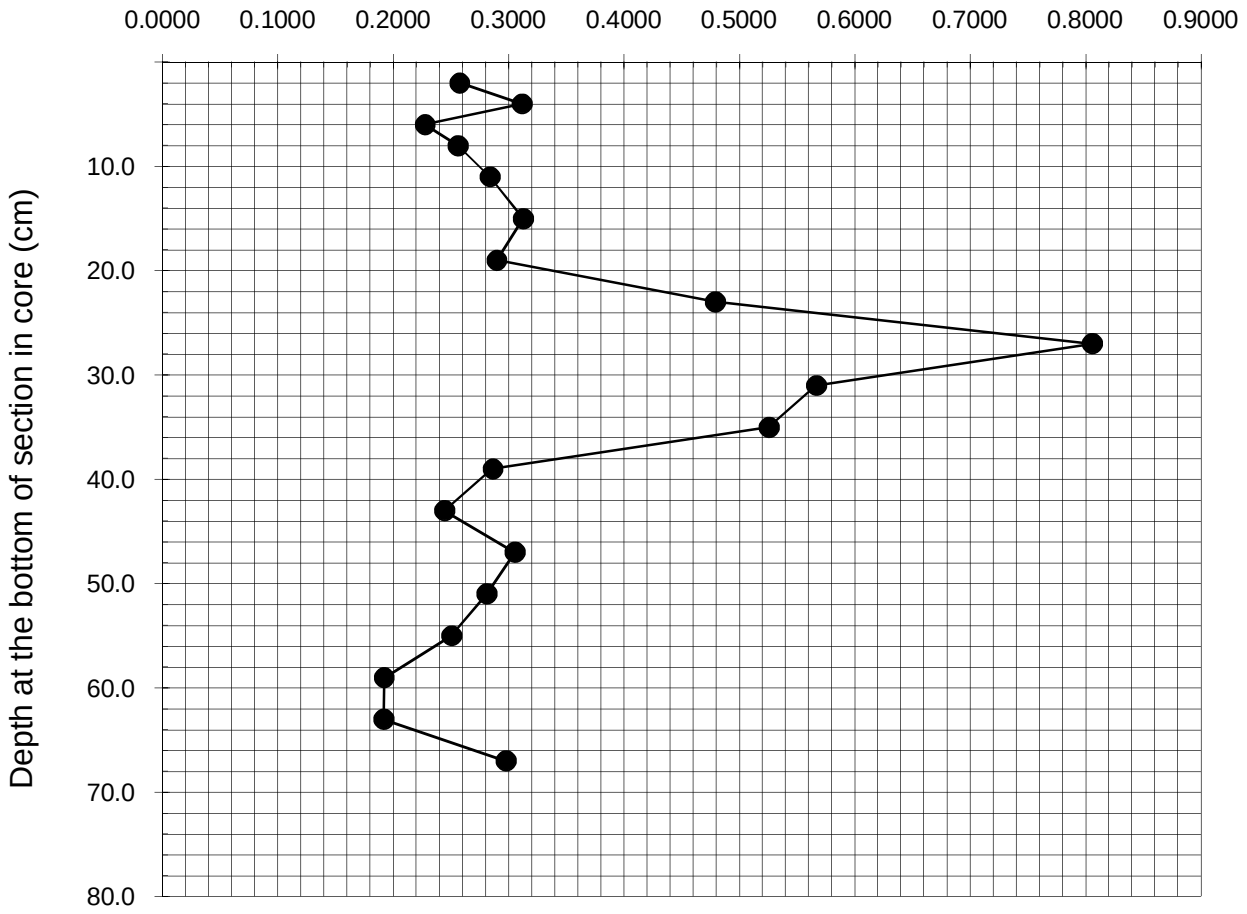
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

OL-STA-80103



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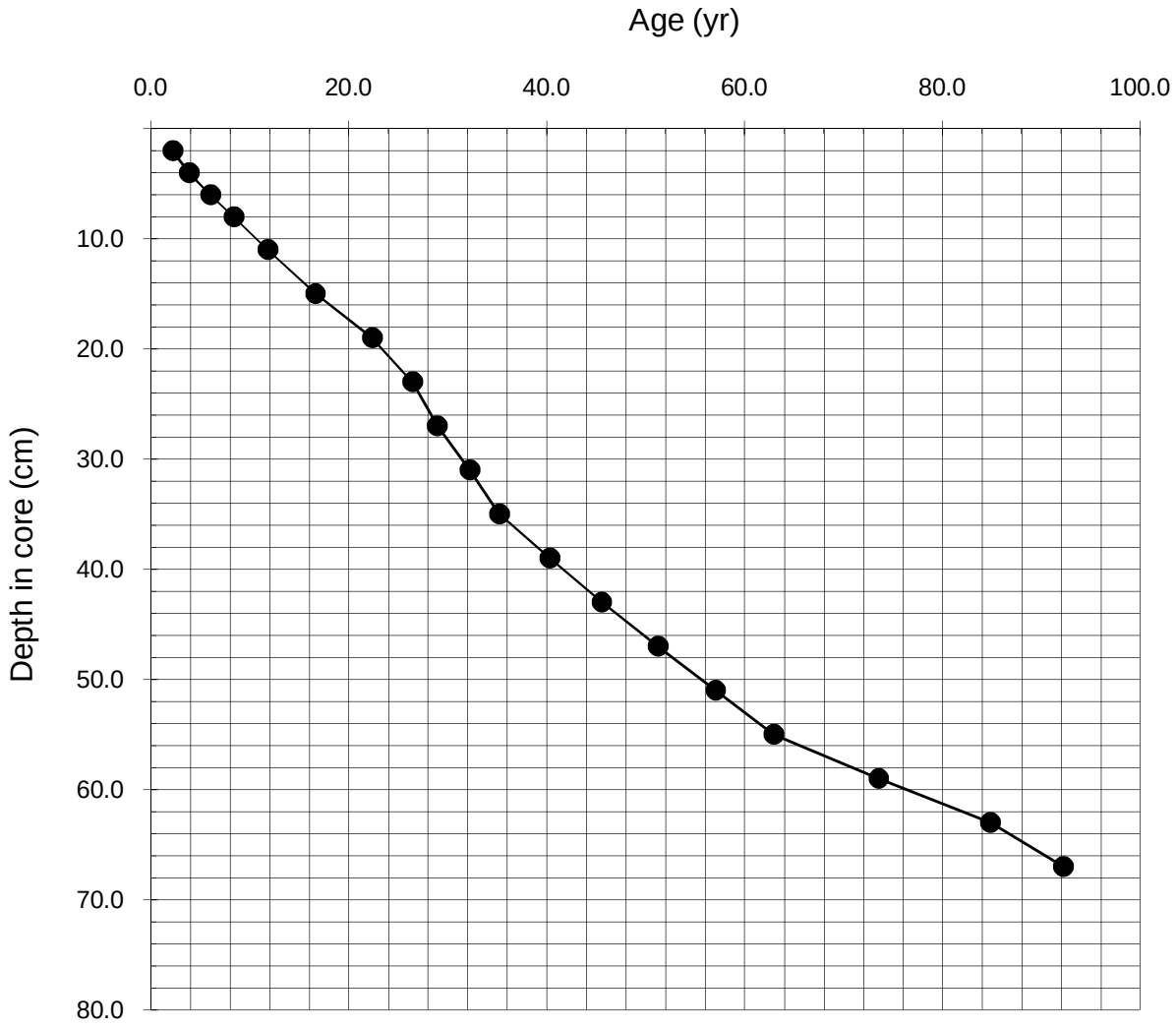
Age (yr) vs. Depth (cm)
CRS Model

OL-STA-80103



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Results of Ra-226 Analysis by Rn-222 Emanation

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Address: Parsons , 290 Elwood Davis Road, Suite 312, Liverpool, N.Y. U.S.A. 13088

Core ID: OL-STA-80103
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Date(s) Analysed: Jan. 14 - Apr. 29, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
OL-STA-80103	OL-0707-08 (0-2 cm)	1.94	0.03
OL-STA-80103	OL-0707-17 (28 - 30 cm)	1.92	0.03
OL-STA-80103	OL-0709-02 (48 - 50 cm)	1.33	0.03
OL-STA-80103	OL-0715-09 (96 - 98 cm)	2.80	0.03

* : See comments section above for discussion.

Ra-226 Analysis by Rn-222 Emanation											
Core ID	OL-STA-80103										
SAMPLE ID	OL-0707-08 (0-2 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.994										
Total Count in Period	9634										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	15	34	0	17.94	0.96133	0.92495
	When cell filled	2009	3	29	39901	14	7	0			
	Beginning time of count	2009	3	29	39901	16	7	0			
Counts/min. (gross)	9.63										
CPM less Cell BKG	9.37										
CPM (decay during count corrected)	10.13										
DPM Sample + System (efficiency corrected)	11.69										
DPM Sample	11.59	Error +/	0.1547	DPM							
DPM/g	5.81										
Ra-226 DPM/g	**1.94**	Error +/	0.0259	DPM/g		1 SD			Error % =	1.3	
Ra-226 pCi/g →	0.88										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										
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30-Mar-09											
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Ra-226 Analysis by Rn-222 Emanation											
Core ID	OL-STA-80103										
SAMPLE ID	OL-0707-17 (28 - 30 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.836										
Total Count in Period	8877										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	16	39	0	18.81	0.96695	0.92413
	When cell filled	2009	4	26	39929	12	0	0			
	Beginning time of count	2009	4	26	39929	14	7	0			
Counts/min. (gross)	8.88										
CPM less Cell BKG	8.61										
CPM (decay during count corrected)	9.32										
DPM Sample + System (efficiency corrected)	10.77										
DPM Sample	10.57	Error +/	0.1503	DPM							
DPM/g	5.76										
Ra-226 DPM/g	**1.92**	Error +/	0.0273	DPM/g		1 SD			Error % =	1.4	
Ra-226 pCi/g →	0.87										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										
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27-Apr-09											
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Ra-226 Analysis by Rn-222 Emanation											
Core ID	OL-STA-80103										
SAMPLE ID	OL-0709-02 (48 - 50 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.495										
Total Count in Period	5352										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	16	37	0	19.84	0.97262	0.92286
	When cell filled	2009	4	27	39930	12	52	0			
	Beginning time of count	2009	4	27	39930	15	10	0			
Counts/min. (gross)	5.35										
CPM less Cell BKG	5.09										
CPM (decay during count corrected)	5.51										
DPM Sample + System (efficiency corrected)	6.37										
DPM Sample	5.98	Error +/	0.1292	DPM							
DPM/g	4.00										
Ra-226 DPM/g	**1.33**	Error +/	0.0288	DPM/g		1 SD			Error % =	2.2	
Ra-226 pCi/g →	0.60										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										
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28-Apr-09											
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Ra-226 Analysis by Rn-222 Emanation											
Core ID	OL-STA-80103										
SAMPLE ID	OL-0715-09 (96 - 98 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.993										
Total Count in Period	13704										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	18	1	0	20.82	0.97706	0.91892
	When cell filled	2009	4	28	39931	13	42	0			
	Beginning time of count	2009	4	28	39931	16	34	0			
Counts/min. (gross)	13.70										
CPM less Cell BKG	13.44										
CPM (decay during count corrected)	14.62										
DPM Sample + System (efficiency corrected)	16.90										
DPM Sample	16.74	Error +/	0.1745	DPM							
DPM/g	8.40										
Ra-226 DPM/g	**2.80**	Error +/	0.0292	DPM/g		1 SD			Error % =	1.0	
Ra-226 pCi/g →	1.27										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										
P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core OL-STA-80103 0509 Final.xlsm]Ra-226 96 - 98 cm											
29-Apr-09											
Page 11 of 15											

Results of Cs-137 Analysis

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290 Elwood Davis Road, Suite 312,
Liverpool, N.Y.
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Core ID: OL-STA-80103
Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

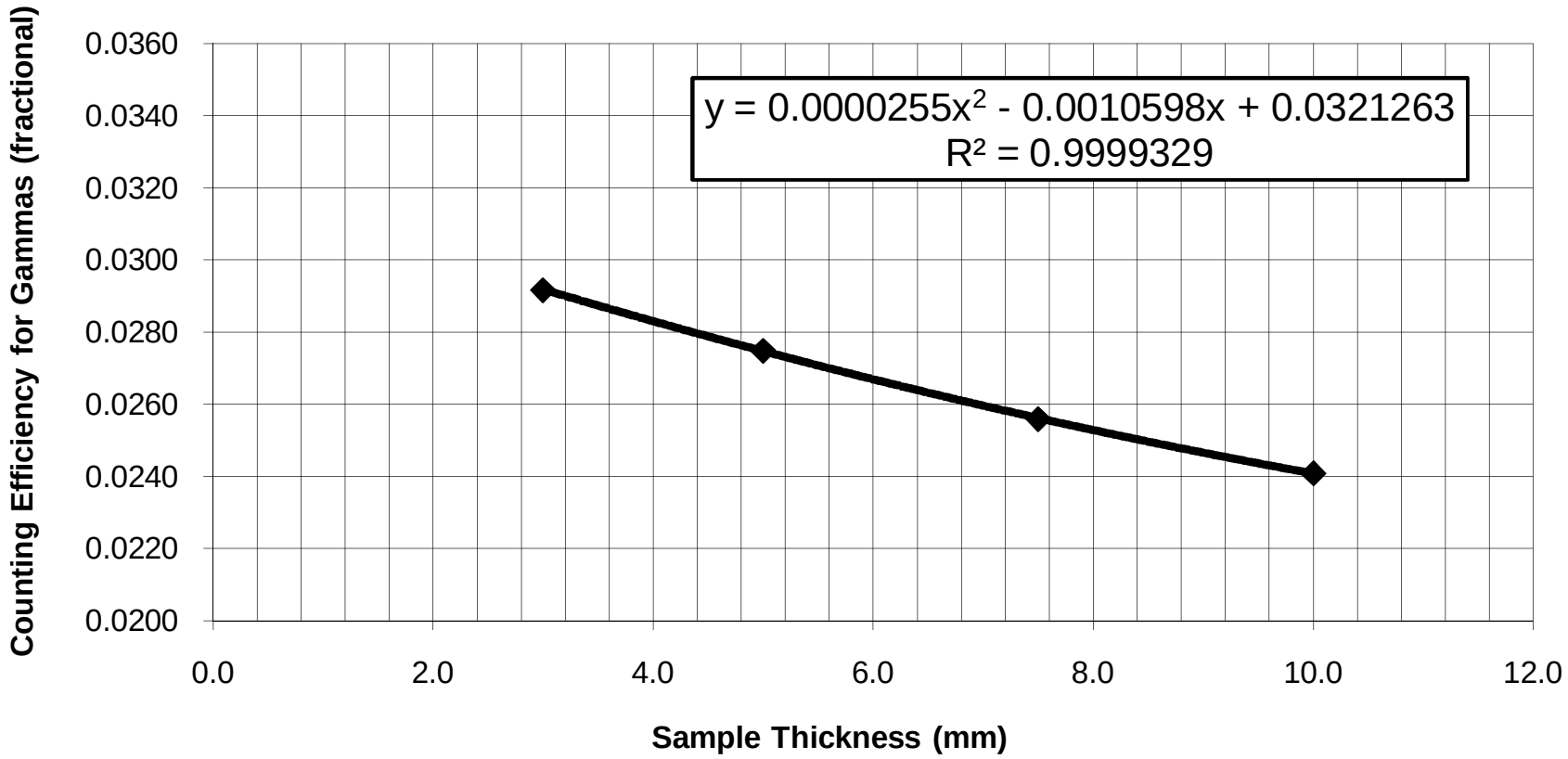
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 14 - Apr. 29, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0707-08 (0-2CM)	0.0	2.0	25	1	2009		124	39	80000	21.125	6.00	0.00	0.0267	0.1650	0.19	0.06	0.09	GMX
OL-0707-09 (2-4CM)	2.0	4.0	25	1	2009		123	31	80000	19.406	5.00	0.00	0.0255	0.1863	0.22	0.06	0.10	GEM
OL-0707-10 (4-6CM)	4.0	6.0	26	1	2009		74	34	80000	19.791	6.00	0.00	0.0249	0.1128	0.13	0.06	0.06	GEM
OL-0707-11 (6-8CM)	6.0	8.0	26	1	2009		77	38	80000	22.313	6.25	0.00	0.0265	0.0977	0.11	0.06	0.05	GMX
OL-0707-12 (8-10CM)	8.0	10.0	14	2	2009		232	46	80000	27.347	8.00	0.01	0.0253	0.2517	0.30	0.06	0.13	GMX
OL-0707-13 (12-14CM)	12.0	14.0	27	1	2009		144	33	80000	27.269	7.90	0.00	0.0236	0.1681	0.20	0.04	0.09	GEM
OL-0707-14 (16-18CM)	16.0	18.0	15	2	2009		64	33	80000	20.310	6.13	0.00	0.0248	0.0954	0.11	0.06	0.05	GEM
OL-0707-15 (20-22CM)	20.0	22.0	27	1	2009		142	37	80000	25.454	7.15	0.00	0.0259	0.1619	0.20	0.05	0.09	GMX
OL-0707-16 (24-26CM)	24.0	26.0	15	2	2009		100	39	80000	27.329	7.75	0.00	0.0254	0.1079	0.13	0.05	0.06	GMX
OL-0707-17 (28-30CM)	28.0	30.0	16	2	2009		217	27	80000	36.877	11.10	0.00	0.0211	0.2090	0.25	0.03	0.11	GEM
OL-0707-18 (32-34CM)	32.0	34.0	13	2	2009		235	43	80000	28.289	8.33	0.01	0.0251	0.2486	0.29	0.05	0.13	GMX
OL-0707-19 (36-38CM)	36.0	38.0	28	1	2009		386	41	80000	26.546	8.00	0.01	0.0253	0.4314	0.51	0.05	0.23	GMX
OL-0707-20 (40-42CM)	40.0	42.0	21	2	2009		908	42	80000	24.291	8.00	0.03	0.0235	1.1935	1.40	0.06	0.64	GEM
OL-0709-01 (44-46CM)	44.0	46.0	21	2	2009		529	46	80000	28.245	8.50	0.01	0.0250	0.5628	0.66	0.06	0.30	GMX
OL-0709-02 (48-50 CM)	48.0	50.0	22	2	2009		42	39	80000	25.742	7.50	0.00	0.0256	0.0478	0.06	0.05	0.03	GMX
OL-0709-03 (52-54 CM)	52.0	54.0	8	3	2009		25	23	80000	18.625	5.50	0.00	0.0252	0.0400	0.05	0.04	0.02	GEM
OL-0709-04 (56-58CM)	56.0	58.0	8	3	2009		18	36	80000	22.620	7.00	0.00	0.0260	0.0230	0.03	0.05	0.01	GMX
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0707-15 (20-22CM)	20.0	22.0	27	1	2009		142	37	80000	25.454	7.15	0.00	0.0259	0.1619	0.19	0.05	0.09	GMX
OL-0707-15 (20-22CM) Duplicate	20.0	22.0	2	4	2009		151	38	80000	25.454	7.15	0.00	0.0259	0.1721	0.20	0.05	0.09	GMX
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



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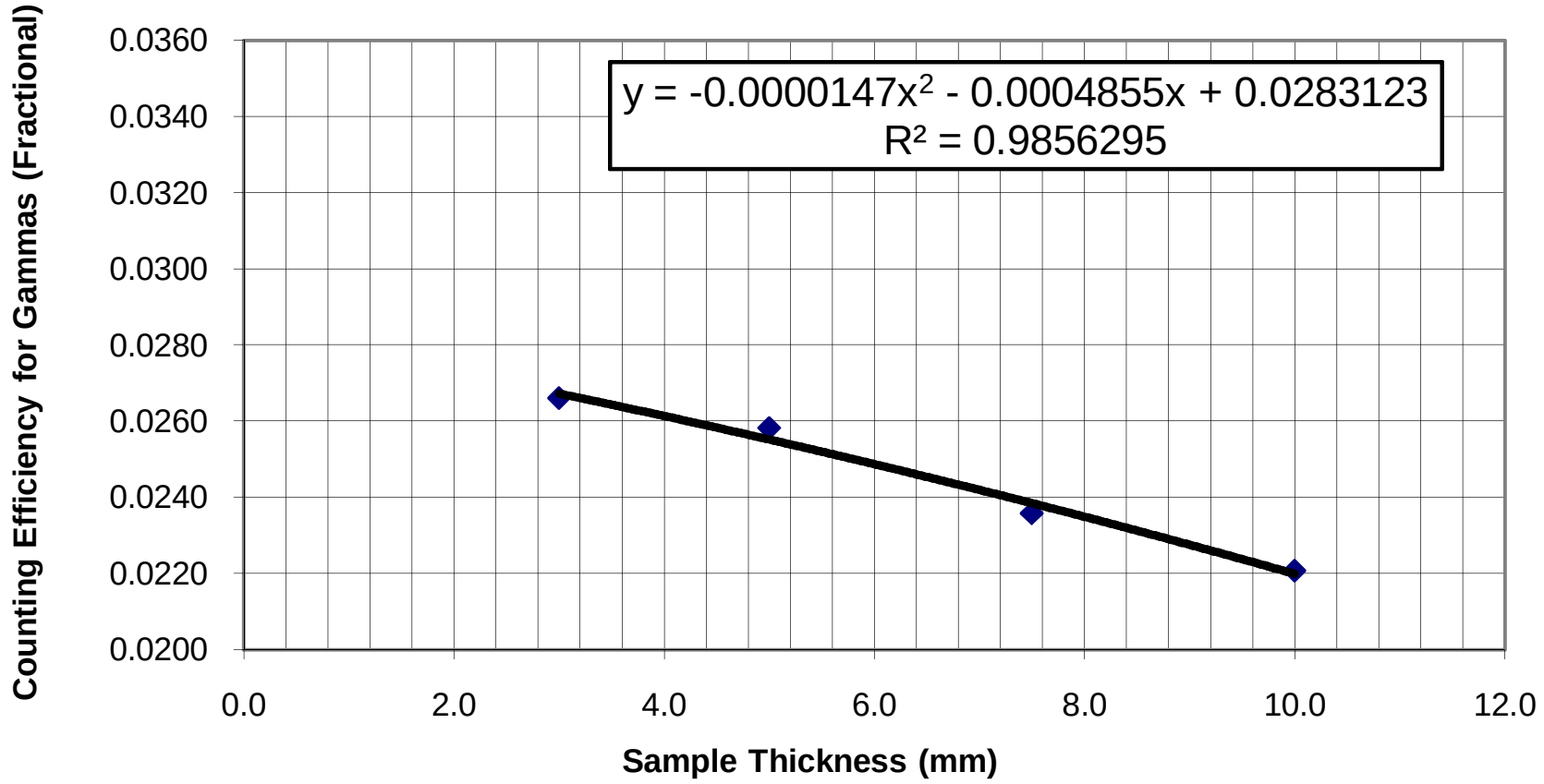
Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



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Results of Cs-137 Analysis

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Core ID: OL-STA-80103

Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

Date(s) Analysed: Jan. 14 - Apr. 29, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0707-08 (0-2CM)	0.0	2.0	0.19	0.06
2	OL-0707-09 (2-4CM)	2.0	4.0	0.22	0.06
3	OL-0707-10 (4-6CM)	4.0	6.0	0.13	0.06
4	OL-0707-11 (6-8CM)	6.0	8.0	0.11	0.06
5	OL-0707-12 (8-10CM)	8.0	10.0	0.30	0.06
6	OL-0707-13 (12-14CM)	12.0	14.0	0.20	0.04
7	OL-0707-14 (16-18CM)	16.0	18.0	0.11	0.06
8	OL-0707-15 (20-22CM)	20.0	22.0	0.20	0.05
9	OL-0707-16 (24-26CM)	24.0	26.0	0.13	0.05
10	OL-0707-17 (28-30CM)	28.0	30.0	0.25	0.03
11	OL-0707-18 (32-34CM)	32.0	34.0	0.29	0.05
12	OL-0707-19 (36-38CM)	36.0	38.0	0.51	0.05
13	OL-0707-20 (40-42CM)	40.0	42.0	1.40	0.06
14	OL-0709-01 (44-46CM)	44.0	46.0	0.66	0.06
15	OL-0709-02 (48-50 CM)	48.0	50.0	0.06	0.05
16	OL-0709-03 (52-54 CM)	52.0	54.0	0.05	0.04
17	OL-0709-04 (56-58CM)	56.0	58.0	0.03	0.05
	* : See 'Comments'				

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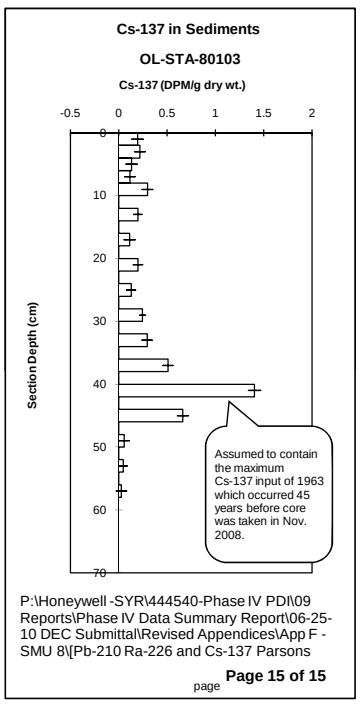

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This table must remain open for chart to plot.

Plot Table X Values	Plot Table Y Values
0	0
0.194097	0
0.194097	1
0.255143	1
0.13305	1
0.194097	1
0.194097	2
0	2
0	2
0.219162	2
0.219162	3
0.275111	3
0.163213	3
0.219162	3
0.219162	4
0	4
0	4
0.132652	4
0.132652	5
0.192704	5
0.0726	5
0.132652	5
0.132652	6
0	6
0	6
0.114916	6
0.114916	7
0.171628	7
0.058204	7
0.114916	7
0.114916	8
0	8
0	8
0.296137	8
0.296137	9
0.354854	9
0.237421	9
0.296137	9
0.296137	10
0	10
0	12
0.197763	12
0.197763	13
0.242397	13
0.153129	13
0.197763	13
0.197763	14
0	14
0	16
0.112183	16
0.112183	17
0.170519	17
0.053848	17
0.112183	17
0.112183	18
0	18
0	20
0.196454	20
0.196454	21
0.246071	21
0.146838	21
0.196454	21
0.196454	22
0	22
0	24
0.126903	24
0.126903	25
0.176395	25
0.077411	25
0.126903	25
0.126903	26
0	26
0	28
0.245904	28
0.245904	29
0.27701	29
0.214798	29
0.245904	29
0.245904	30
0	30
0	32
0.292437	32
0.292437	33
0.345947	33
0.238927	33
0.292437	33
0.292437	34
0	34
0	36
0.507579	36
0.507579	37
0.561492	37
0.453665	37
0.507579	37
0.507579	38
0	38
0	40
1.404172	40
1.404172	41
1.468767	41
1.339577	41
1.404172	41
1.404172	42
0	42
0	44
0.662156	44
0.662156	45
0.719735	45
0.604577	45
0.662156	45
0.662156	46
0	46
0	48
0.056214	48
0.056214	49
0.108413	49
0.004015	49
0.056214	49
0.056214	50
0	50
0	52
0.047002	52
0.047002	53
0.090244	53
0.00376	53
0.047002	53
0.047002	54
0	54
0	56
0.027052	56
0.027052	57
0.081156	57
-0.02705	57
0.027052	57
0.027052	58
0	58

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Sample Information

Project: Onondaga Lake
Core: OL-STA-80089
Sampling Date(s): N/A
Date(s) Received: 12/4/2008, 3/20/2009
Analysis Date(s): Feb. 2 - Apr. 6, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

ST-51

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Core ID:	**ST-51**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**December 4, 2008**
Analysis Date(s):	**Jan. 8 - Apr. 24, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 10.48 DPM/g observed in section 4 (depth 6.0 - 8.0 cm) is about 5.2 times the lowest activity of 2.02 DPM/g in section 26 (extrapolated depth 91 - 95 cm).

The dry bulk density profile is irregular, ranging 0.208 - 0.487 g/cm^3. It gradually increases to 0.487 g/cm^3 with depth until 27 cm, then decreases to 0.224 g/cm^3 at 39 - 43 cm (extrapolated depth), and then generally increases with depth (Page 4). This density profile is unusual compared to most cores which typically have increasing dry bulk density as a function with depth, and suggests that the sediments may be of varying composition throughout the core.

Sediment accumulation rates in this core appear relatively constant (0.1960 - 0.2882 g/cm^2/year) in the upper 8 sections (0 - 23 cm, extrapolated depth) but show an increase to 0.4711 g/cm^2/year in section 9 (23 - 27 cm, extrapolated depth), then drop to 0.1413 g/cm^2/year in section 13 (39 - 43 cm, extrapolated depth), again rapidly increase to 2.0741 g/cm^2/year in section 20 (67 - 71 cm, extrapolated depth), and then again drop downward (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 15 sections (depth 0 - 50 cm) is significantly above background, with a surface activity of 0.10 DPM/g and increasing to a pronounced maximum of 1.01 DPM/g in the 40 - 42 cm section. The Cs-137 activity then declines gradually with depth (Page 11 & 14). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.82, 2.09 and 2.32 DPM/g in sections 2 (depth 2.0 - 4.0 cm), 16 (extrapolated depth 51 - 55 cm), and 30 (extrapolated depth 107 - 110 cm), respectively (Page 8, 9 & 10). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise. The Ra-226 activity measured in section 30 is similar to the Pb-210 activity of 2.62 DPM/g in the same section, suggesting that background level of Pb-210 has been attained, and the changing Ra-226 activities also suggest that background levels of Pb-210 vary with depth in this core.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not completely satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210 i.e. it contains a complete Pb-210 inventory. Although several different sections could plausibly be assigned to represent uppermost background, section 30 (extrapolated depth 107 - 110 cm) was chosen because it caused the CRS model to most accurately predict the age (2008 - 1963 = 45 years) of the Cs-137 peak (see Page 2). It has been assumed that the background activity of section 30 (2.62 DPM/g) applies to section 30 itself, that the activity of section 26 (2.02 DPM/g) applies to the sections 17 to 29, and that the Ra-226 background of 2.09 DPM/g observed in section 16 applies to sections 9 - 16.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 4 (depth 6 - 8 cm) can be calculated as: 1.813/7.6 = 0.2386 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 13 at 40 - 42 cm depth (Pages 11 and 14) where maximum Cs-137 activity of 1.01 DPM/g occurred. It is possible that the true Cs-137 maximum occurred in the 38 - 40 cm section or the 42 - 44 cm section which were not analysed. The CRS model indicates that each cm of core section contains about 1.58 yr of accumulated sediment over the depth interval of 39 - 43 cm and therefore the uncertainty in the CRS date could be 2 cm X 1.58 yr/cm = 3.2 years, or about 3.2 yr / 45 yr X 100 = +/- 7 %.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Address: Parsons , 290 Elwood Davis Road, Suite 312 , Liverpool, N.Y. U.S.A. 13088

Core ID: ST-51 **Transaction ID: 393**

Date(s) Received: 4-Dec-08 **PO/Contract No.: 444540.30010.00**

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrap-olated Upper Section Depth (cm)	Extrap-olated Lower Section Depth (cm)	Dry Wt./ Wet cc. (g/cm^3)	Mass in extrap-olated section (g/cm^2)	Cumul-ative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumul-ative mass in current section (g/cm^2)	Po-209 counts less detector back-ground	Po-210 counts less detector back-ground and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsup-ported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumu-lation Rate ($g/cm^2/yr$)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0703-08 (0-2 CM)	0.0	2.0	0.00	2.00	0.208	0.416	0.416	0.208	2785	1400	0.493	60000	**10.01**	0.28	8.19	**1.7**	2.0	3.408	0.2458		
2	OL-0703-09 (2-4 CM)	2.0	4.0	2.00	4.00	0.222	0.445	0.861	0.639	2731	1313	0.519	60000	**9.09**	0.26	7.27	**3.4**	4.0	3.232	0.2626		1.82
3	OL-0703-10 (4-6 CM)	4.0	6.0	4.00	6.00	0.220	0.440	1.301	1.081	2338	1011	0.493	60000	**8.61**	0.28	6.79	**5.0**	6.0	2.987	0.2669		
4	OL-0703-11 (6-8 CM)	6.0	8.0	6.00	8.00	0.256	0.512	1.813	1.557	2901	1549	0.510	60000	**10.48**	0.27	8.66	**7.6**	8.0	4.429	0.1960		
5	OL-0703-12 (8-10 CM)	8.0	10.0	8.00	11.00	0.312	0.937	2.749	2.125	2246	938	0.495	60000	**8.33**	0.28	6.51	**11.6**	11.0	6.100	0.2352		
6	OL-0703-13 (12-14 CM)	12.0	14.0	11.00	15.00	0.345	1.381	4.131	3.440	2439	858	0.501	60000	**6.89**	0.24	5.07	**16.9**	15.0	7.003	0.2618		
7	OL-0703-14 (16-18 CM)	16.0	18.0	15.00	19.00	0.373	1.492	5.623	4.877	2198	658	0.494	60000	**5.99**	0.24	4.17	**22.5**	19.0	6.223	0.2690		
8	OL-0703-15 (20-22 CM)	20.0	22.0	19.00	23.00	0.357	1.428	7.051	6.337	2186	583	0.511	60000	**5.12**	0.22	3.30	**27.4**	23.0	4.720	0.2882		
9	OL-0703-16 (24-26 CM)	24.0	26.0	23.00	27.00	0.487	1.949	9.000	8.026	2256	443	0.516	60000	**3.85**	0.19	1.76	**31.5**	27.0	3.420	0.4711		
10	OL-0703-17 (28-30 CM)	28.0	30.0	27.00	31.00	0.418	1.671	10.671	9.836	2558	474	0.499	60000	**3.67**	0.18	1.58	**35.2**	31.0	2.644	0.4632		
11	OL-0703-18 (32-34 CM)	32.0	34.0	31.00	35.00	0.344	1.374	12.045	11.358	2502	538	0.499	60000	**4.26**	0.19	2.17	**39.8**	35.0	2.980	0.2974		
12	OL-0703-19 (36-38 CM)	36.0	38.0	35.00	39.00	0.307	1.227	13.272	12.659	2001	466	0.500	60000	**4.57**	0.22	2.48	**45.3**	39.0	3.043	0.2224		
13	OL-0703-20 (40-42 CM)	40.0	42.0	39.00	43.00	0.224	0.896	14.169	13.721	2475	666	0.498	60000	**5.34**	0.21	3.25	**51.6**	43.0	2.909	0.1413	**Cs-137 peak here**	
14	OL-0705-01 (44-46 CM)	44.0	46.0	43.00	47.00	0.277	1.107	15.275	14.722	2430	474	0.495	60000	**3.89**	0.19	1.80	**56.8**	47.0	1.997	0.2123		
15	OL-0705-02 (48-50 CM)	48.0	50.0	47.00	51.00	0.323	1.292	16.567	15.921	2542	480	0.507	60000	**3.68**	0.18	1.59	**63.3**	51.0	2.050	0.2016		
16	OL-0705-03 (52-54 CM)	52.0	54.0	51.00	55.00	0.356	1.426	17.993	17.280	2155	345	0.495	60000	**3.17**	0.18	1.08	**69.1**	55.0	1.543	0.2444		2.09
17	OL-0705-04 (56-58 CM)	56.0	58.0	55.00	59.00	0.378	1.510	19.503	18.748	2615	302	0.477	60000	**2.39**	0.15	0.37	**71.5**	59.0	0.558	0.6290		
18	OL-0705-05 (60-62 CM)	60.0	62.0	59.00	63.00	0.442	1.769	21.272	20.388	2011	262	0.518	60000	**2.48**	0.17	0.46	**75.4**	63.0	0.820	0.4551		
19	OL-0705-06 (64-66 CM)	64.0	66.0	63.00	67.00	0.395	1.582	22.854	22.063	2631	292	0.514	60000	**2.14**	0.13	0.12	**76.3**	67.0	0.185	1.6758		
20	OL-0705-07 (68-70 CM)	68.0	70.0	67.00	71.00	0.431	1.724	24.578	23.716	2099	221	0.491	60000	**2.11**	0.16	0.09	**77.2**	71.0	0.158	2.0741		
21	OL-0715-10 (72-74 CM)	72.0	74.0	71.00	75.00	0.382	1.527	26.105	25.341	2211	294	0.502	60000	**2.61**	0.16	0.59	**82.4**	75.0	0.901	0.2937		
22	OL-0715-11 (76-78 CM)	76.0	78.0	75.00	79.00	0.335	1.341	27.445	26.775	2423	344	0.537	60000	**2.60**	0.15	0.58	**87.6**	79.0	0.779	0.2535		
23	OL-0715-12 (80-82 CM)	80.0	82.0	79.00	83.00	0.332	1.329	28.775	28.110	1868	225	0.527	60000	**2.25**	0.16	0.23		83.0	0.304			
24	OL-0715-13 (84-86 CM)	84.0	86.0	83.00	87.00	0.429	1.715	30.490	29.632	2430	297	0.502	60000	**2.39**	0.15	0.37		87.0	0.643			
25	OL-0715-14 (88-90 CM)	88.0	90.0	87.00	91.00	0.369	1.474	31.964	31.227	3067	361	0.503	60000	**2.30**	0.13	0.28		91.0	0.416			
26	OL-0715-15 (92-94 CM)	92.0	94.0	91.00	95.00	0.398	1.591	33.555	32.759	2539	281	0.538	60000	**2.02**	0.14	0.00		95.0	0.000			
27	OL-0715-16 (96-98 CM)	96.0	98.0	95.00	99.00	0.448	1.791	35.346	34.450	2580	253	0.506	60000	**2.16**	0.13	0.14		99.0	0.251			
28	OL-0715-17(100-102CM)	100.0	102.0	99.00	103.00	0.392	1.569	36.915	36.130	2399	360	0.500	60000	**2.95**	0.17	0.93		103.0	1.454			
29	OL-0715-18(104-106CM)	104.0	106.0	103.00	107.00	0.369	1.475	38.390	37.652	2899	469	0.549	60000	**2.90**	0.14	0.88		107.0	1.292			
30	OL-0715-19(108-110CM)	108.0	110.0	107.00	110.00	0.413	1.239	39.629	39.216	2841	357	0.472	60000	**2.62**	0.15	0.00		110.0	0.000			2.32
Blank	Blank									6	5											
Blank	Blank									1900	15											
3	OL-0703-10 (4-6 CM)					0.221																
3 Dup	OL-0703-10 (4-6 CM) DUP					0.219																
11	OL-0703-18 (32-34 CM)					0.345																
11 Dup	OL-0703-18 (32-34 CM) DUP					0.342																
4	OL-0703-11 (6-8 CM)									2901	1549	0.510	60000	**10.27**	0.27							
4 Dup	OL-0703-11 (6-8 CM) Dup									2066	1109	0.493	60000	**10.68**	0.33							
9	OL-0703-16 (24-26 CM)									2551	483	0.476	60000	**3.93**	0.19							
9 Dup	OL-0703-16 (24-26 CM) Dup									2256	443	0.516	60000	**3.76**	0.19							
27	OL-0715-16 (96-98 CM)									2623	290	0.495	60000	**2.20**	0.14							
27 Dup	OL-0715-16 (96-98 CM)									3098	335	0.502	60000	**2.12**	0.12							
																Total DPM/cm^2 in core		66.45				

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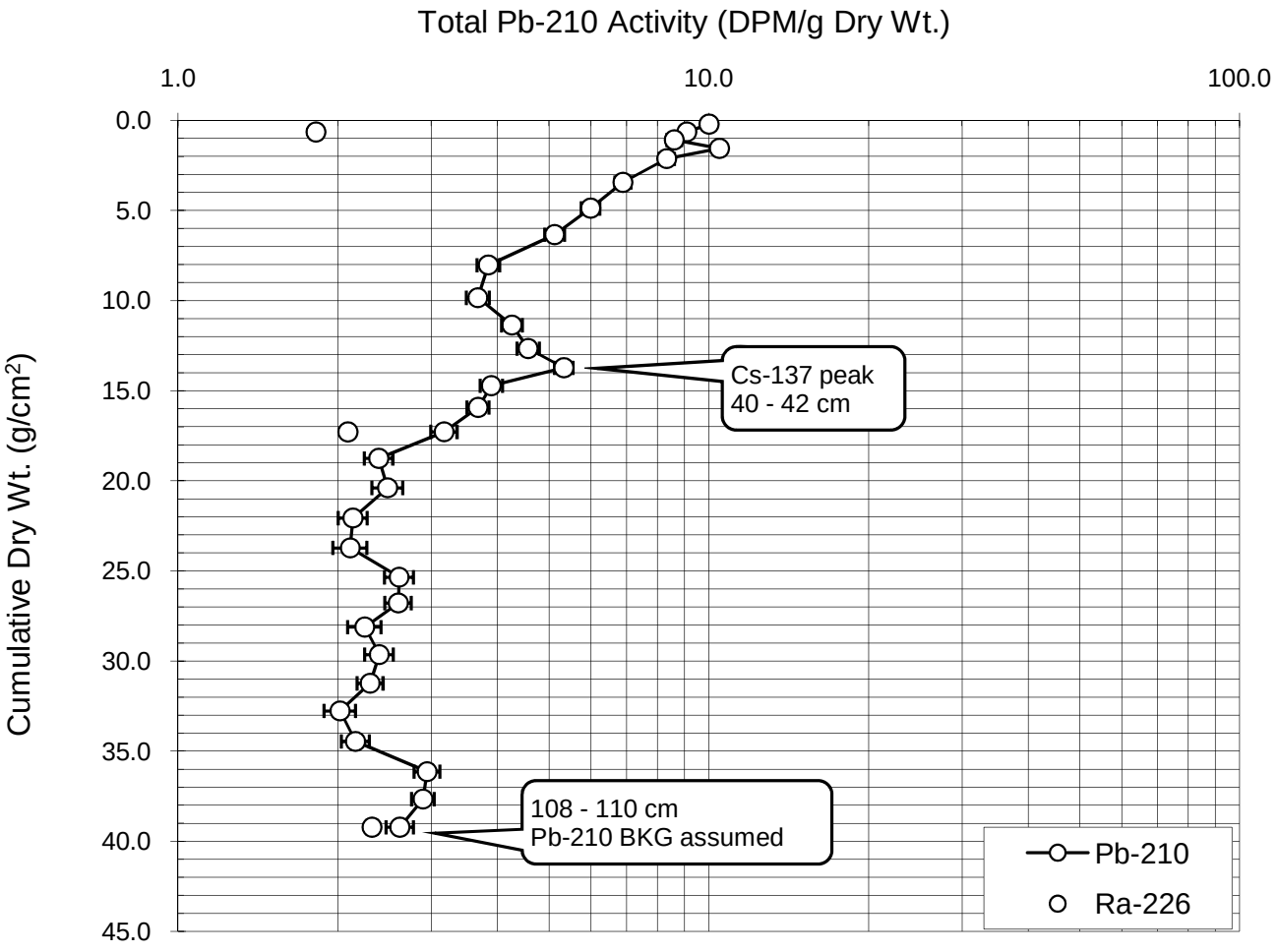
*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

ST-51



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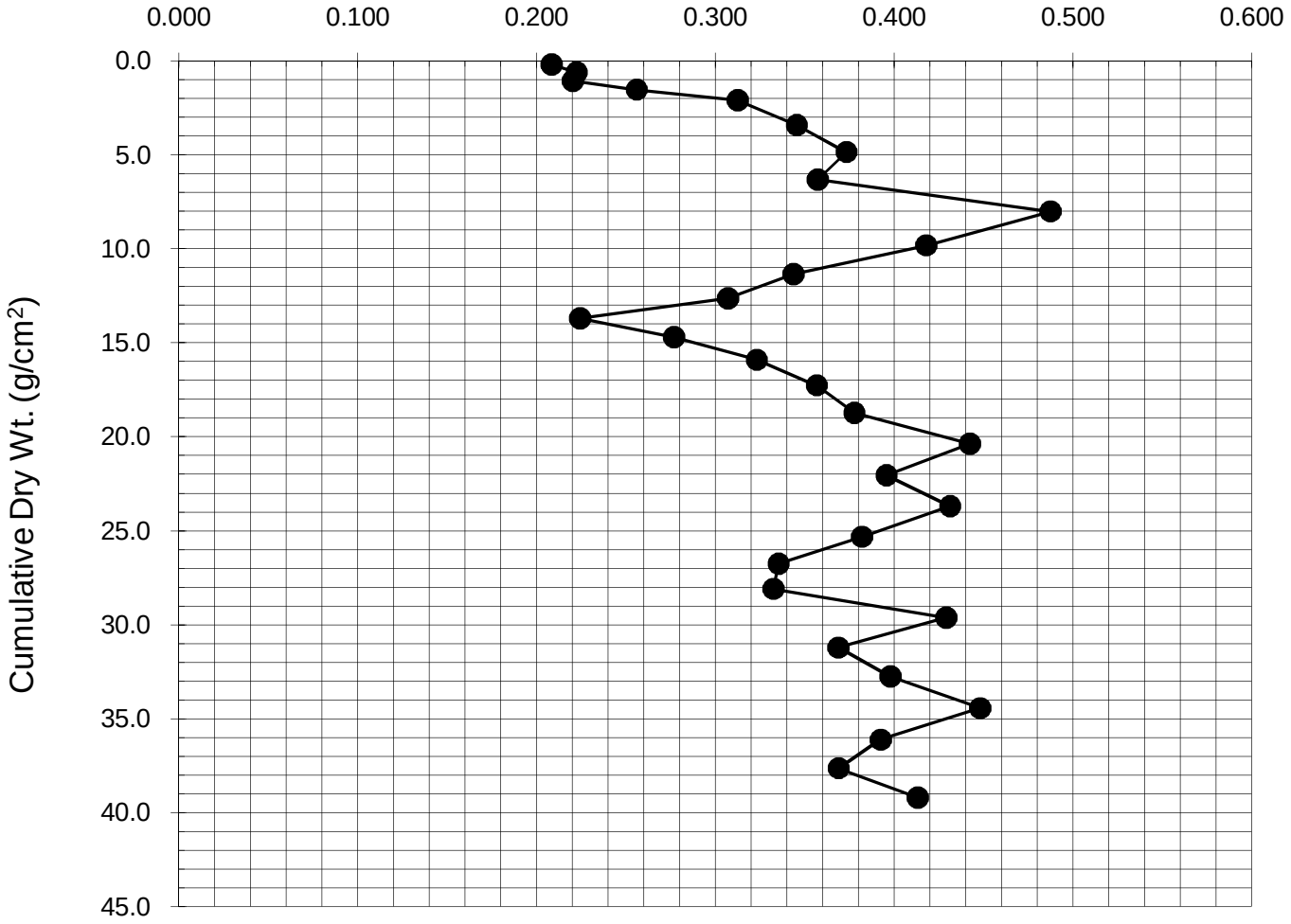
Dry Bulk Density vs. Accumulated Sediment

ST-51



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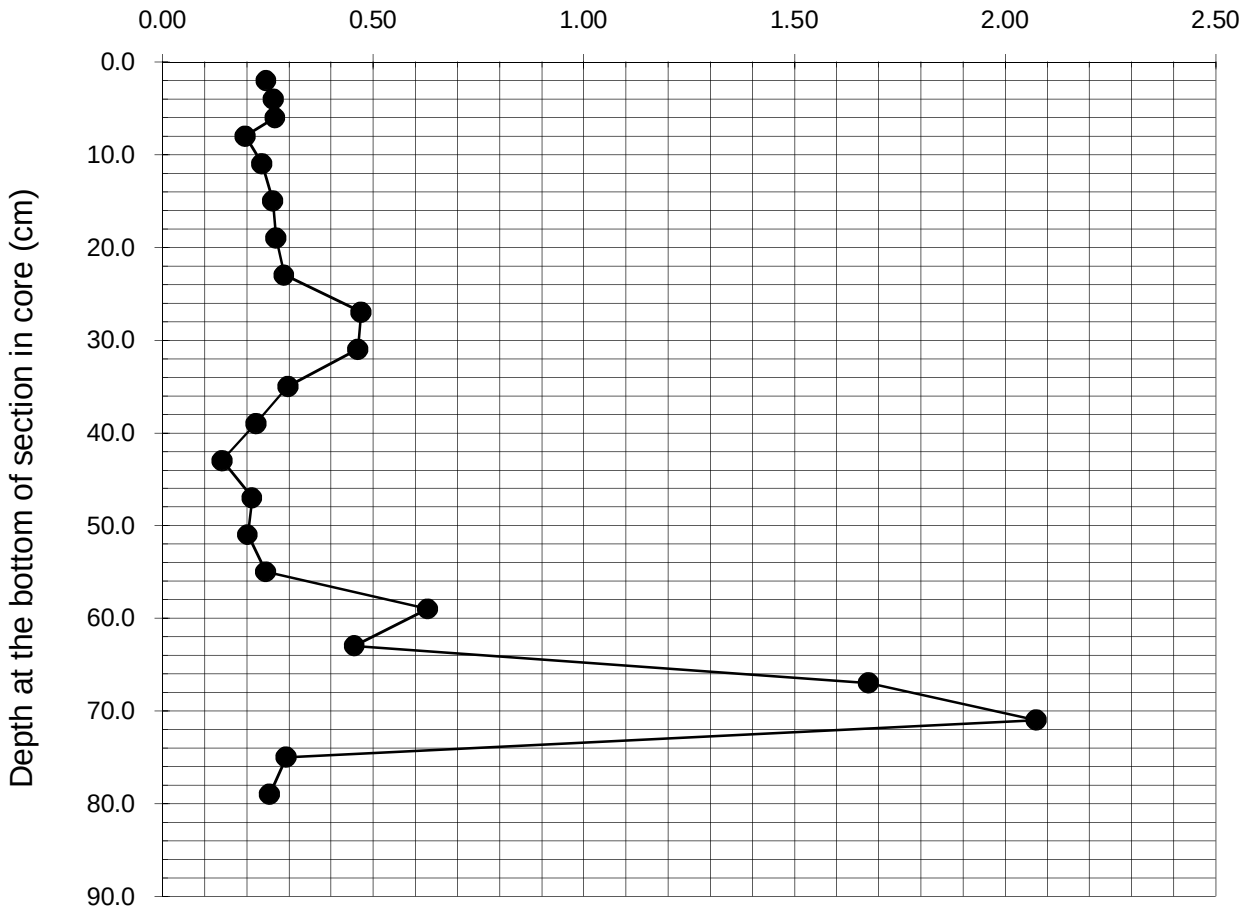
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

ST-51



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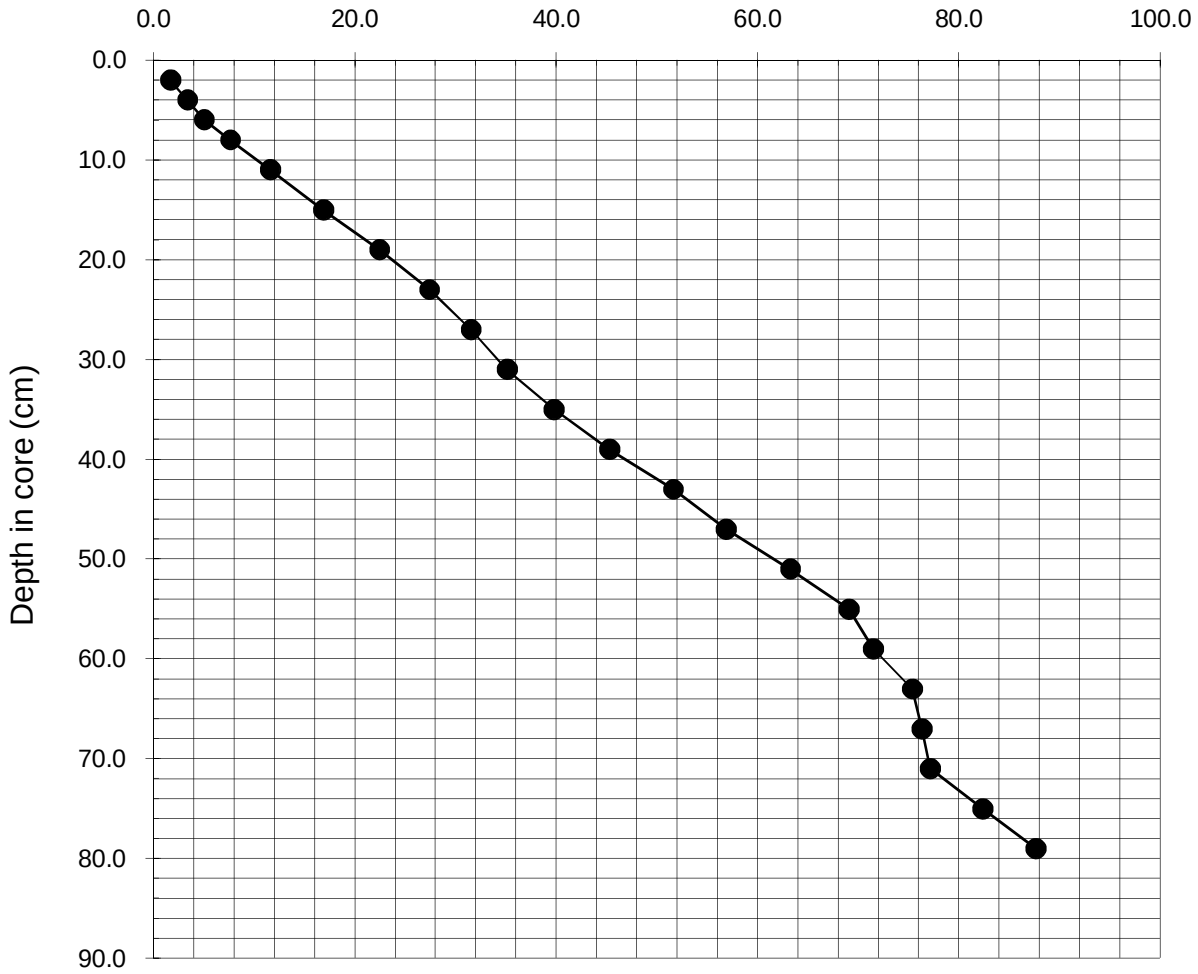
Age (yr) vs. Depth (cm)
CRS Model

ST-51



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Results of Ra-226 Analysis by Rn-222 Emanation

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons , 290 Elwood Davis Road, Suite 312 , Liverpool, N.Y. U.S.A. 13088

Core ID: ST-51
Date(s) Received: 4-Dec-08
Sampling Dates(s): N/A
Project:

Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 8 - Apr. 24, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
ST-51	OL-0703-09 (2 - 4 cm)	1.82	0.03
ST-51	OL-0705-03 (52 - 54 cm)	2.09	0.04
ST-51	OL-0715-19 (108 - 110 cm)	2.32	0.04

* : See comments section above for discussion.

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Ra-226 Analysis by Rn-222 Emanation

Core ID	ST-51										
SAMPLE ID	OL-0703-09 (2 - 4 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.996										
Total Count in Period	9149										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	17	3	0	18.80	0.96694	0.92495
	When cell filled	2009	3	30	39902	12	22	0			
	Beginning time of count	2009	3	30	39902	14	22	0			
Counts/min. (gross)	9.15										
CPM less Cell BKG	8.88										
CPM (decay during count corrected)	9.60										
DPM Sample + System (efficiency corrected)	11.09										
DPM Sample	10.90	Error +/-	0.1516	DPM							
DPM/g	5.46										
Ra-226 DPM/g	**1.82**	Error +/-	0.0253	DPM/g		1 SD			Error % =	1.4	
Ra-226 pCi/g ⟶	0.82										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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31-Mar-09

Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	ST-51										
SAMPLE ID	OL-0705-03 (52 - 54 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.218										
Total Count in Period	6189										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	16	41	0	12.83	0.90231	0.92151
	When cell filled	2009	4	20	39923	12	34	23			
	Beginning time of count	2009	4	20	39923	15	4	0			
Counts/min. (gross)	6.19										
CPM less Cell BKG	5.92										
CPM (decay during count corrected)	6.43										
DPM Sample + System (efficiency corrected)	7.43										
DPM Sample	7.63	Error +/-	0.1393	DPM							
DPM/g	6.26										
Ra-226 DPM/g	**2.09**	Error +/-	0.0381	DPM/g		1 SD			Error % =	1.8	
Ra-226 pCi/g ⟶	0.94										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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21-Apr-09

Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	ST-51										
SAMPLE ID	OL-0715-19 (108 - 110 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.268										
Total Count in Period	7404										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	6	39909	18	55	0	16.74	0.95197	0.92346
	When cell filled	2009	4	23	39926	12	46	14			
	Beginning time of count	2009	4	23	39926	14	59	0			
Counts/min. (gross)	7.40										
CPM less Cell BKG	7.14										
CPM (decay during count corrected)	7.73										
DPM Sample + System (efficiency corrected)	8.93										
DPM Sample	8.81	Error +/-	0.1431	DPM							
DPM/g	6.95										
Ra-226 DPM/g	**2.32**	Error +/-	0.0376	DPM/g		1 SD			Error % =	1.6	
Ra-226 pCi/g →	1.05										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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Results authorised by Dr. Robert J. Flett

Results of Cs-137 Analysis

Flett Research Ltd.

440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7

Fax/Phone (204) 667-2505

E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons ,
290 Elwood Davis Road, Suite 312 ,
Liverpool, N.Y.
U.S.A. 13088

Core ID: ST-51
Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

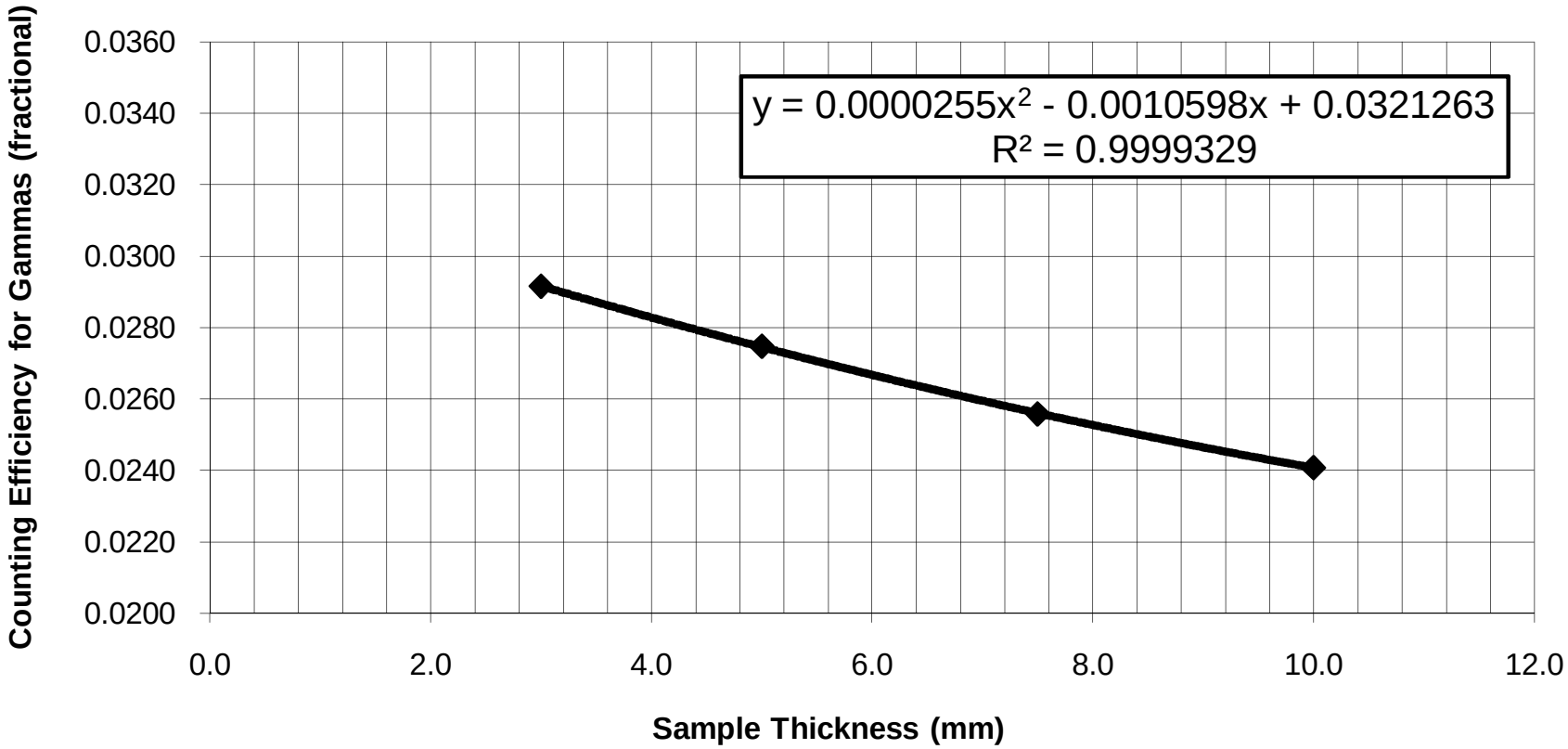
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 8 - Apr. 24, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0703-08 (0-2 CM)	0.0	2.0	13	1	2009		45	29	80000	14.676	4.50	0.00	0.0258	0.0890	0.10	0.07	0.05	GEM
OL-0703-09 (2-4 CM)	2.0	4.0	13	1	2009		104	37	80000	15.360	5.00	0.01	0.0275	0.1849	0.22	0.08	0.10	GMX
OL-0703-10 (4-6 CM)	4.0	6.0	15	1	2009		58	30	80000	14.895	5.00	0.00	0.0255	0.1144	0.13	0.07	0.06	GEM
OL-0703-11 (6-8 CM)	6.0	8.0	15	1	2009		97	41	80000	19.912	6.00	0.00	0.0267	0.1369	0.16	0.07	0.07	GMX
OL-0703-12 (8-10 CM)	8.0	10.0	28	1	2009		45	32	80000	20.980	6.00	0.00	0.0249	0.0647	0.08	0.05	0.03	GEM
OL-0703-13 (12-14 CM)	12.0	14.0	16	1	2009		108	41	80000	20.833	6.00	0.00	0.0267	0.1457	0.17	0.07	0.08	GMX
OL-0703-14 (16-18 CM)	16.0	18.0	29	1	2009		107	30	80000	22.591	6.70	0.00	0.0262	0.1357	0.13	0.04	0.06	GMX
OL-0703-15 (20-22 CM)	20.0	22.0	16	1	2009		53	29	80000	11.547	3.50	0.00	0.0264	0.1302	0.15	0.08	0.07	GEM
OL-0703-16 (24-26 CM)	24.0	26.0	29	1	2009		61	31	80000	13.916	3.75	0.00	0.0263	0.1251	0.15	0.07	0.07	GEM
OL-0703-17 (28-30 CM)	28.0	30.0	30	1	2009		147	29	80000	16.326	4.25	0.01	0.0260	0.2599	0.31	0.06	0.14	GEM
OL-0703-18 (32-34 CM)	32.0	34.0	30	1	2009		241	39	80000	24.004	6.00	0.01	0.0267	0.2822	0.33	0.05	0.15	GMX
OL-0703-19 (36-38 CM)	36.0	38.0	17	1	2009		437	44	80000	17.430	4.50	0.02	0.0279	0.6746	0.79	0.08	0.36	GMX
OL-0703-20 (40-42 CM)	40.0	42.0	31	1	2009		774	45	80000	26.090	6.90	0.02	0.0260	0.8549	1.01	0.06	0.46	GMX
OL-0705-01 (44-46 CM)	44.0	46.0	1	2	2009		614	38	80000	23.375	5.50	0.02	0.0252	0.7818	0.92	0.06	0.42	GEM
OL-0705-02 (48-50 CM)	48.0	50.0	1	2	2009		506	42	80000	25.655	6.50	0.01	0.0263	0.5622	0.66	0.05	0.30	GMX
OL-0705-03 (52-54 CM)	52.0	54.0	12	3	2009		43	25	80000	27.815	7.20	0.00	0.0241	0.0482	0.06	0.03	0.03	GEM
OL-0705-04 (56-58 CM)	56.0	58.0	12	3	2009		60	37	80000	26.326	7.00	0.00	0.0260	0.0659	0.08	0.05	0.04	GMX
OL-0705-05 (60-62 CM)	60.0	62.0	15	3	2009		47	25	80000	31.016	8.50	0.00	0.0231	0.0491	0.06	0.03	0.03	GEM
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0703-14 (16-18 CM)	16.0	18.0	29	1	2009		107	30	80000	22.591	6.70	0.00	0.0262	0.1357	0.16	0.04	0.07	GMX
OL-0703-14 (16-18 CM) Duplicate	16.0	18.0	16	5	2009		70	35	80000	22.591	6.70	0.00	0.0262	0.0888	0.10	0.05	0.05	GMX
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

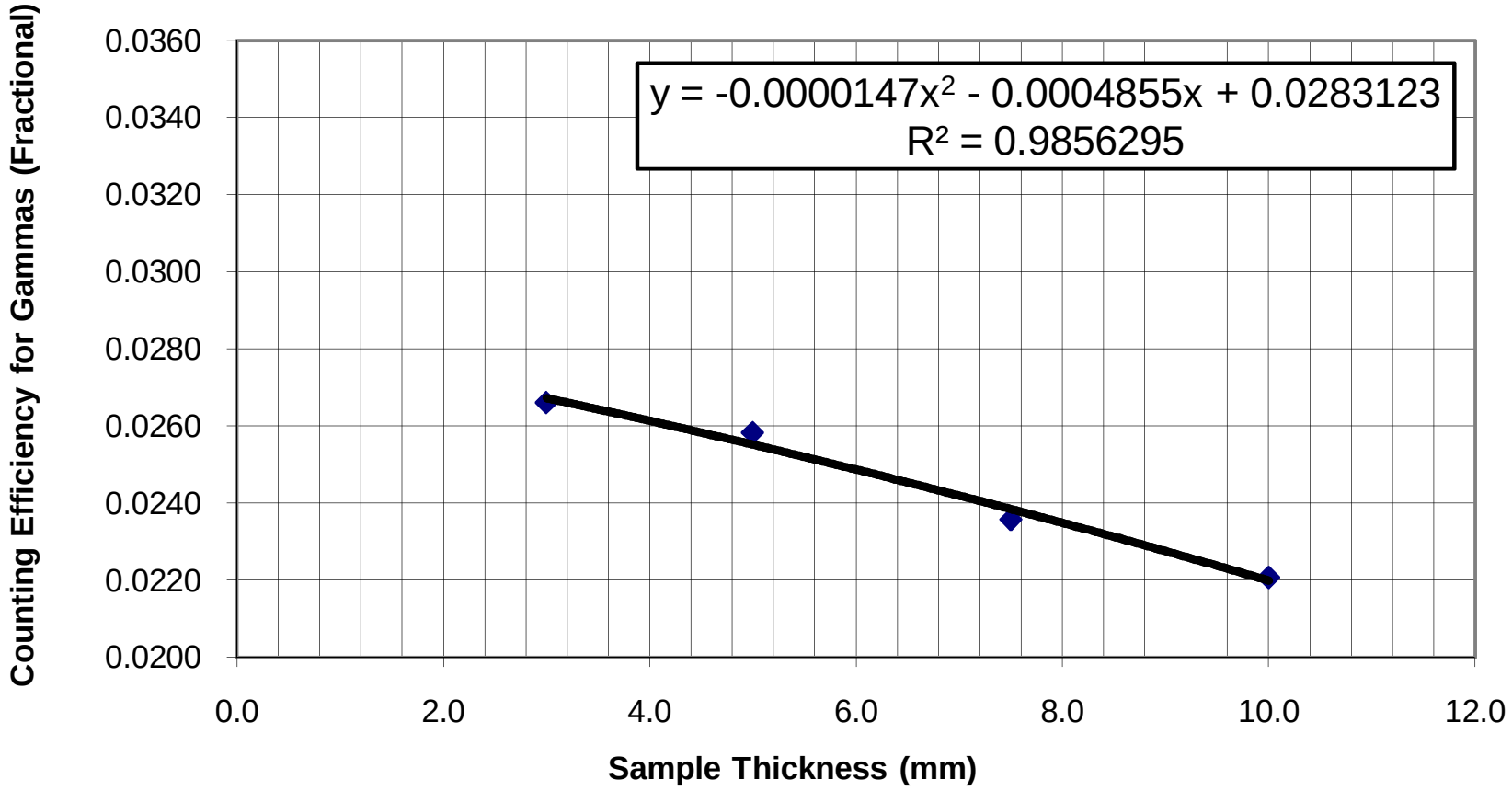
* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core ST-51 0509 Final.xlsm]Cs-137

Results of Cs-137 Analysis

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Address: Parsons ,
290 Elwood Davis Road, Suite 312 ,
Liverpool, N.Y.
U.S.A. 13088

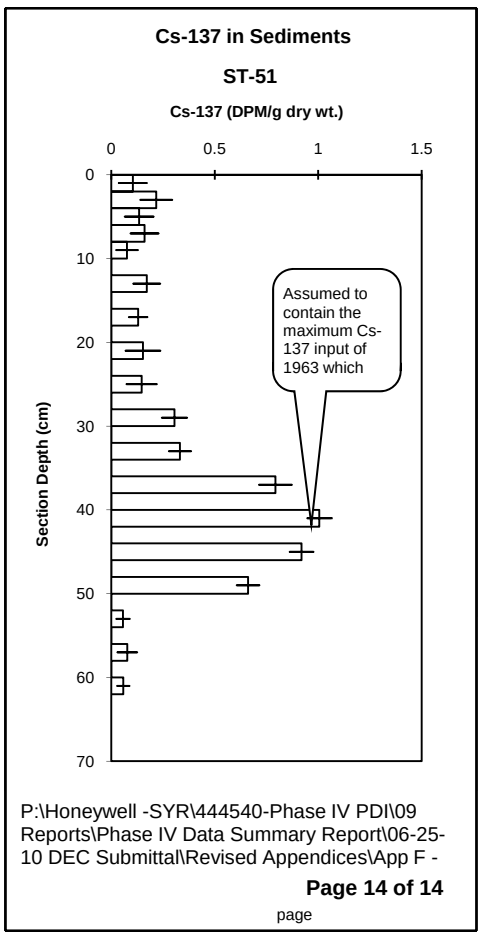
Core ID: ST-51

Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

Date(s) Analysed: Jan. 8 - Apr. 24, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0703-08 (0-2 CM)	0.00	2.00	0.10	0.07
2	OL-0703-09 (2-4 CM)	2.00	4.00	0.22	0.08
3	OL-0703-10 (4-6 CM)	4.00	6.00	0.13	0.07
4	OL-0703-11 (6-8 CM)	6.00	8.00	0.16	0.07
5	OL-0703-12 (8-10 CM)	8.00	10.00	0.08	0.05
6	OL-0703-13 (12-14 CM)	12.00	14.00	0.17	0.07
7	OL-0703-14 (16-18 CM)	16.00	18.00	0.13	0.04
8	OL-0703-15 (20-22 CM)	20.00	22.00	0.15	0.08
9	OL-0703-16 (24-26 CM)	24.00	26.00	0.15	0.07
10	OL-0703-17 (28-30 CM)	28.00	30.00	0.31	0.06
11	OL-0703-18 (32-34 CM)	32.00	34.00	0.33	0.05
12	OL-0703-19 (36-38 CM)	36.00	38.00	0.79	0.08
13	OL-0703-20 (40-42 CM)	40.00	42.00	1.01	0.06
14	OL-0705-01 (44-46 CM)	44.00	46.00	0.92	0.06
15	OL-0705-02 (48-50 CM)	48.00	50.00	0.66	0.05
16	OL-0705-03 (52-54 CM)	52.00	54.00	0.06	0.03
17	OL-0705-04 (56-58 CM)	56.00	58.00	0.08	0.05
18	OL-0705-05 (60-62 CM)	60.00	62.00	0.06	0.03
	* : See 'Comments'				



This table must remain open for chart to plot.	Plot Table X Values	Plot Table Y Values
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	0.036659	1
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	0	2
	0	2
	0.217533	2
	0.217533	3
	0.294925	3
	0.140142	3
	0.217533	3
	0.217533	4
	0	4
	0	4
	0.134643	4
	0.134643	5
	0.204657	5
	0.064629	5
	0.134643	5
	0.134643	6
	0	6
	0	6
	0.161083	6
	0.161083	7
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	0.161083	7
	0.161083	8
	0	8
	0	8
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	0.13	18
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Contact Information

ID	Client	Organization	Contract/ PO Reference	EndDate	Contact	Contact Phone	Contact Address	Contact E-mail
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Sample Information

Project: Onondaga Lake
Core: OL-STA-80089
Sampling Date(s): N/A
Date(s) Received: 12/4/2008, 3/20/2009
Analysis Date(s): Feb. 2 - Apr. 6, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

ST-51A

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Client: Babcock, David

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Core ID:	**ST-51A**
Transaction ID:	**393**
PO/Contract No.:	**444540.30010.00**
Date(s) Received:	**December 4, 2008**
Analysis Date(s):	**Jan. 12 - Apr. 26, 2009**
Analyst(s):	**B. Nykyforuk, L. Hesketh-Jost, X. Hu**
Sampling Date(s):	**N/A**
Project:	

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activity profile of this core shows an irregular, but approximately exponential decrease as a function of depth (Pages 2 & 3). The maximum activity of 10.13 DPM/g observed in section 4 (depth 6.0 - 8.0 cm) is about 5.2 times the lowest activity of 1.71 DPM/g in section 23 (extrapolated depth 79 - 83 cm).

The dry bulk density profile is irregular, ranging 0.198 - 0.590 g/cm^3. It gradually increases to 0.472 g/cm^3 with depth until 27 cm, then decreases to 0.243 g/cm^3 at 35 - 39 cm (extrapolated depth), and then generally increases with depth (Page 4). This density profile is unusual compared to most cores which typically have increasing dry bulk density as a function with depth, and suggests that the sediments may be of varying composition throughout the core.

Sediment accumulation rates in this core exhibit some variability (0.1490 - 0.5051 g/cm^2/year) (by CRS model and the shape of Pb-210 activity profile) (Pages 2, 3 & 6).

The Cs-137 profile in the upper 15 sections (depth 0 - 50 cm), except for section 4, is significantly above background, with a surface activity of 0.11 DPM/g and increasing to a pronounced maximum of 1.29 DPM/g in the 40 - 42 cm section. The Cs-137 activity then declines gradually with depth (Page 12 & 15). The tailing of Cs-137 into deeper depths with Pb-210 dates prior to 1954 is commonly seen and is attributed to downward diffusion of the isotope.

Ra-226 was measured at 1.81, 2.43, 1.26 and 2.34 DPM/g in sections 3 (depth 4.0 - 6.0 cm), 13 (extrapolated depth 39 - 43 cm), 18 (extrapolated depth 59 - 63 cm) and 27 (extrapolated depth 95 - 98 cm), respectively (Page 8, 9, 10 & 11). Net unsupported Pb-210 (column AG on Page 2) was calculated by subtracting the nearest neighbouring Ra-226 measurement from each total Pb-210 value, unless noted otherwise. The Ra-226 activity measured in section 27 is similar to the Pb-210 activity of 2.16 DPM/g in the same section, suggesting that background level of Pb-210 has been attained, and the changing Ra-226 activities also suggest that background levels of Pb-210 vary with depth in this core.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight(g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not completely satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210 i.e. it contains a complete Pb-210 inventory. Although several different sections could plausibly be assigned to represent uppermost background, section 23 (extrapolated depth 79 - 83 cm) was chosen because it caused the CRS model to most accurately predict the age (2008 - 1963 = 45 years) of the Cs-137 peak (see Page 2). It has been assumed that the background activity of section 23 (1.71 DPM/g) applies to the sections 21 and 22 immediately above, and that the Ra-226 background of 1.26 DPM/g observed in section 18 applies to sections 15 - 20.

The measured total activity results (DPM/g) are shown in column AE of the main data table on Page 2. The estimated age at the bottom of each section is shown in column AH, also shown on Page 2. The average sediment accumulation rate, from core surface to the extrapolated bottom depth of any section, can be calculated by dividing the cumulative dry mass at the bottom of the extrapolated section by the calculated age at that depth. For example, the average sediment accumulation rate, from the core surface to the bottom of section 4 (depth 6 - 8 cm) can be calculated as: 1.804/7.1 = 0.2541 g/cm^2/yr. The individual sedimentation rate for each section is shown in column AK in data sheet. Plots of age vs. depth and sediment accumulation rate vs. depth are seen in Pages 5 and 6, respectively.

Conclusion:

It is assumed that the 1963 peak input of atmospheric Cs-137 has been recorded in section 13 at 40 - 42 cm depth (Pages 12 and 15) where maximum Cs-137 activity of 1.29 DPM/g occurred. It is possible that the true Cs-137 maximum occurred in the 38 - 40 cm section or the 42 - 44 cm section which were not analysed. The CRS model indicates that each cm of core section contains about 0.8 yr of accumulated sediment over the depth interval of 39 - 43 cm and therefore the uncertainty in the CRS date could be 2 cm X 0.8 yr/cm = +/- 1.6 years, or about 1.6 yr / 45 yr X 100 = +/- 3.6 %. Total uncertainty is probably greater because of unanalysed sections and unknown processes at work in the core.

Overall, the analytical quality of radioisotope data (based upon the results of repeat analyses and blanks) is considered good. It is cautioned that predicted ages greater than 80 years in this core are gross approximations only.

Results of Pb-210 Analysis

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Client: Babcock, David

Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y. U.S.A. 13088

Core ID: ST-51A **Transaction ID: 393**

Date(s) Received: 4-Dec-08 **PO/Contract No.: 444540.30010.00**

Results authorized by Dr. Robert J. Flett, Chief Scientist

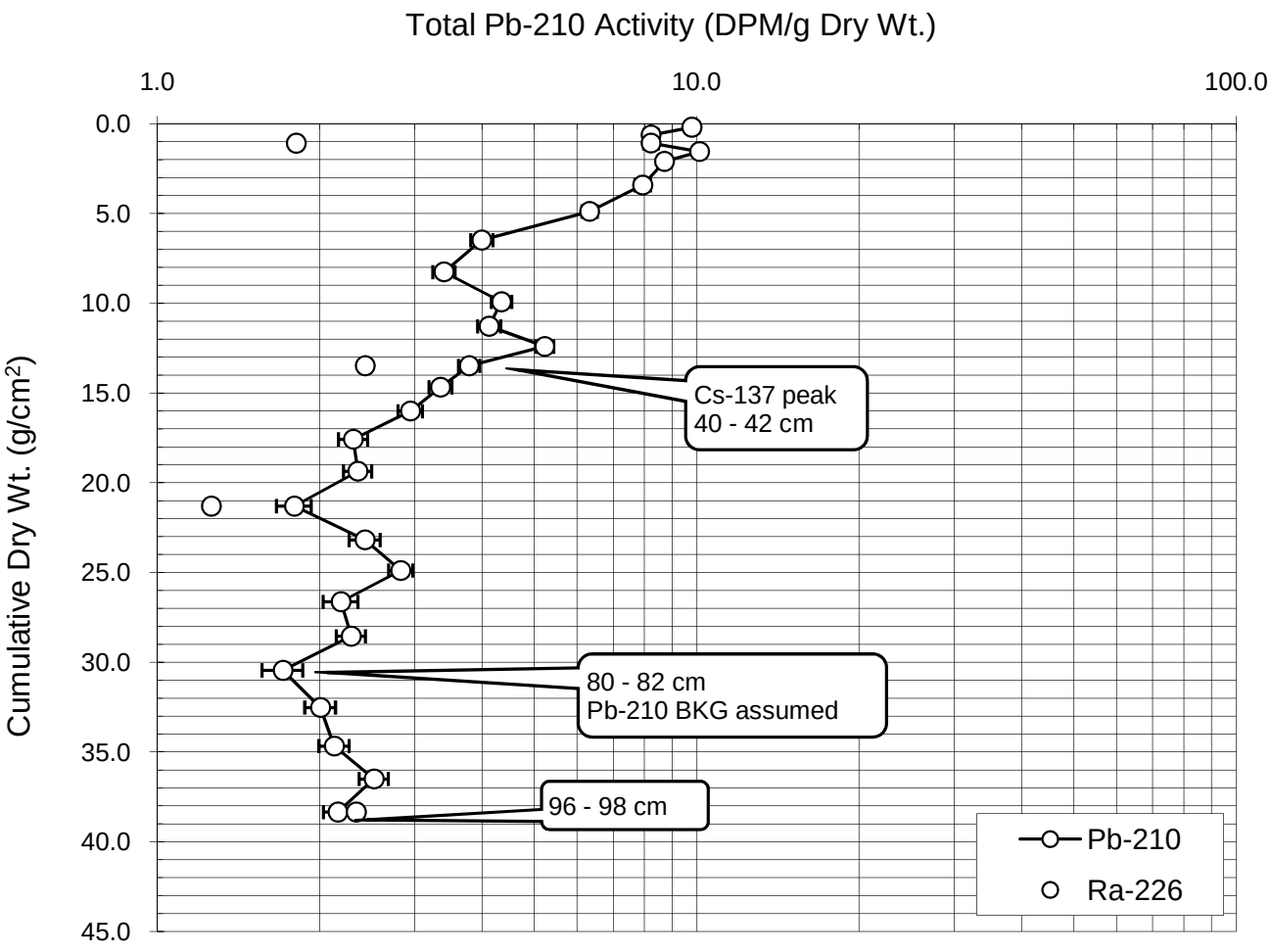
Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrap-olated Upper Section Depth (cm)	Extrap-olated Lower Section Depth (cm)	Dry Wt./ Wet cc. (g/cm^3)	Mass in extrap-olated section (g/cm^2)	Cumul-ative Mass to Bottom of Current Section (g/cm^2)	Plot-point of cumul-ative mass in current section (g/cm^2)	Po-209 counts less detector back-ground	Po-210 counts less detector back-ground and Po-209 spike standard blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsup-ported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of bottom edge of current section (cm)	DPM/cm^2 in Section	CRS Sediment Accumu-lation Rate ($g/cm^2/yr$)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g Dry wt.)
1	OL-0705-08 (0-2 CM)	0.0	2.0	0.00	2.00	0.198	0.396	0.396	0.198	2614	1273	0.490	60000	**9.80**	0.28	7.99	**1.6**	2.0	3.162	0.2507		
2	OL-0705-09 (2-4 CM)	2.0	4.0	2.00	4.00	0.231	0.461	0.857	0.626	2893	1212	0.502	60000	**8.23**	0.24	6.42	**3.1**	4.0	2.961	0.2971		
3	OL-0705-10 (4-6 CM)	4.0	6.0	4.00	6.00	0.223	0.446	1.303	1.080	2664	1049	0.472	60000	**8.23**	0.26	6.42	**4.7**	6.0	2.863	0.2831		1.81
4	OL-0705-11 (6-8 CM)	6.0	8.0	6.00	8.00	0.250	0.501	1.804	1.553	2736	1661	0.587	60000	**10.13**	0.25	8.32	**7.1**	8.0	4.164	0.2054		
5	OL-0705-12 (8-10 CM)	8.0	10.0	8.00	11.00	0.303	0.909	2.713	2.107	2968	1305	0.498	60000	**8.72**	0.25	6.91	**11.2**	11.0	6.281	0.2236		
6	OL-0705-13 (12-14 CM)	12.0	14.0	11.00	15.00	0.353	1.411	4.125	3.419	2461	934	0.471	60000	**7.94**	0.27	6.13	**17.8**	15.0	8.659	0.2134		
7	OL-0705-14 (16-18 CM)	16.0	18.0	15.00	19.00	0.381	1.524	5.649	4.887	2964	958	0.504	60000	**6.33**	0.21	4.52	**24.3**	19.0	6.890	0.2364		
8	OL-0705-15 (20-22CM)	20.0	22.0	19.00	23.00	0.417	1.669	7.318	6.483	2702	490	0.448	60000	**4.00**	0.19	2.19	**28.3**	23.0	3.650	0.4149		
9	OL-0705-16 (24-26CM)	24.0	26.0	23.00	27.00	0.472	1.887	9.205	8.261	2837	489	0.500	60000	**3.40**	0.16	1.59	**32.0**	27.0	3.004	0.5051		
10	OL-0705-17 (28-30CM)	28.0	30.0	27.00	31.00	0.359	1.437	10.642	9.923	2694	584	0.492	60000	**4.35**	0.19	1.92	**35.9**	31.0	2.755	0.3728		
11	OL-0705-18 (32-34CM)	32.0	34.0	31.00	35.00	0.321	1.282	11.924	11.283	2159	450	0.500	60000	**4.12**	0.20	1.69	**39.3**	35.0	2.172	0.3768		
12	OL-0705-19 (36-38CM)	36.0	38.0	35.00	39.00	0.243	0.972	12.896	12.410	2413	730	0.571	60000	**5.23**	0.20	2.80	**44.1**	39.0	2.719	0.2008		
13	OL-0705-20 (40-42 CM)	40.0	42.0	39.00	43.00	0.294	1.175	14.070	13.483	2730	530	0.506	60000	**3.79**	0.17	1.36	**47.3**	43.0	1.596	0.3647	**Cs-137 peak**	2.43
14	OL-0707-01 (44-46 CM)	44.0	46.0	43.00	47.00	0.304	1.217	15.287	14.679	2772	471	0.500	60000	**3.35**	0.16	0.92	**49.8**	47.0	1.122	0.4919		
15	OL-0707-02 (48-50CM)	48.0	50.0	47.00	51.00	0.362	1.449	16.736	16.012	2856	413	0.485	60000	**2.95**	0.15	1.69	**56.0**	51.0	2.445	0.2354		
16	OL-0707-03 (52-54CM)	52.0	54.0	51.00	55.00	0.421	1.685	18.421	17.579	2411	300	0.532	60000	**2.31**	0.14	1.05	**61.3**	55.0	1.768	0.3164		
17	OL-0707-04 (56-58 CM)	56.0	58.0	55.00	59.00	0.470	1.881	20.302	19.362	2641	314	0.499	60000	**2.35**	0.14	1.09	**68.9**	59.0	2.059	0.2486		
18	OL-0707-05 (60-62 CM)	60.0	62.0	59.00	63.00	0.500	1.999	22.302	21.302	2724	244	0.493	60000	**1.80**	0.13	0.54	**73.6**	63.0	1.070	0.4190		1.26
19	OL-0707-06 (64-66CM)	64.0	66.0	63.00	67.00	0.442	1.766	24.068	23.185	2174	269	0.504	60000	**2.43**	0.16	1.17	**85.5**	67.0	2.062	0.1490		
20	OL-0707-07 (68-70CM)	68.0	70.0	67.00	71.00	0.412	1.648	25.715	24.892	2805	422	0.525	60000	**2.83**	0.15	1.57		71.0	2.582			
21	OL-0715-20 (72-74 CM)	72.0	74.0	71.00	75.00	0.457	1.828	27.544	26.630	1931	217	0.504	60000	**2.19**	0.16	0.48		75.0	0.881			
22	OL-0716-01 (76-78 CM)	76.0	78.0	75.00	79.00	0.504	2.016	29.560	28.552	2510	301	0.515	60000	**2.29**	0.14	0.58		79.0	1.167			
23	OL-0716-02 (80-82 CM)	80.0	82.0	79.00	83.00	0.446	1.782	31.342	30.451	1883	166	0.508	60000	**1.71**	0.15	0.00		83.0	0.000			
24	OL-0716-03 (84-86 CM)	84.0	86.0	83.00	87.00	0.590	2.358	33.701	32.522	2447	273	0.546	60000	**2.01**	0.13							
25	OL-0716-04 (88-90 CM)	88.0	90.0	87.00	91.00	0.484	1.936	35.637	34.669	2590	284	0.507	60000	**2.13**	0.14							
26	OL-0716-05 (92-94 CM)	92.0	94.0	91.00	95.00	0.434	1.735	37.372	36.504	2341	299	0.498	60000	**2.52**	0.16							
27	OL-0716-06 (96-98 CM)	96.0	98.0	95.00	98.00	0.488	1.463	38.835	38.347	2820	319	0.515	60000	**2.16**	0.13							2.34
Blank	Blank									-1	12											
Blank	Blank									1976	25											
Blank	Blank									4	2											
Blank	Blank									1600	17											
3	OL-0705-10 (4-6 CM)					0.223																
3 Dup	OL-0705-10 (4-6 CM) DUP					0.223																
4	OL-0705-11 (6-8 CM)									2736	1661	0.587	60000	**10.20**	0.25							
4 Dup	OL-0705-11 (6-8 CM) Dup									2659	1341	0.495	60000	**10.05**	0.28							
11	OL-0705-18 (32-34CM)					0.321				2159	450	0.500	60001	**4.11**	0.20							
11 Dup	OL-0705-18 (32-34CM) DUP					0.320				2066	439	0.507	60002	**4.14**	0.21							
																Total DPM/cm^2 in core		66.03				

P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core ST-51A 0509 Final.xlsm]Pb-210 and bulk density

*: See 'Comments' section on 'Interpretation' sheet for discussion.

Total Pb-210 Activity vs. Accumulated Sediment

ST-51A



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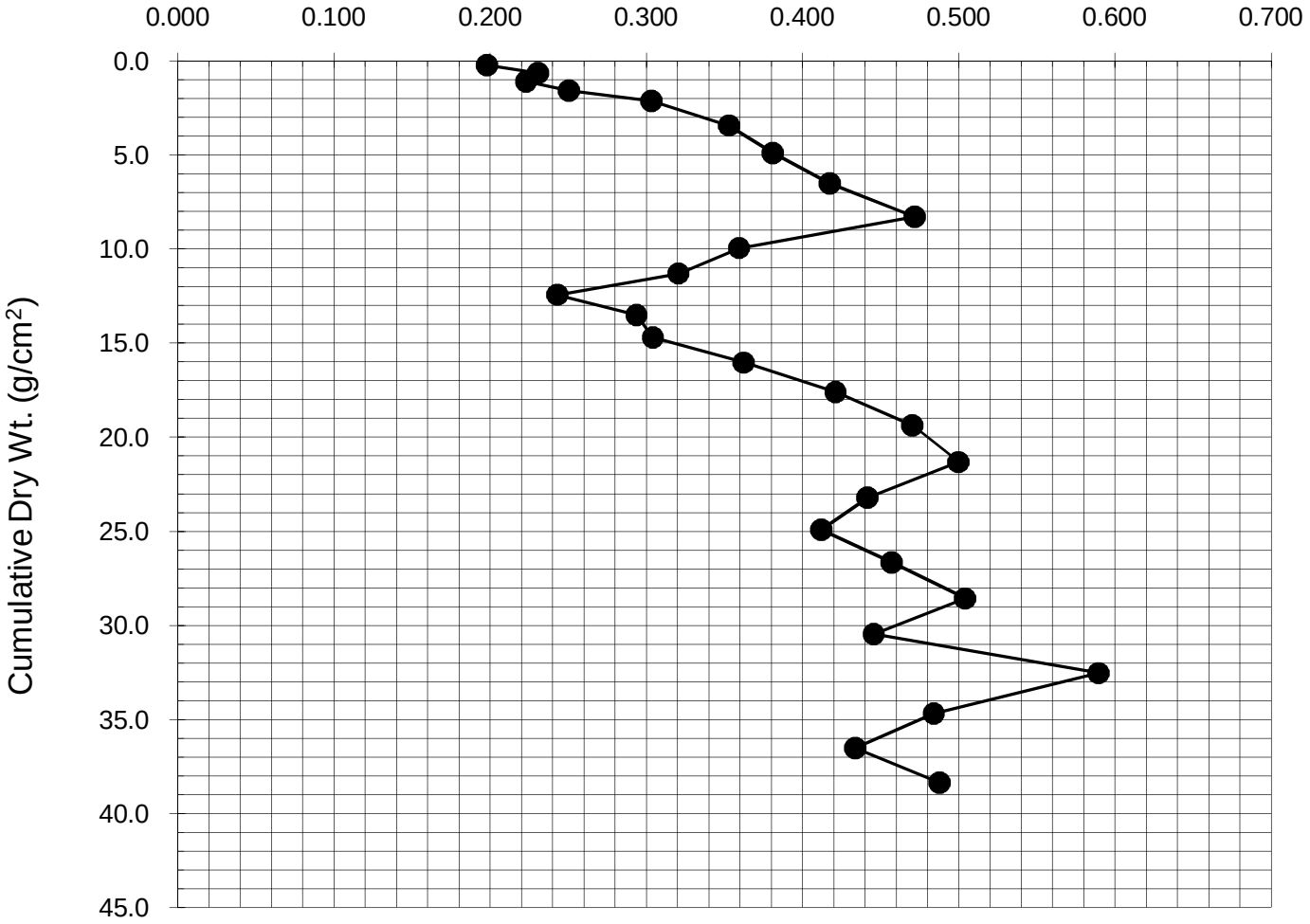
Dry Bulk Density vs. Accumulated Sediment

ST-51A



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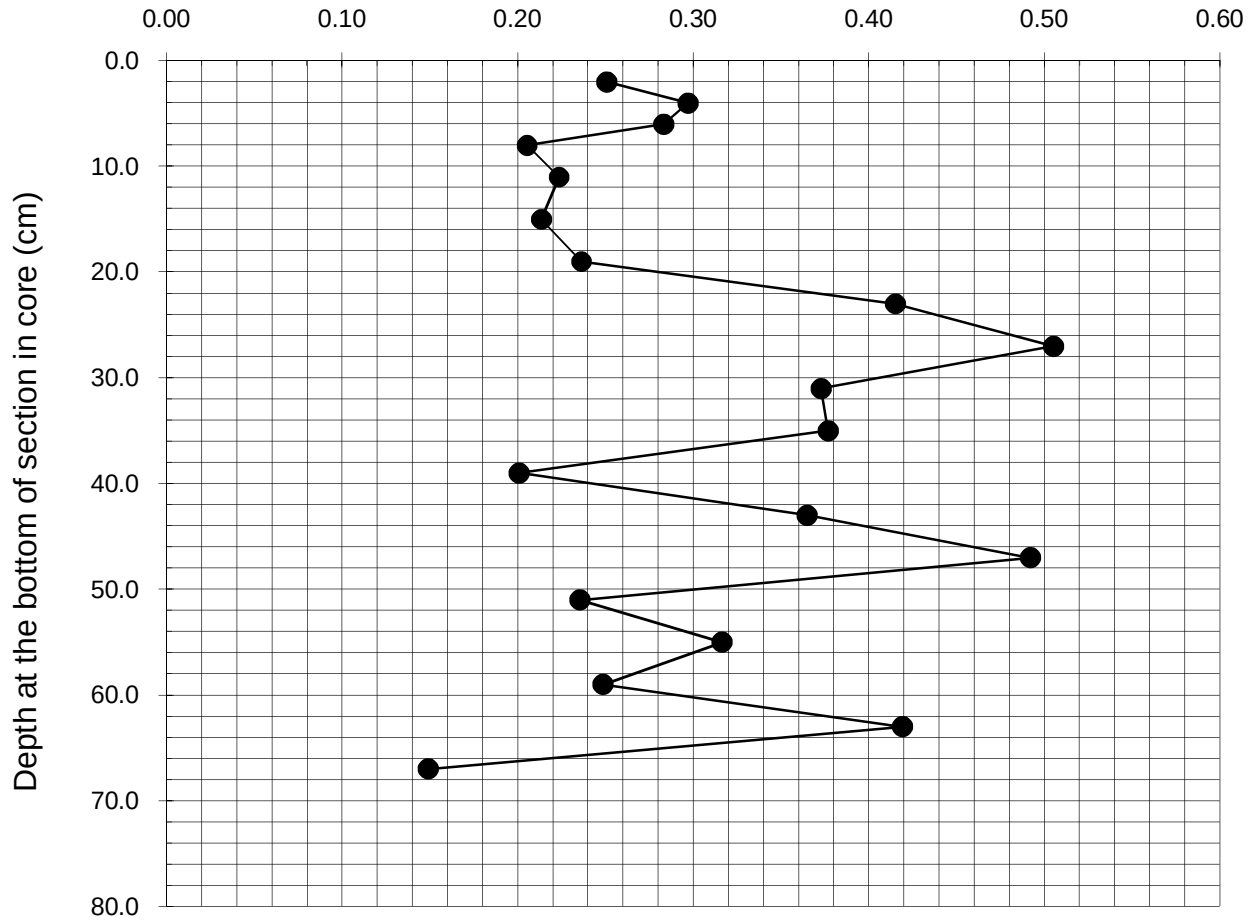
CRS Sediment accumulation rate (g/cm^2/year) vs. Depth at the bottom of section in core (cm)

ST-51A



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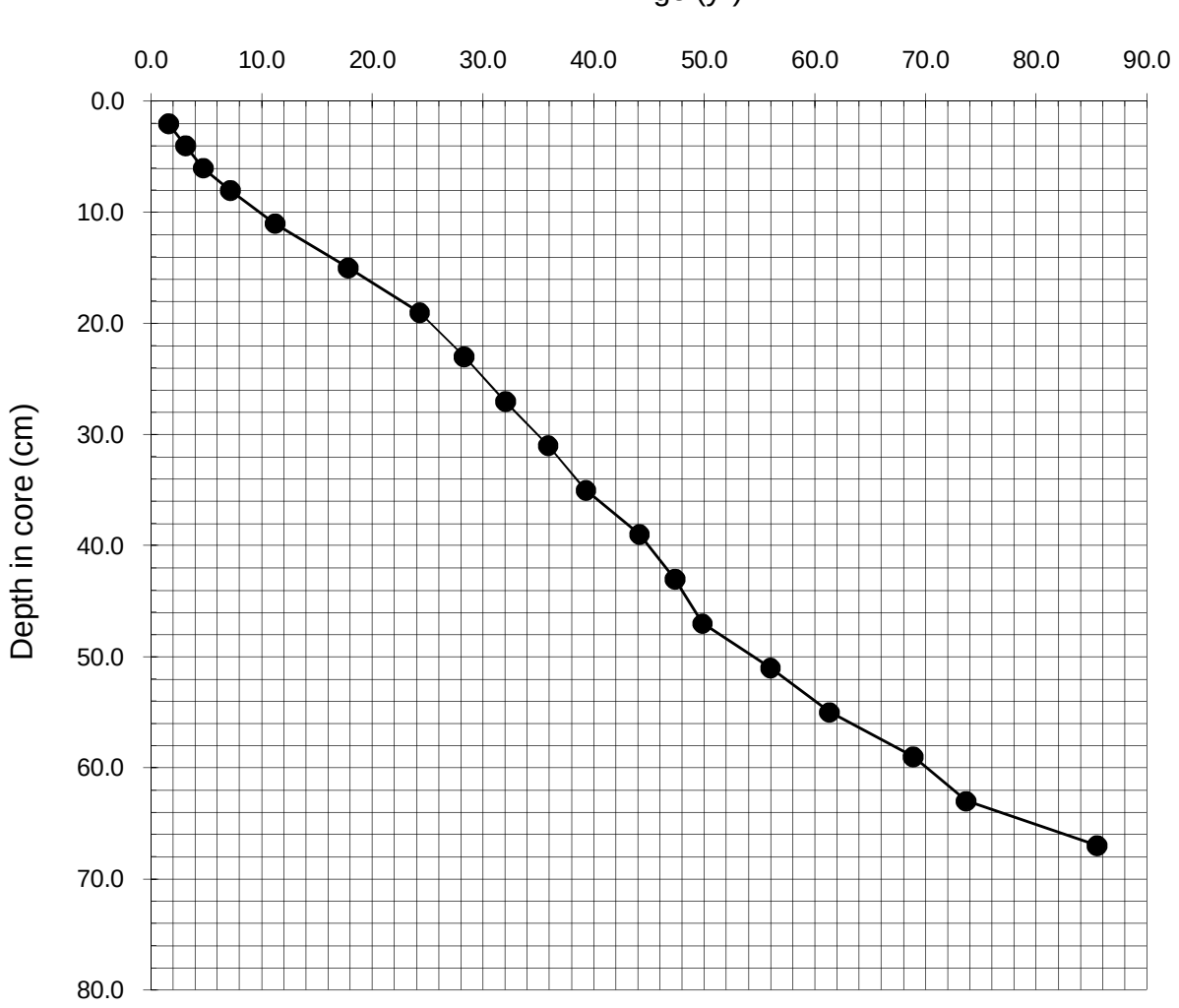
Age (yr) vs. Depth (cm)
CRS Model

ST-51A



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Results of Ra-226 Analysis by Rn-222 Emanation

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons, 290 Elwood Davis Road, Suite 312, Liverpool, N.Y. U.S.A. 13088

Core ID: ST-51A
Date(s) Received: 4-Dec-08
Sampling Dates(s): N/A
Project:

Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 12 - Apr. 26, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g dry wt.)	Combined Error: 1 SD (DPM/g dry wt.)
ST-51A	OL-0705-10 (4 - 6 cm)	1.81	0.03
ST-51A	OL-0705-20 (40 - 42 cm)	2.43	0.03
ST-51A	OL-0705-05 (60 - 62 cm)	1.26	0.02
ST-51A	OL-0705-05 (96 - 98 cm)	2.34	0.03

* : See comments section above for discussion.

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Ra-226 Analysis by Rn-222 Emanation											
Core ID	ST-51A										
SAMPLE ID	OL-0705-10 (4 - 6 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.988										
Total Count in Period	9116										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	15	33	0	19.88	0.97279	0.92460
	When cell filled	2009	3	31	39903	12	37	0			
	Beginning time of count	2009	3	31	39903	14	40	0			
Counts/min. (gross)	9.12										
CPM less Cell BKG	8.85										
CPM (decay during count corrected)	9.57										
DPM Sample + System (efficiency corrected)	11.05										
DPM Sample	10.79	Error +/	0.1509	DPM							
DPM/g	5.43										
Ra-226 DPM/g	**1.81**	Error +/	0.0253	DPM/g		1 SD			Error % =	1.4	
Ra-226 pCi/g →	0.82										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										
P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core ST-51A 0509 Final.xlsm]Ra-226 4 - 6 cm											
1-Apr-09											
Page 8 of 15											

Ra-226 Analysis by Rn-222 Emanation

Core ID	ST-51A										
SAMPLE ID	OL-0705-20 (40 - 42 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.996										
Total Count in Period	12090										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.551										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.866										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	3	11	39883	15	30	0	21.10	0.97818	0.92296
	When cell filled	2009	4	1	39904	17	47	54			
	Beginning time of count	2009	4	1	39904	20	5	0			
Counts/min. (gross)	12.09										
CPM less Cell BKG	11.82										
CPM (decay during count corrected)	12.81										
DPM Sample + System (efficiency corrected)	14.79										
DPM Sample	14.56	Error +/-	0.1659	DPM							
DPM/g	7.29										
Ra-226 DPM/g	**2.43**	Error +/-	0.0277	DPM/g		1 SD			Error % =	1.1	
Ra-226 pCi/g →	1.10										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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2-Apr-09

Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	ST-51A										
SAMPLE ID	OL-0707-05 (60 - 62 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.932										
Total Count in Period	6307										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	6	39909	18	52	0	17.72	0.95974	0.92135
	When cell filled	2009	4	24	39927	12	5	0			
	Beginning time of count	2009	4	24	39927	14	36	0			
Counts/min. (gross)	6.31										
CPM less Cell BKG	6.04										
CPM (decay during count corrected)	6.56										
DPM Sample + System (efficiency corrected)	7.58										
DPM Sample	7.32	Error +/-	0.1360	DPM							
DPM/g	3.79										
Ra-226 DPM/g	**1.26**	Error +/-	0.0235	DPM/g		1 SD			Error % =	1.9	
Ra-226 pCi/g →	0.57										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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25-Apr-09

Results authorised by Dr. Robert J. Flett

Ra-226 Analysis by Rn-222 Emanation

Core ID	ST-51A										
SAMPLE ID	OL-0716-06 (96 - 98 cm)										
Lucas Cell No.	3										
Number of days since Rn board last run	1										
Sediment dry mass (g)	1.338										
Total Count in Period	7908										
Cell BKG count (cpm)	0.267										
System Blank (DPM) corresponding to the number of days since Rn board last used.	0.549										
System Efficiency [Obtain from most recent efficiency calibration sheet for same Lucas cell]	0.865										
Count duration (minutes)	1000										
		Year	Month	Day		Hour	Min	Sec	In growth time (days)	Ingrowth factor	Decay Correction
	When sample last stripped	2009	4	7	39910	16	40	0	17.84	0.96061	0.92402
	When cell filled	2009	4	25	39928	12	48	0			
	Beginning time of count	2009	4	25	39928	14	56	0			
Counts/min. (gross)	7.91										
CPM less Cell BKG	7.64										
CPM (decay during count corrected)	8.27										
DPM Sample + System (efficiency corrected)	9.56										
DPM Sample	9.38	Error +/-	0.1454	DPM							
DPM/g	7.01										
Ra-226 DPM/g	**2.34**	Error +/-	0.0362	DPM/g		1 SD			Error % =	1.5	
Ra-226 pCi/g ⟶	1.06										
Chemist Name	X. Hu / R. Flett										
PMT High Voltage +ve	778										
HV Power supply	Spectrum Technologies										
Alpha Counter	Spectrum Technologies										
Region of Interest Ch. #s	28-1023										
PMT	6655A - #1										
Preamp	Canberra 2007P tube base										
Amp Gain	4										

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26-Apr-09

Results authorised by Dr. Robert J. Flett

Results of Cs-137 Analysis

Flett Research Ltd.

440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
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E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Babcock, David

Address: Parsons,
290 Elwood Davis Road, Suite 312,
Liverpool, N.Y.
U.S.A. 13088

Core ID: ST-51A
Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

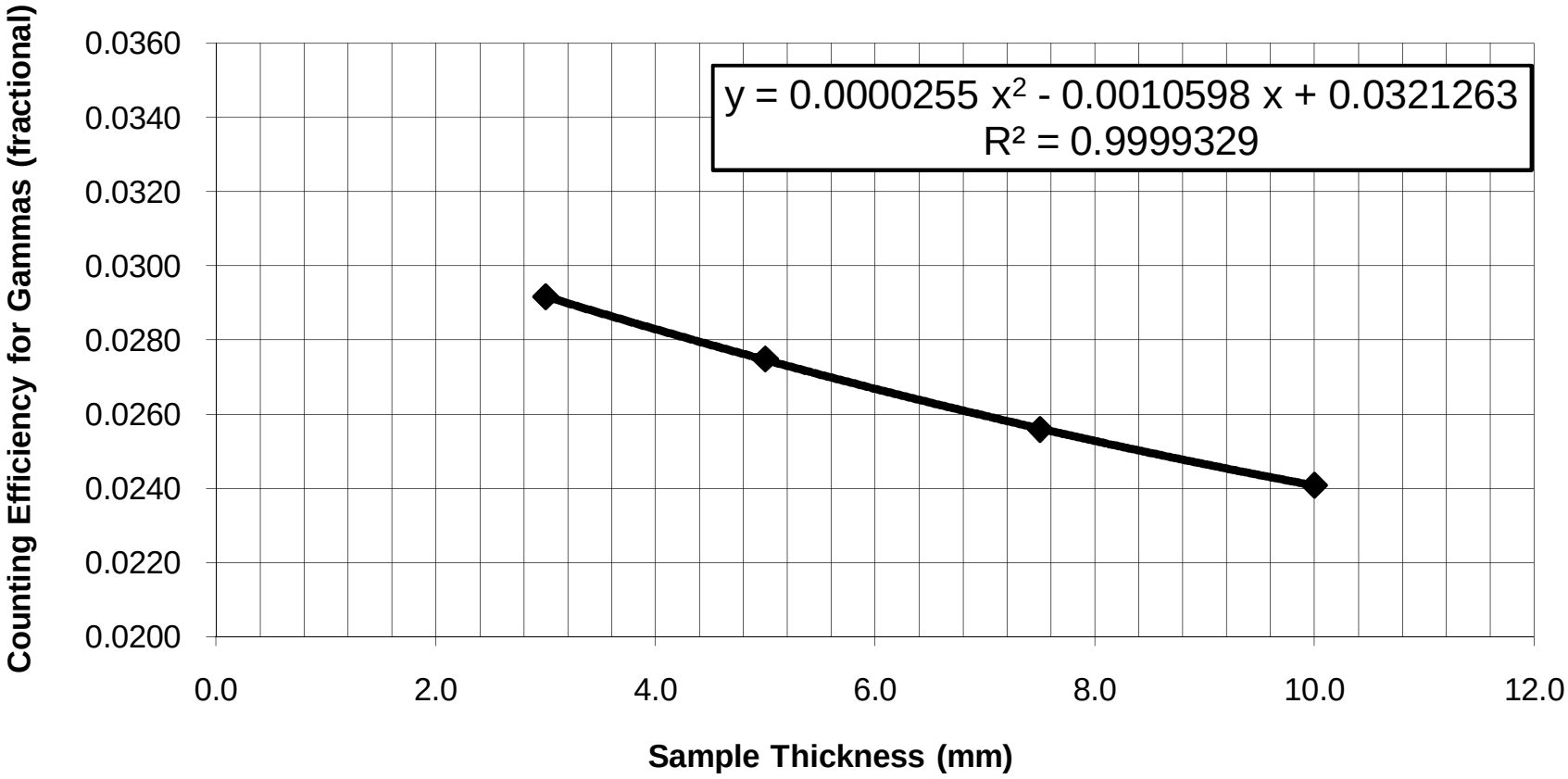
Transaction ID: 393
PO/Contract No.: 444540.30010.00
Date(s) Analysed: Jan. 12 - Apr. 26, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day sample Counted	Month Sample Counted	Year Sample Counted	Max and Min Dates	Integral NET Cs-137 peak	Counting Error 1 STD (counts)	Count time (seconds)	Dry sample weight (g)	Sample thickness (mm)	CPM/g	Efficiency for Gammas fractional	Gammas per min. per gram	DPM/g	Approx. Error DPM/g	Activity pCi/g	Detector Used
OL-0705-08 (0-2 CM)	0.0	2.0	17	1	2009		47	31	80000	15.139	4.50	0.00	0.0258	0.0901	0.11	0.07	0.05	GEM
OL-0705-09 (2-4 CM)	2.0	4.0	18	1	2009		58	30	80000	15.234	4.50	0.00	0.0258	0.1105	0.13	0.07	0.06	GEM
OL-0705-10 (4-6 CM)	4.0	6.0	18	1	2009		96	40	80000	13.601	4.00	0.01	0.0283	0.1871	0.22	0.09	0.10	GMX
OL-0705-11 (6-8 CM)	6.0	8.0	19	1	2009		15	29	80000	10.276	3.00	0.00	0.0267	0.0410	0.05	0.09	0.02	GEM
OL-0705-12 (8-10 CM)	8.0	10.0	20	2	2009		132	30	80000	21.868	6.20	0.00	0.0247	0.1830	0.22	0.05	0.10	GEM
OL-0705-13 (12-14 CM)	12.0	14.0	19	1	2009		117	41	80000	19.841	5.63	0.00	0.0270	0.1640	0.19	0.07	0.09	GMX
OL-0705-14 (16-18 CM)	16.0	18.0	20	2	2009		164	40	80000	25.135	7.50	0.00	0.0256	0.1911	0.21	0.05	0.09	GMX
OL-0705-15 (20-22CM)	20.0	22.0	20	1	2009		178	40	80000	20.087	5.00	0.01	0.0275	0.2420	0.28	0.06	0.13	GMX
OL-0705-16 (24-26CM)	24.0	26.0	19	2	2009		136	26	80000	22.906	6.50	0.00	0.0245	0.1815	0.21	0.04	0.10	GEM
OL-0705-17 (28-30CM)	28.0	30.0	19	2	2009		349	38	80000	30.359	8.50	0.01	0.0250	0.3455	0.41	0.04	0.18	GMX
OL-0705-18 (32-34CM)	32.0	34.0	16	2	2009		274	50	80000	25.961	7.75	0.01	0.0254	0.3111	0.37	0.07	0.17	GMX
OL-0705-19 (36-38CM)	36.0	38.0	20	1	2009		455	35	80000	16.998	5.25	0.02	0.0254	0.7917	0.93	0.07	0.42	GEM
OL-0705-20 (40-42 CM)	40.0	42.0	18	2	2009		994	56	80000	27.342	8.63	0.03	0.0249	1.0959	1.29	0.07	0.58	GMX
OL-0707-01 (44-46 CM)	44.0	46.0	17	2	2009		556	34	80000	24.355	7.88	0.02	0.0236	0.7262	0.85	0.05	0.39	GEM
OL-0707-02 (48-50CM)	48.0	50.0	18	2	2009		60	25	80000	21.156	6.25	0.00	0.0247	0.0861	0.10	0.04	0.05	GEM
OL-0707-03 (52-54CM)	52.0	54.0	10	3	2009		2	20	80000	20.876	6.00	0.00	0.0249	0.0029	0.00	0.03	0.00	GEM
OL-0707-04 (56-58 CM)	56.0	58.0	10	3	2009		61	36	80000	27.278	8.00	0.00	0.0253	0.0664	0.08	0.05	0.04	GMX
Background			16	3	2009		19	36	80000									GMX
Background			20	3	2009		13	23	80000									GEM
OL-0705-14 (16-18 CM)	16.0	18.0	20	2	2009		164	40	80000	25.135	7.50	0.00	0.0256	0.1911	0.22	0.05	0.10	GMX
OL-0705-14 (16-18 CM) Duplicate	16.0	18.0	16	5	2009		138	36	80000	25.135	7.50	0.00	0.0256	0.1608	0.19	0.05	0.09	GMX
EML-QAP 9909 Soil (May 18, 2009 - 9.84 DPM/g)			18	5	2009		9584	112	80000	34.350	10.0	0.21	0.0241	8.6923	10.23	0.12	4.63	GMX
EML-QAP 0209 Vegetation (May 18, 2009 - 15.54 DPM/g)			18	5	2009		11249	111	80000	28.452	10.0	0.30	0.0220	13.4850	15.86	0.16	7.18	GEM
Cs-137 Standards																		
GMX 32g 10mm			4	12	2008		25609	161	5000	32.00	10.0	9.603	0.0241	398.81	469.18	2.95	212.30	
GMX 24g 7.5mm			4	12	2008		204110	458	50000	24.00	7.5	10.206	0.0256	398.81	469.18	1.05	212.30	
GMX 15g 5mm			5	12	2008		13701	118	5000	15.00	5.0	10.961	0.0275	398.78	469.15	4.04	212.29	
GMX 9g 3mm			5	12	2008		17447	135	10000	9.00	3.0	11.631	0.0292	398.78	469.15	3.63	212.29	
GEM 32g 10mm			4	1	2009		23432	155	5000	32.00	10.0	8.79	0.0221	398.04	468.28	3.09	211.89	
GEM 24g 7.5mm			4	1	2009		18769	138	5000	24.00	7.5	9.38	0.0236	398.04	468.28	3.44	211.89	
GEM 15g 5mm			5	1	2009		12846	114	5000	15.00	5.0	10.28	0.0258	398.01	468.25	4.16	211.88	
GEM 9g 3mm			10	1	2009		7939		5000	9.00	3.0	10.59	0.0266	397.89	468.10	0.00	211.81	

* : See 'Comments' section above for discussion

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (December, 2008)



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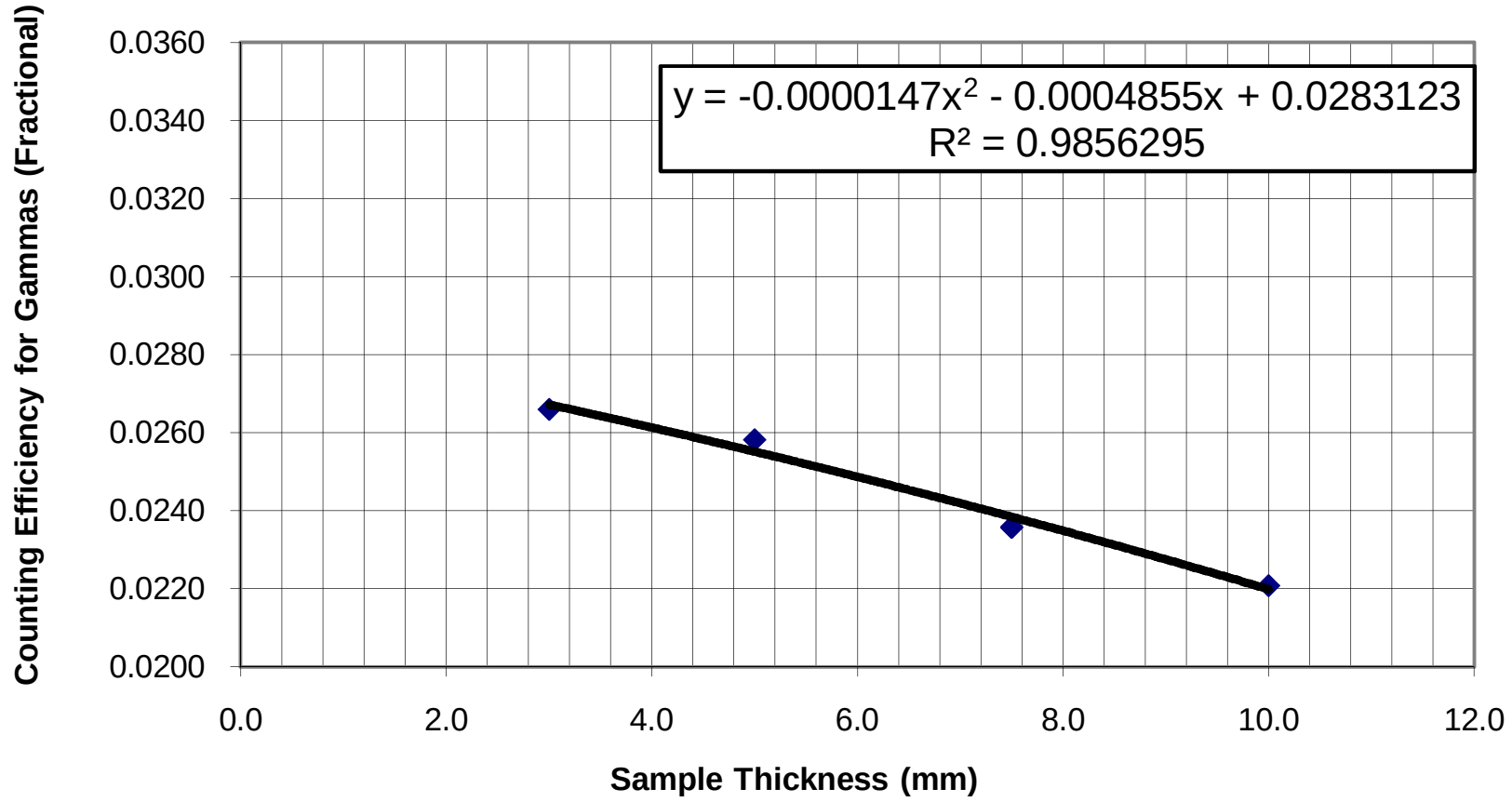
Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (January, 2009)



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Results of Cs-137 Analysis

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Client: Babcock, David

Address: Parsons,
290 Elwood Davis Road, Suite 312,
Liverpool, N.Y.
U.S.A. 13088

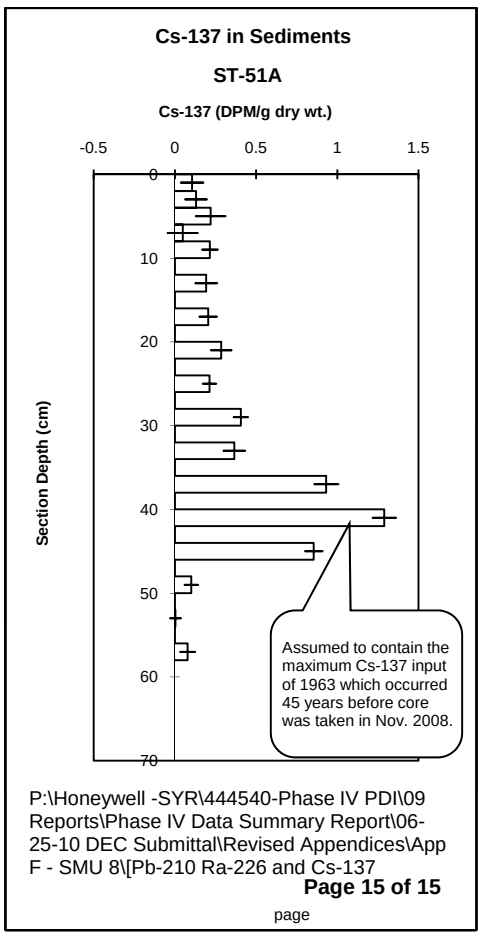
Core ID: ST-51A

Date(s) Received: 4-Dec-08
Sampling Date(s): N/A
Project:

Date(s) Analysed: Jan. 12 - Apr. 26, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section No.	Sample ID	Upper depth (cm)	Lower depth (cm)	Cs-137 activity (DPM/g dry wt)	1 Std Dev. Counting Error (DPM/g dry wt.)
1	OL-0705-08 (0-2 CM)	0.00	2.00	0.11	0.07
2	OL-0705-09 (2-4 CM)	2.00	4.00	0.13	0.07
3	OL-0705-10 (4-6 CM)	4.00	6.00	0.22	0.09
4	OL-0705-11 (6-8 CM)	6.00	8.00	0.05	0.09
5	OL-0705-12 (8-10 CM)	8.00	10.00	0.22	0.05
6	OL-0705-13 (12-14 CM)	12.00	14.00	0.19	0.07
7	OL-0705-14 (16-18 CM)	16.00	18.00	0.21	0.05
8	OL-0705-15 (20-22CM)	20.00	22.00	0.28	0.06
9	OL-0705-16 (24-26CM)	24.00	26.00	0.21	0.04
10	OL-0705-17 (28-30CM)	28.00	30.00	0.41	0.04
11	OL-0705-18 (32-34CM)	32.00	34.00	0.37	0.07
12	OL-0705-19 (36-38CM)	36.00	38.00	0.93	0.07
13	OL-0705-20 (40-42 CM)	40.00	42.00	1.29	0.07
14	OL-0707-01 (44-46 CM)	44.00	46.00	0.85	0.05
15	OL-0707-02 (48-50CM)	48.00	50.00	0.10	0.04
16	OL-0707-03 (52-54CM)	52.00	54.00	0.00	0.03
17	OL-0707-04 (56-58 CM)	56.00	58.00	0.08	0.05
	* : See 'Comments'				



P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137

P:\Honeywell -SYR\444540-Phase IV PDI\09 Reports\Phase IV Data Summary Report\06-25-10 DEC Submittal\Revised Appendices\App F - SMU 8\[Pb-210 Ra-226 and Cs-137 Parsons Core ST-51A 0509 Final.xlsm]Cs-137 Plot

This table must remain open for chart to plot.

Plot Table X Values	Plot Table Y Values
0	0
0.10605	0
0.10605	1
0.176043	1
0.036057	1
0.10605	1
0.10605	2
0	2
0	2
0.130054	2
0.130054	3
0.197481	3
0.062628	3
0.130054	3
0.130054	4
0	4
0	4
0.220112	4
0.220112	5
0.311825	5
0.128398	5
0.220112	5
0.220112	6
0	6
0	6
0.048196	6
0.048196	7
0.141375	7
-0.04498	7
0.048196	7
0.048196	8
0	8
0	8
0.215299	8
0.215299	9
0.264165	9
0.166433	9
0.215299	9
0.215299	10
0	10
0	12
0.19292	12
0.19292	13
0.260525	13
0.125316	13
0.19292	13
0.19292	14
0	14
0	16
0.205	16
0.205	17
0.25983	17
0.15017	17
0.205	17
0.205	18
0	18
0	20
0.284701	20
0.284701	21
0.348678	21
0.220723	21
0.284701	21
0.284701	22
0	22
0	24
0.213511	24
0.213511	25
0.254926	25
0.172096	25
0.213511	25
0.213511	26
0	26
0	28
0.406428	28
0.406428	29
0.450681	29
0.362175	29
0.406428	29
0.406428	30
0	30
0	32
0.366036	32
0.366036	33
0.432831	33
0.299241	33
0.366036	33
0.366036	34

0	34
0	36
0.931375	36
0.931375	37
1.003838	37
0.858912	37
0.931375	37
0.931375	38
0	38
0	40
1.289322	40
1.289322	41
1.36196	41
1.216684	41
1.289322	41
1.289322	42
0	42
0	44
0.854297	44
0.854297	45
0.907091	45
0.801503	45
0.854297	45
0.854297	46
0	46
0	48
0.101293	48
0.101293	49
0.142824	49
0.059763	49
0.101293	49
0.101293	50
0	50
0	52
0.003399	52
0.003399	53
0.037387	53
-0.03059	53
0.003399	53
0.003399	54
0	54
0	56
0.078061	56
0.078061	57
0.124129	57
0.031992	57
0.078061	57
0.078061	58
0	58

Contact Information

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Sample Information

Project:
Core: ST-51A
Sampling Date(s): N/A
Date(s) Received: December 4, 2008
Analysis Date(s): Jan. 12 - Apr. 26, 2009
Analyst(s): B. Nykyforuk, L. Hesketh-Jost, X. Hu