FIRST BOUNDING SAMPLING AND TESTING OBSERVATIONS

The results from the two EMAs, resampled in the first bounding efforts, are illustrated by Figures 20 and 21. As shown, the area near location SM1-4 has sub-surface contamination, beneath 6 inches of lower-activity stream-bottom sediment cover. This EMA originally produced a peak Cs-137 value of 11.7 pCi/g (rounded to 12 on the diagram); the re-located EMA produced a peak value of 16 pCi/g. The highest values detected in this sampling round were somewhat parallel to streamflow. The highest observed values, from upstream to downstream, were as follows: 12, (12 and 16), and 13 pCi/g.

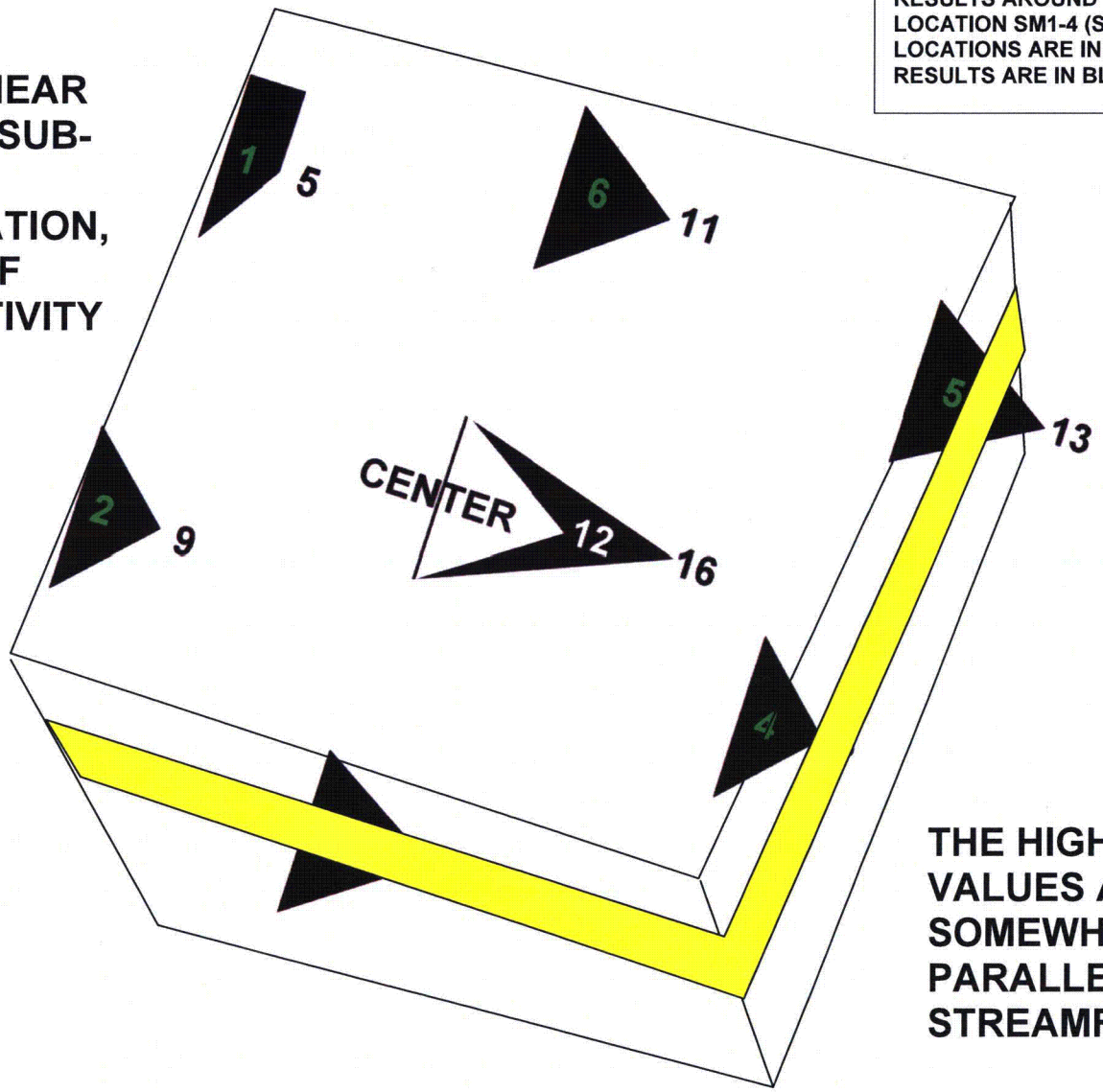
The area around the EMA at location SM6-6 had stream-bottom surface contamination that plunged under 6 inches of lower-activity cover to the west. This EMA originally produced a peak Cs-137 value of 20.6 pCi/g (rounded to 20 on the diagram); the re-located EMA produced a peak value of 6 pCi/g. The highest values were found parallel to streamflow. The highest observed values, from upstream to downstream, were as follows: 12, (20 and 6), and 12 pCi/g.

At the start of the first bounding effort for the EMA at SM6-6, some bounding samples were inadvertently obtained roughly 20 feet north of the actual location SM6-6. Two of the 7 samples obtained from that incorrect location were analyzed. Their results are reported in Appendix B as locations SM6-6 Bound 1 and SM6-6 Bound 2. Both locations produced Cs-137 values of about 7-8 pCi/g, spanning the top 18 inches of the stream bottom.

The observation that the first bounding approach failed to enclose an area in which all values were below 12 pCi/g led to execution of the second bounding approach.

FIGURE 20 – FIRST BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4 (SAMPLE LOCATIONS ARE IN GREEN, RESULTS ARE IN BLACK OR WHITE)

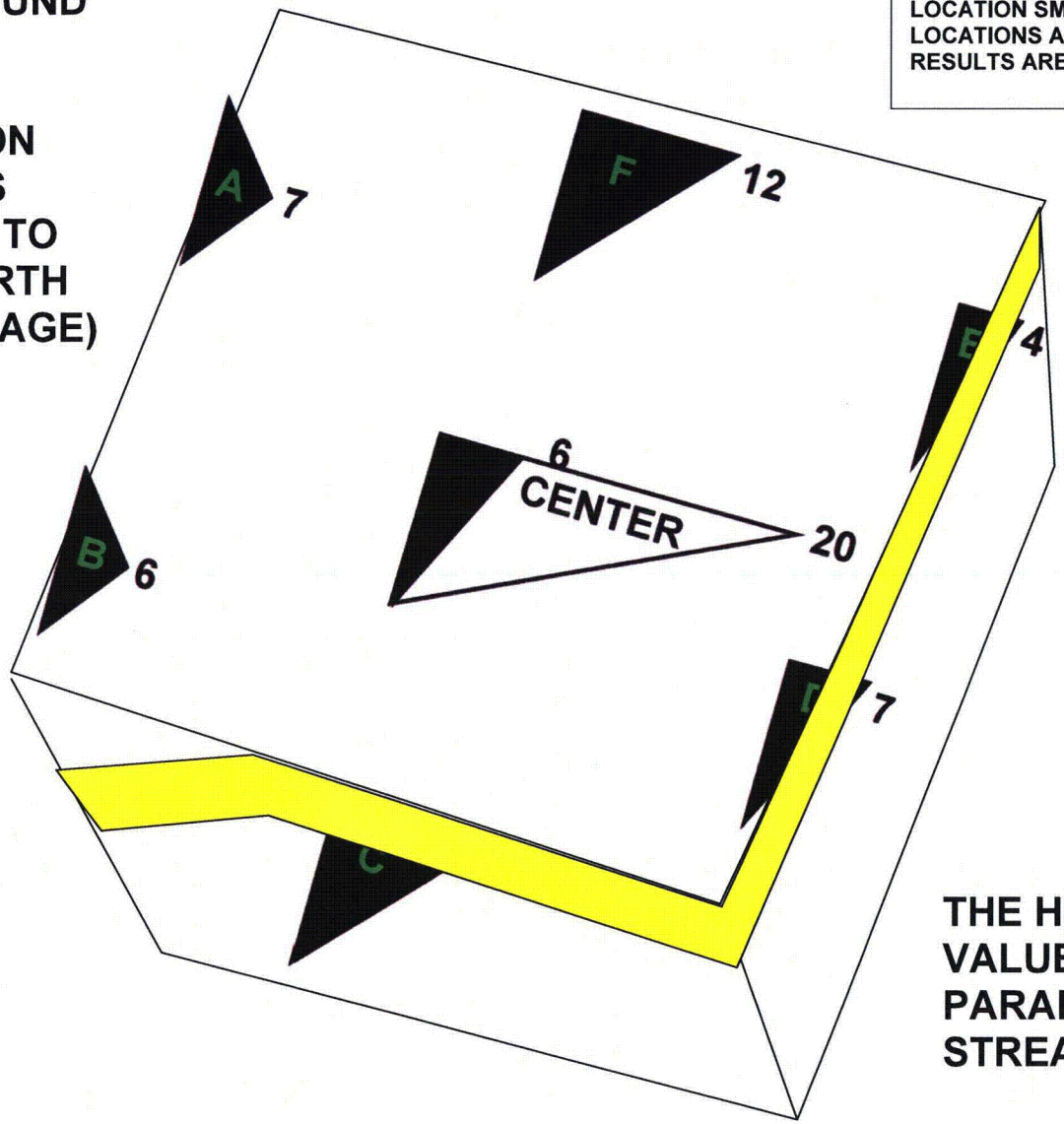
THE AREA NEAR SM 1-4 HAS SUB-SURFACE CONTAMINATION, UNDER 6" OF LOWER-ACTIVITY COVER



THE HIGHEST VALUES ARE SOMEWHAT PARALLEL TO STREAMFLOW

FIGURE 21 – FIRST BOUNDING RESULTS AROUND EMA AT LOCATION SM6-6 (SAMPLE LOCATIONS ARE IN GREEN, RESULTS ARE IN BLACK)

THE AREA AROUND SM 6-6 HAS SURFACE CONTAMINATION THAT PLUNGES UNDER COVER TO THE WEST (NORTH IS TO TOP OF PAGE)



THE HIGHEST VALUES ARE PARALLEL TO STREAMFLOW

SECOND BOUNDING SAMPLING AND TESTING OBSERVATIONS

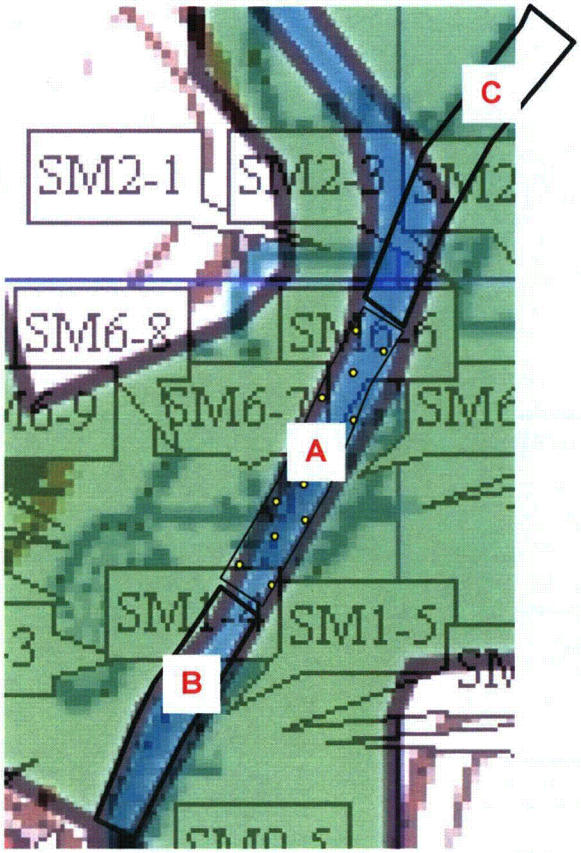
The results produced by the second bounding effort for the two EMAs are illustrated in Figures 22 through 36. Within this group of illustrations, Figures 22-24 represent the evaluation of section A, in which a lognormal distribution was observed around a declining trend line.

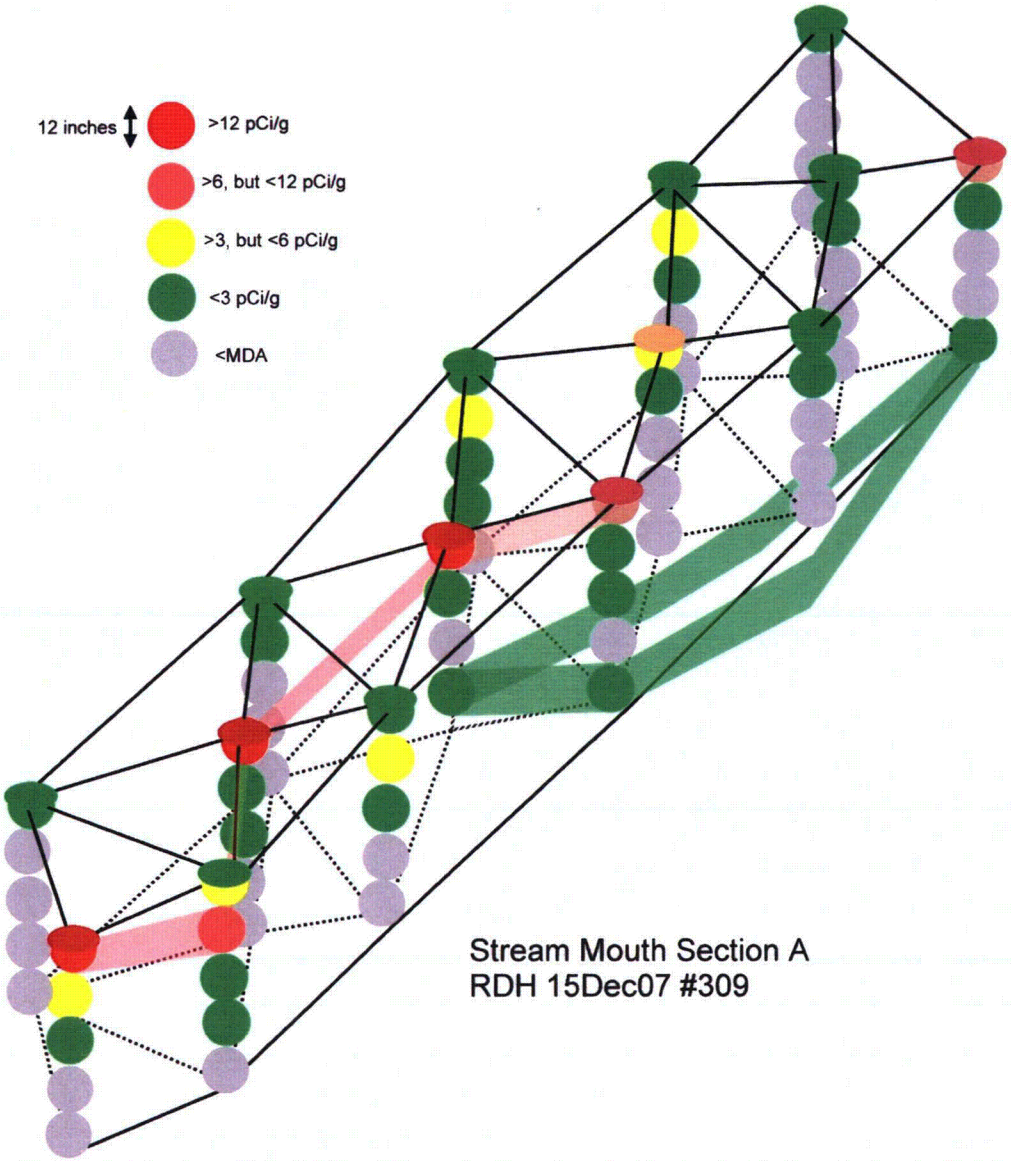
Figures 25-34 represent the evaluation of upstream section B, in which a lognormal distribution was observed, with no trend up or down.

Figures 35 and 36 represent the evaluation of downstream section C, in which it was noted that two adjacent sample points indicated the presence of a discontinuous deposit with two peak Cs-137 values just over 6 pCi/g, and one adjacent peak value just over 3 pCi/g.

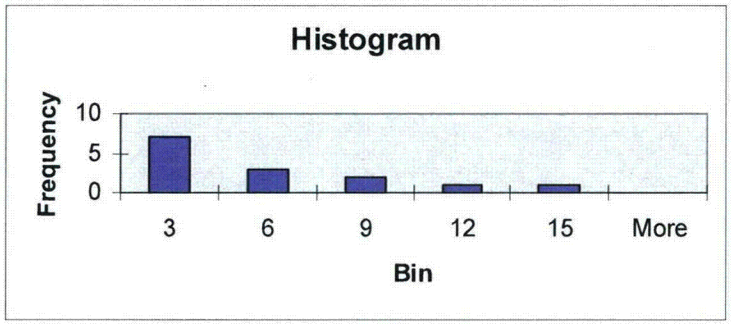
Using the approach described in the Methods section of this report, the representative peak value for Cs-137 in upstream section B was defined as 8.9 pCi/g, with no trend. The representative Cs-137 value in stream section A was defined as ranging from a high of 6.3 pCi/g at the upstream end, to a low of 2.5 pCi/g at the downstream end. The representative Cs-137 value in section C was defined as an isolated occurrence measuring 3-6 pCi/g.

FIGURE 22 – SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM6-6





STREAM MOUTH SECTION A RESULTS (pCi/g)



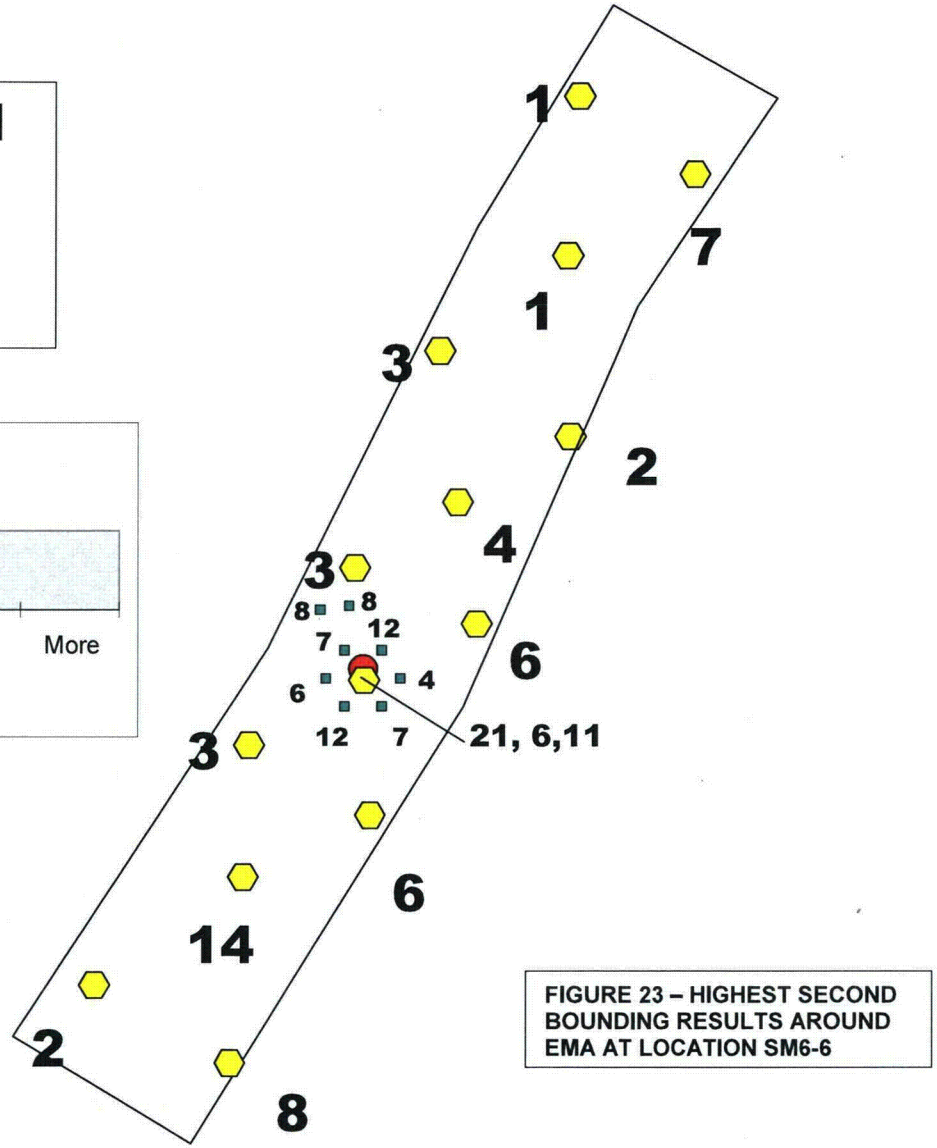


FIGURE 23 – HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM6-6

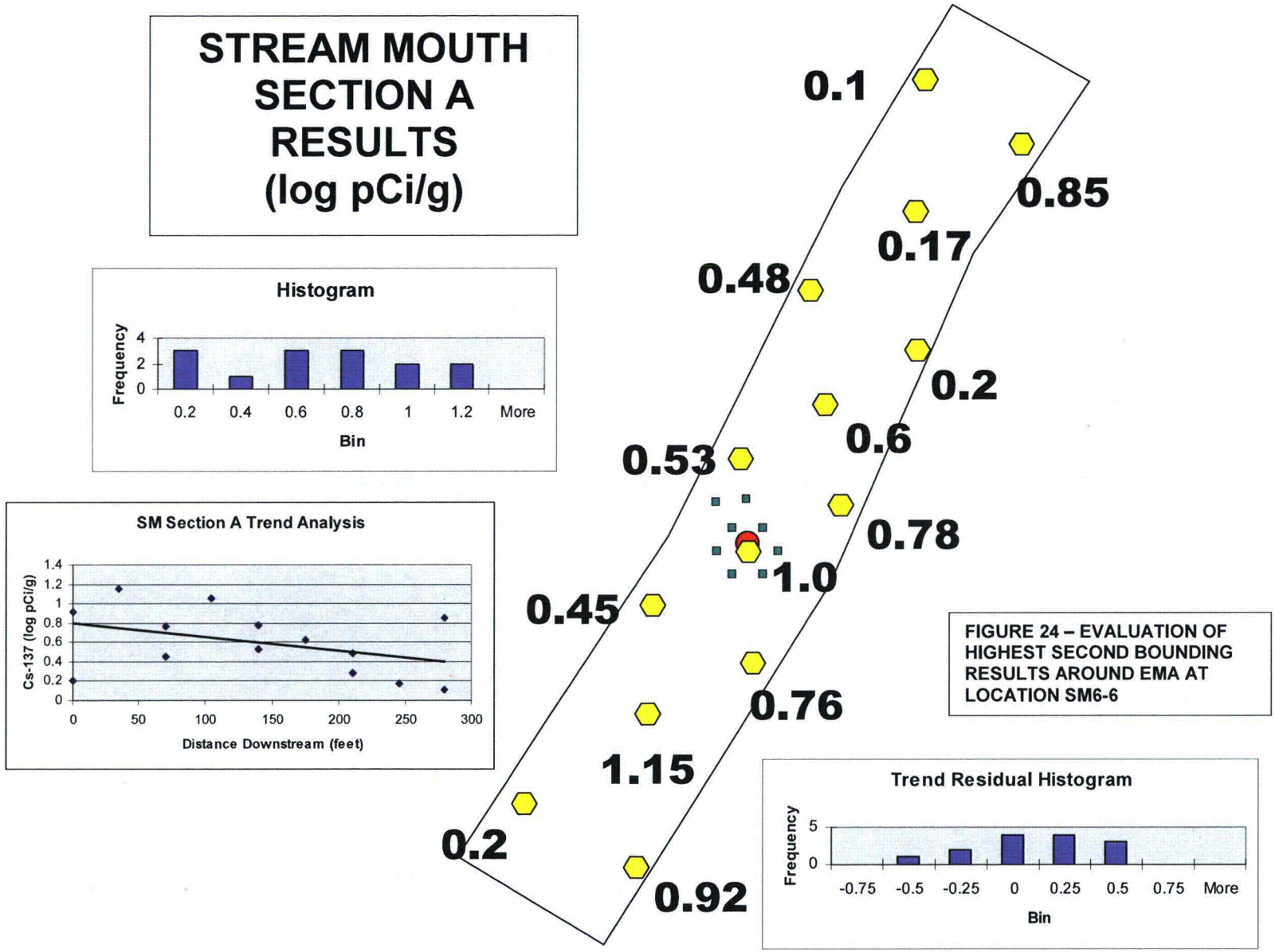
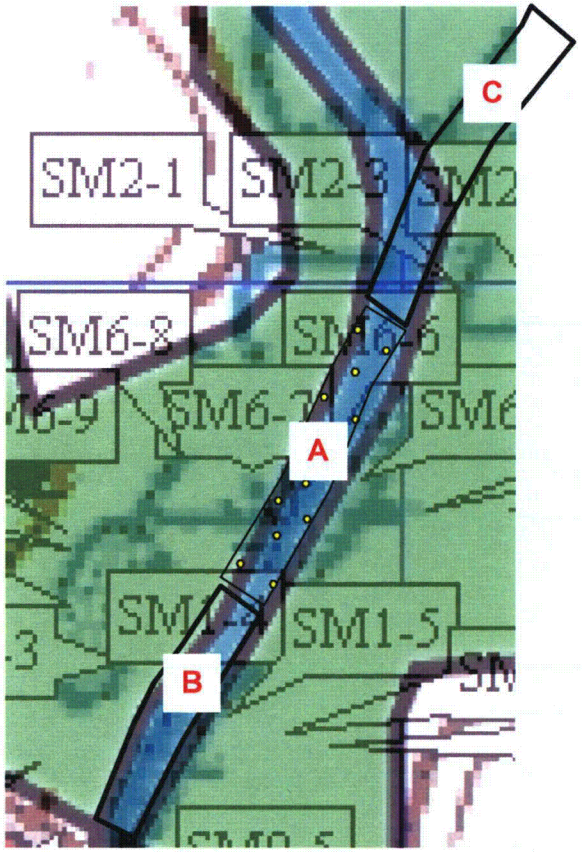


FIGURE 24 – EVALUATION OF HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM6-6

FIGURE 25 – SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4



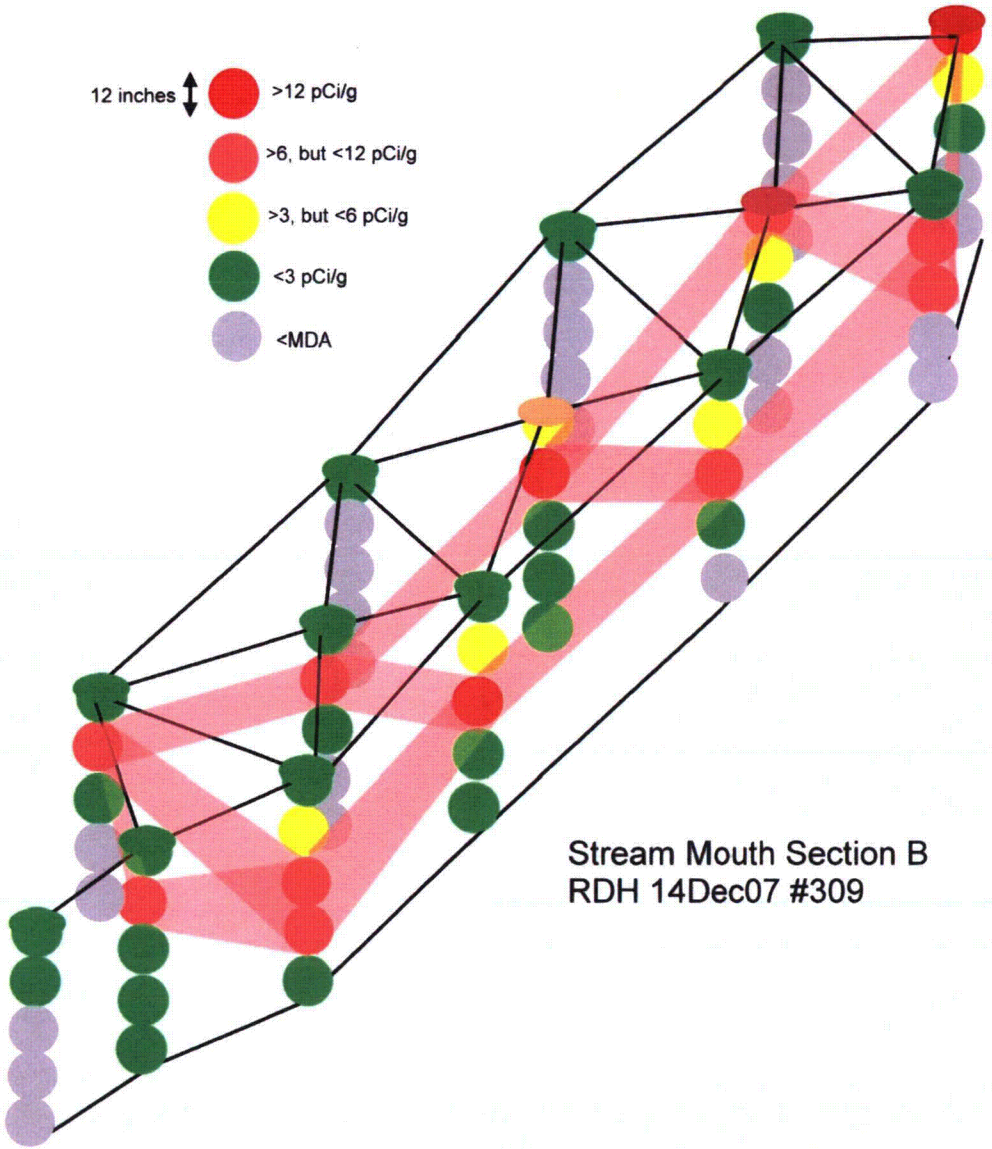
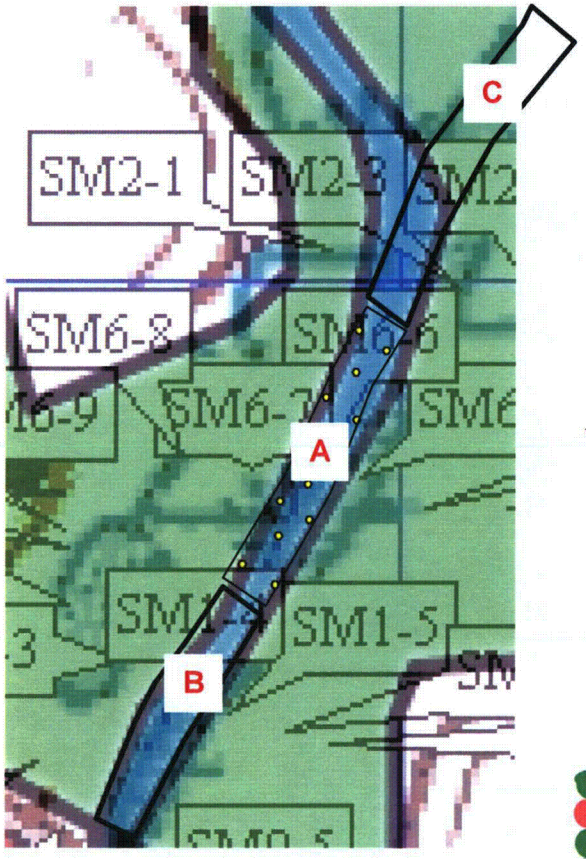
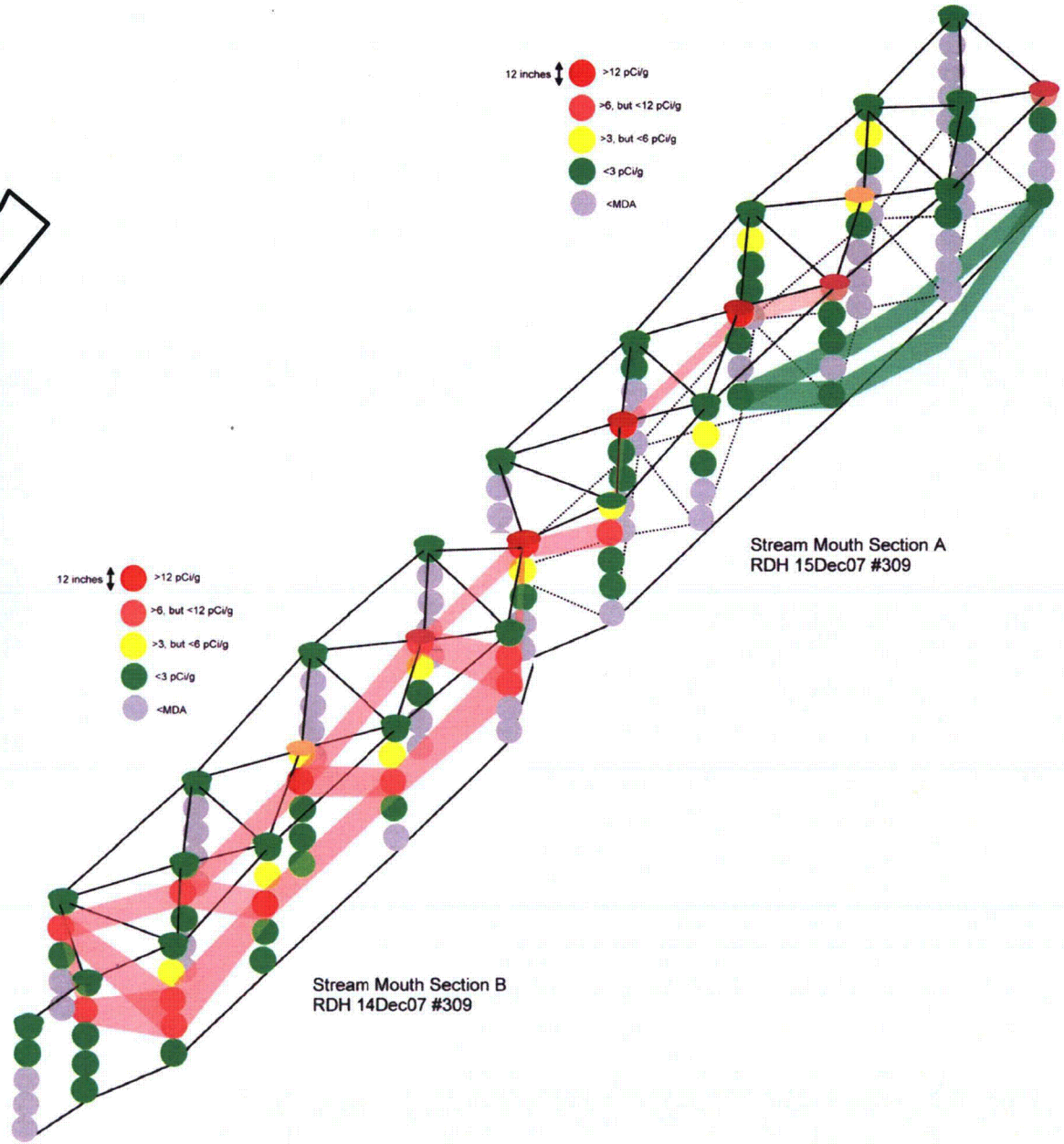
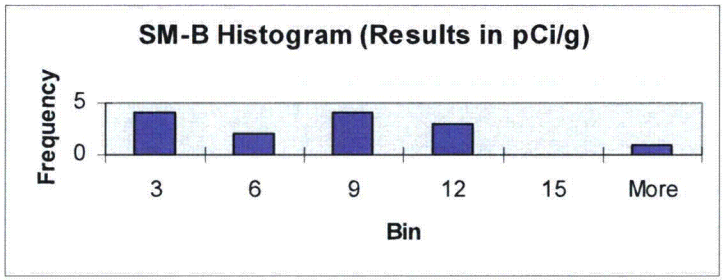


FIGURE 26 – SECOND BOUNDING RESULTS FOR SECTIONS A + B COMBINED





STREAM MOUTH SECTION B RESULTS (pCi/g)



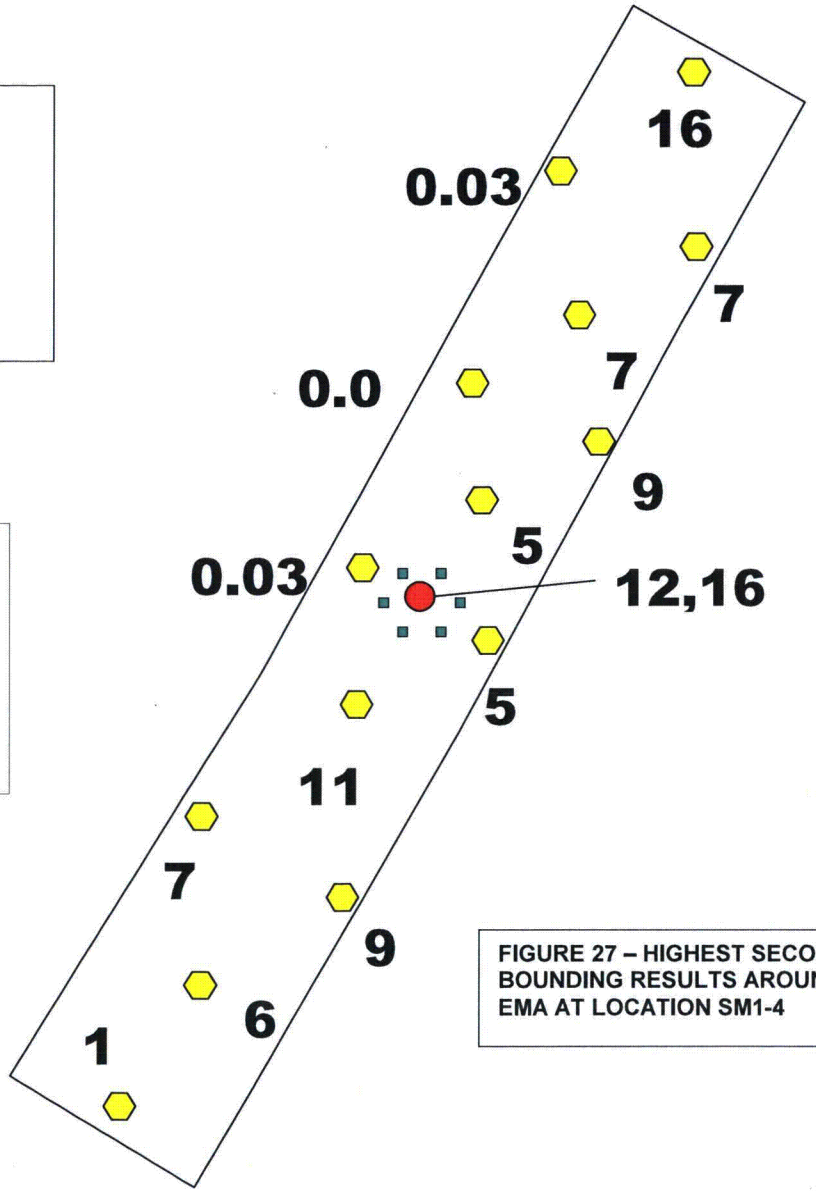


FIGURE 27 – HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4

STREAM MOUTH SECTION B RESULTS (log pCi/g)

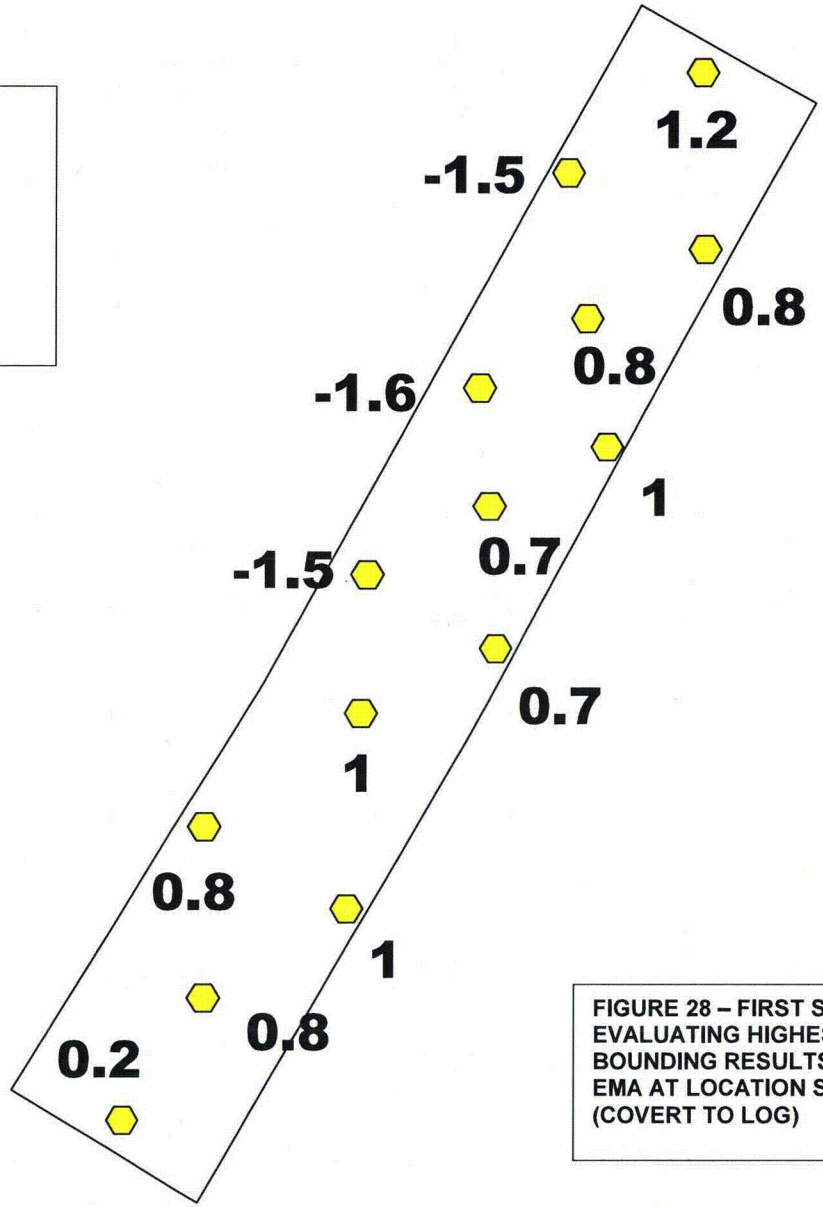
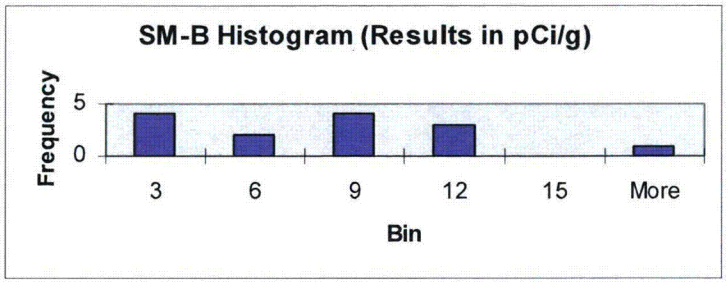


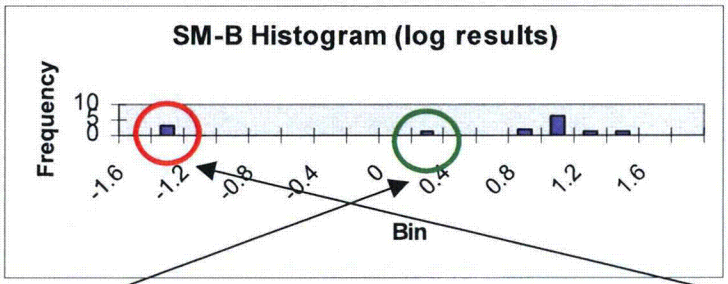
FIGURE 28 – FIRST STEP IN EVALUATING HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4 (COVERT TO LOG)

FIGURE 29 – EVALUATION OF HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4



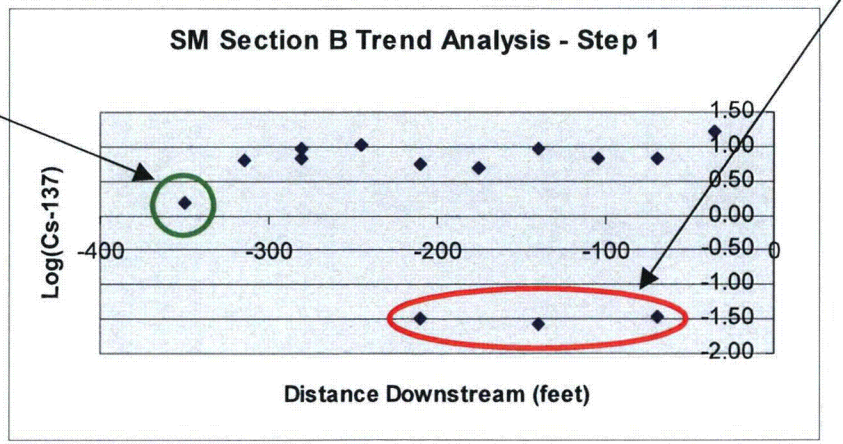
(Not a bell curve)

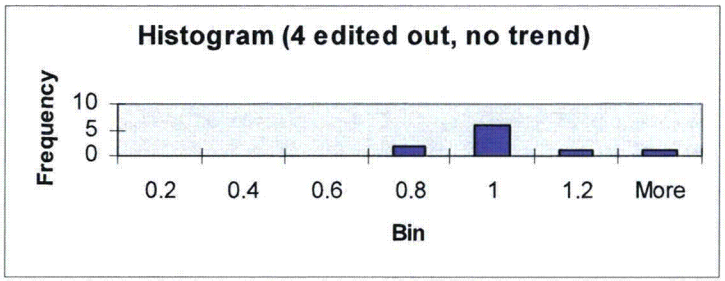
(A bell curve with outliers)



Clearly not part of the pattern

Maybe part of the pattern



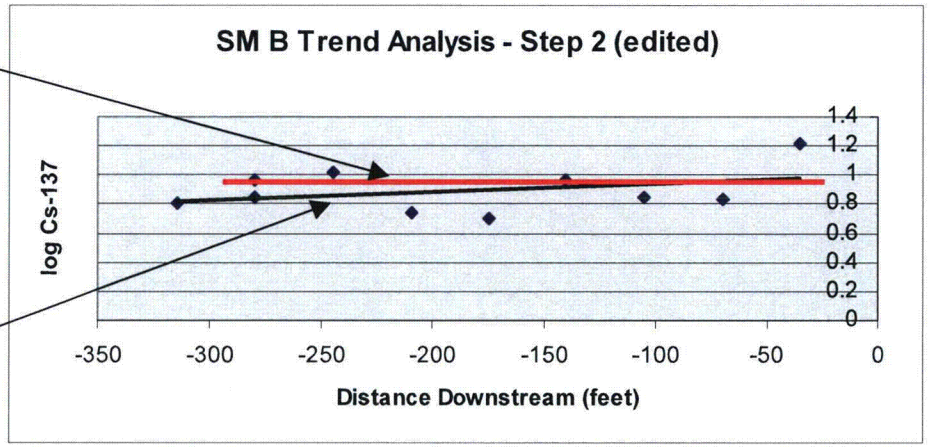


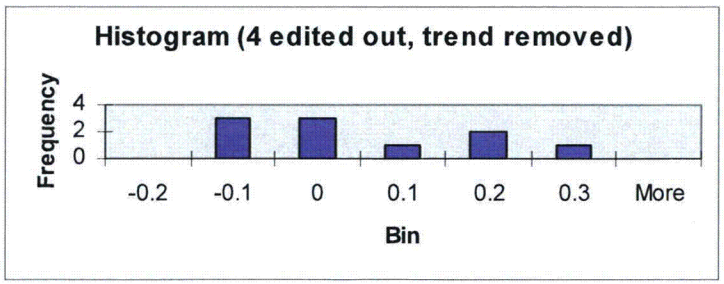
(Maybe a bell curve)

FIGURE 30 – CONTINUED EVALUATION OF HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4 (EDIT OUT 4 POINTS)

No Trend

Trend





(Not a bell curve)

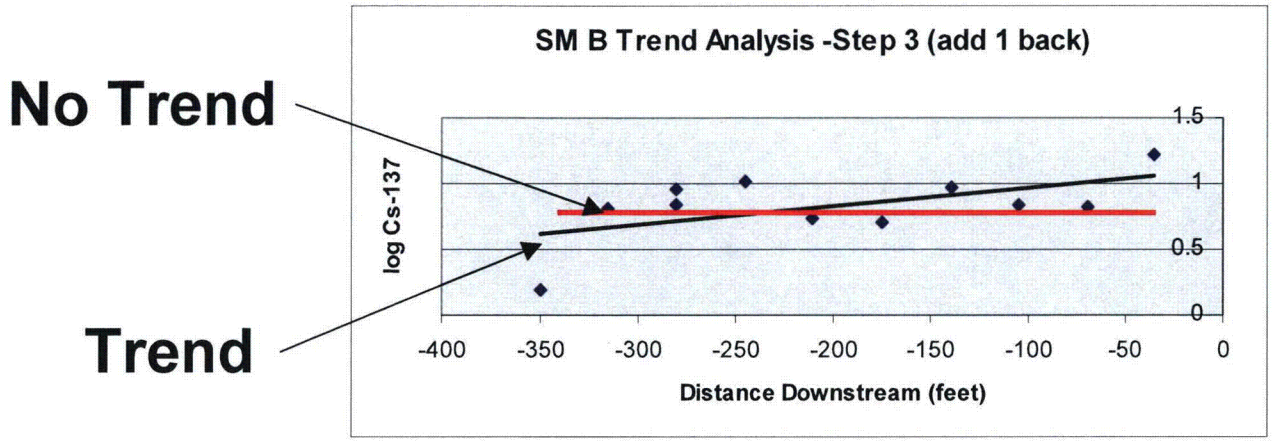
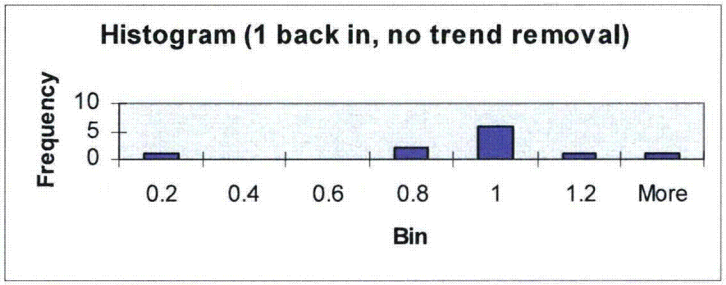
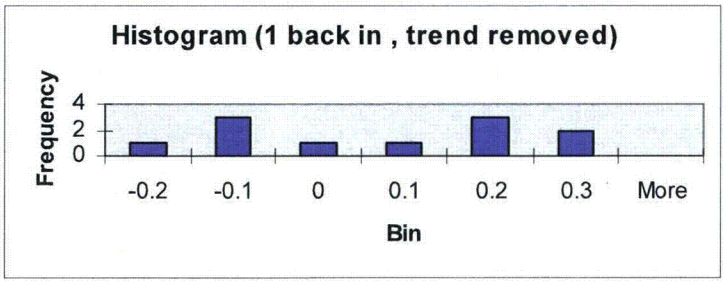


FIGURE 31 – CONTINUED EVALUATION OF HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4 (ADD 1 POINT BACK)



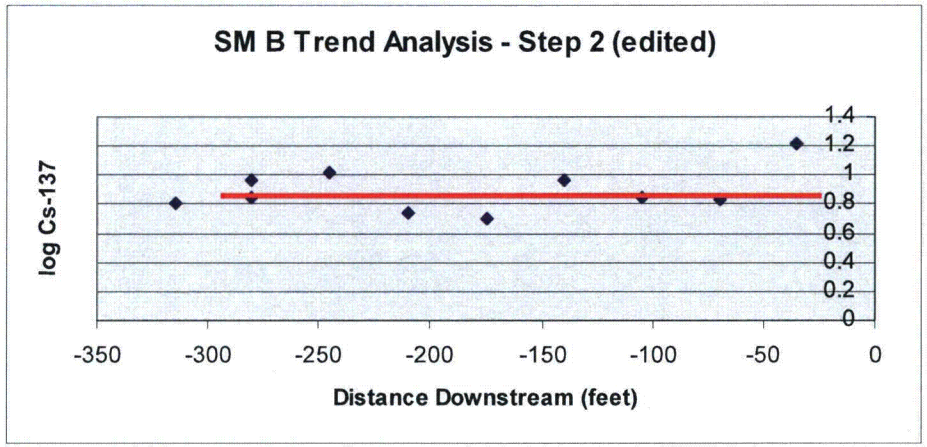
(Maybe a bell curve)



(Not a bell curve)

STREAM MOUTH SECTION B INTERPRETATIONS

- 4 points are not part of the Cs-137 deposit
- The Cs-137 deposit has a uniform log = 0.95
- The Cs-137 deposit representative value = 8.9 pCi/g



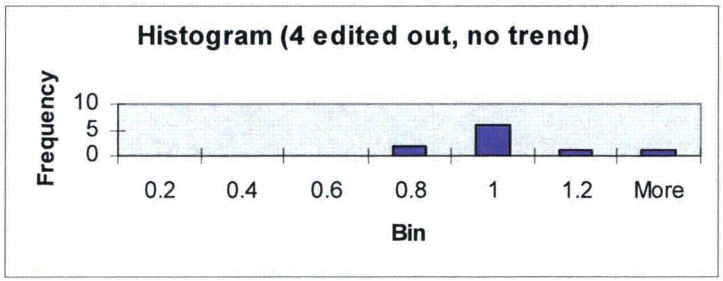


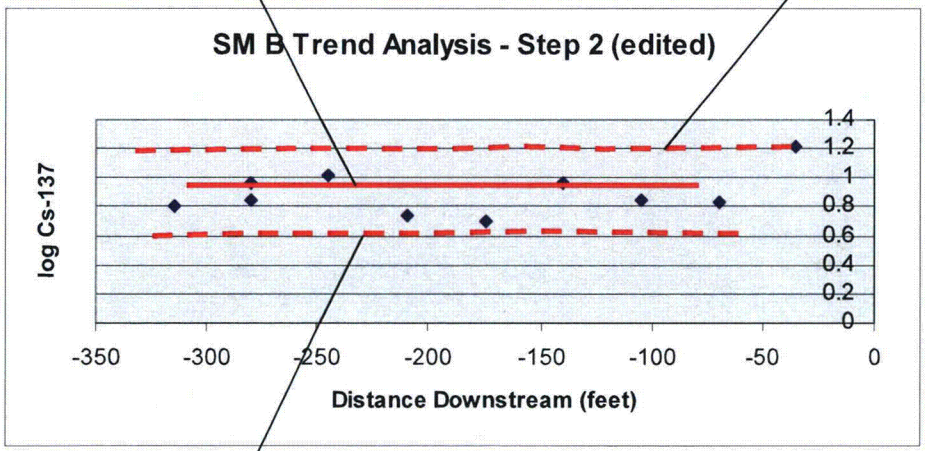
FIGURE 32 – FINAL EVALUATION OF HIGHEST SECOND BOUNDING RESULTS AROUND EMA AT LOCATION SM1-4

FIGURE 33 – ERROR BOUNDS FOR STREAM SECTION B

STREAM MOUTH SECTION B RESULTS (log pCi/g)

$10^{0.95} = 8.9$ pCi/g

$10^{1.2} = 15.8$ pCi/g



$10^{0.7} = 5.0$ pCi/g

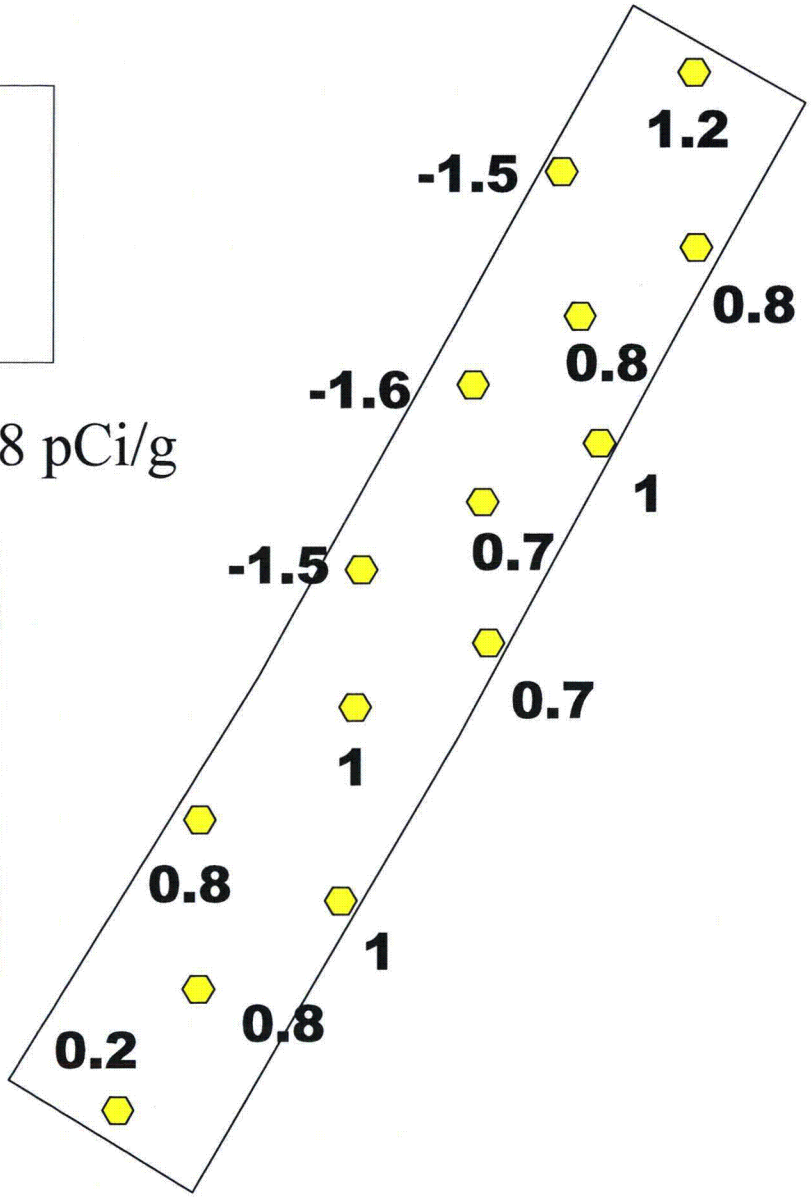


FIGURE 34 – ERROR BOUNDS FOR STREAM SECTIONS B + A

STREAM MOUTH SECTION A+B TRENDS COMBINED

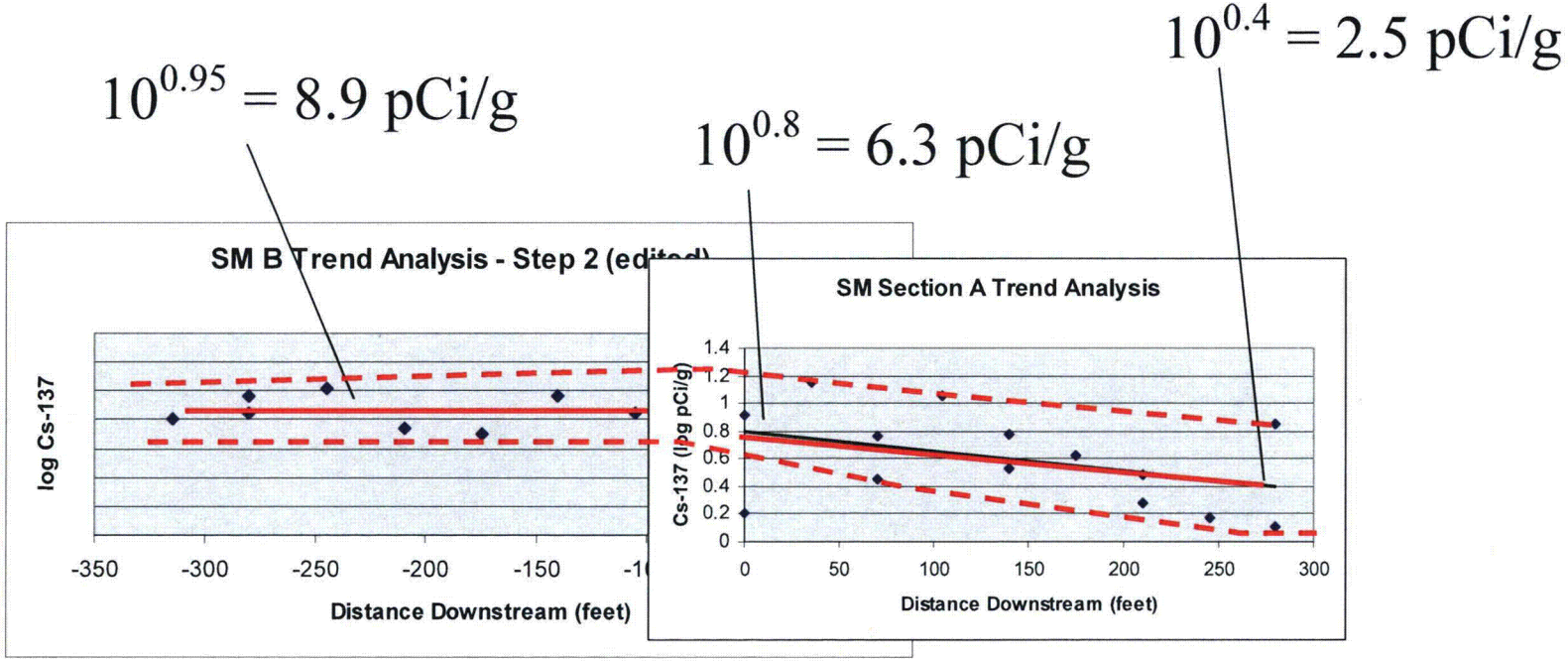
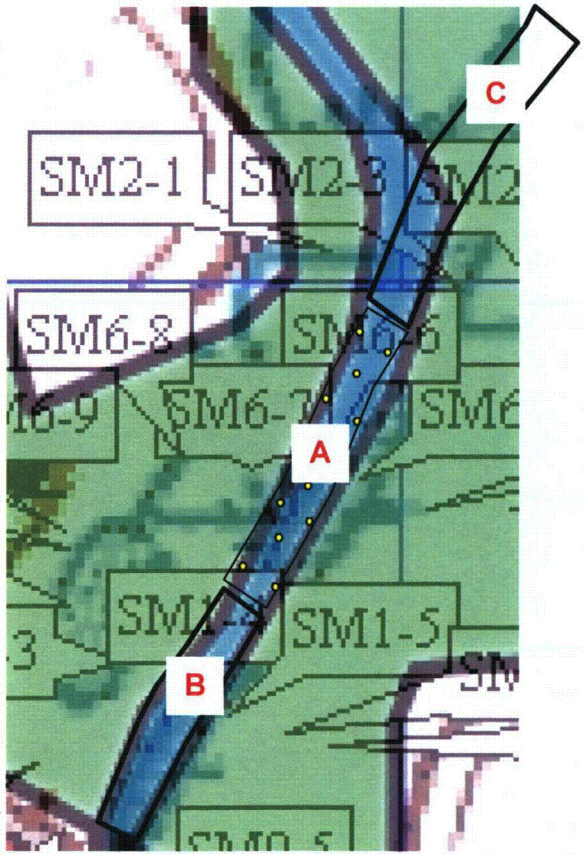


FIGURE 35 – RESULTS FOR STREAM SECTION C



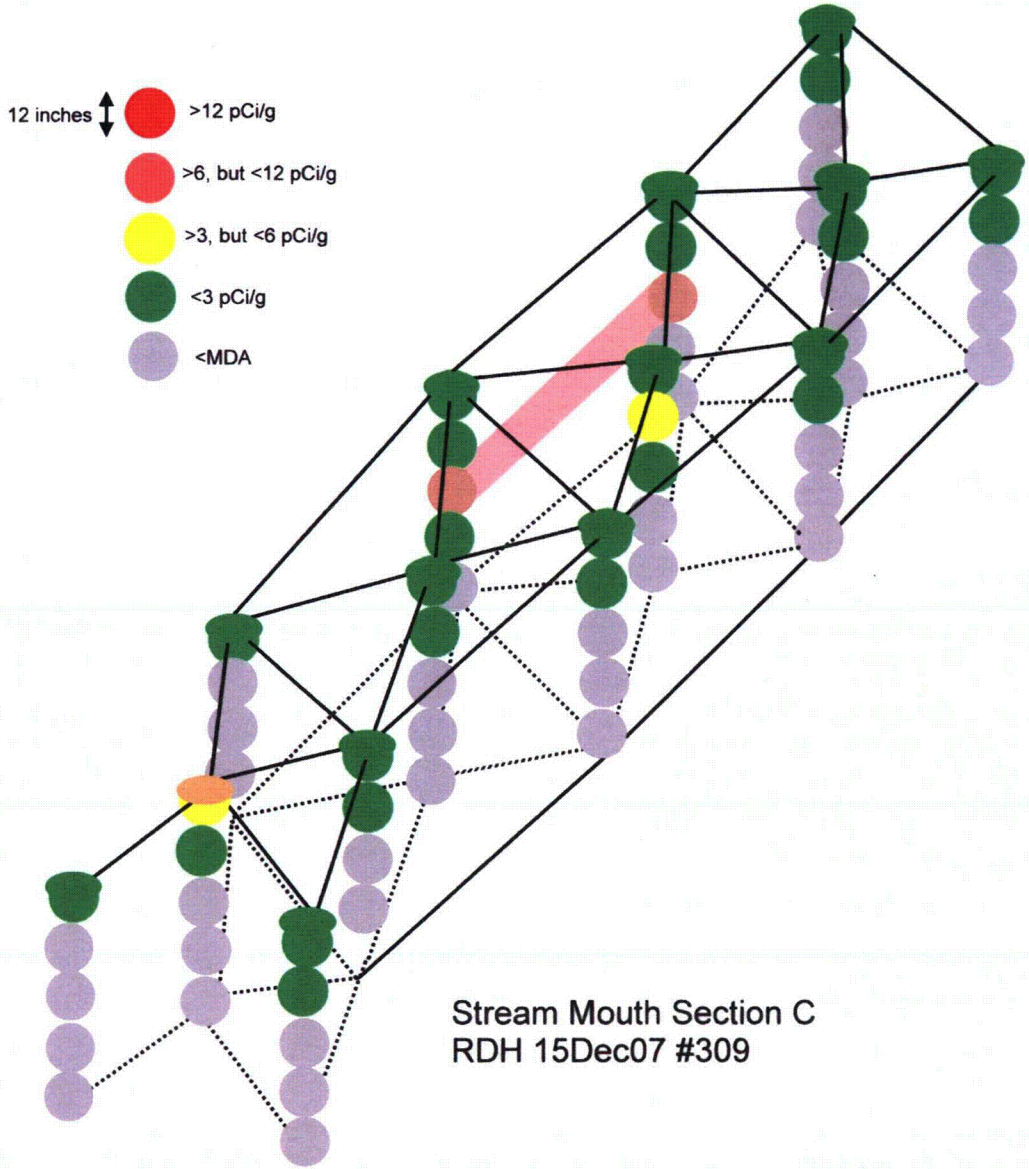
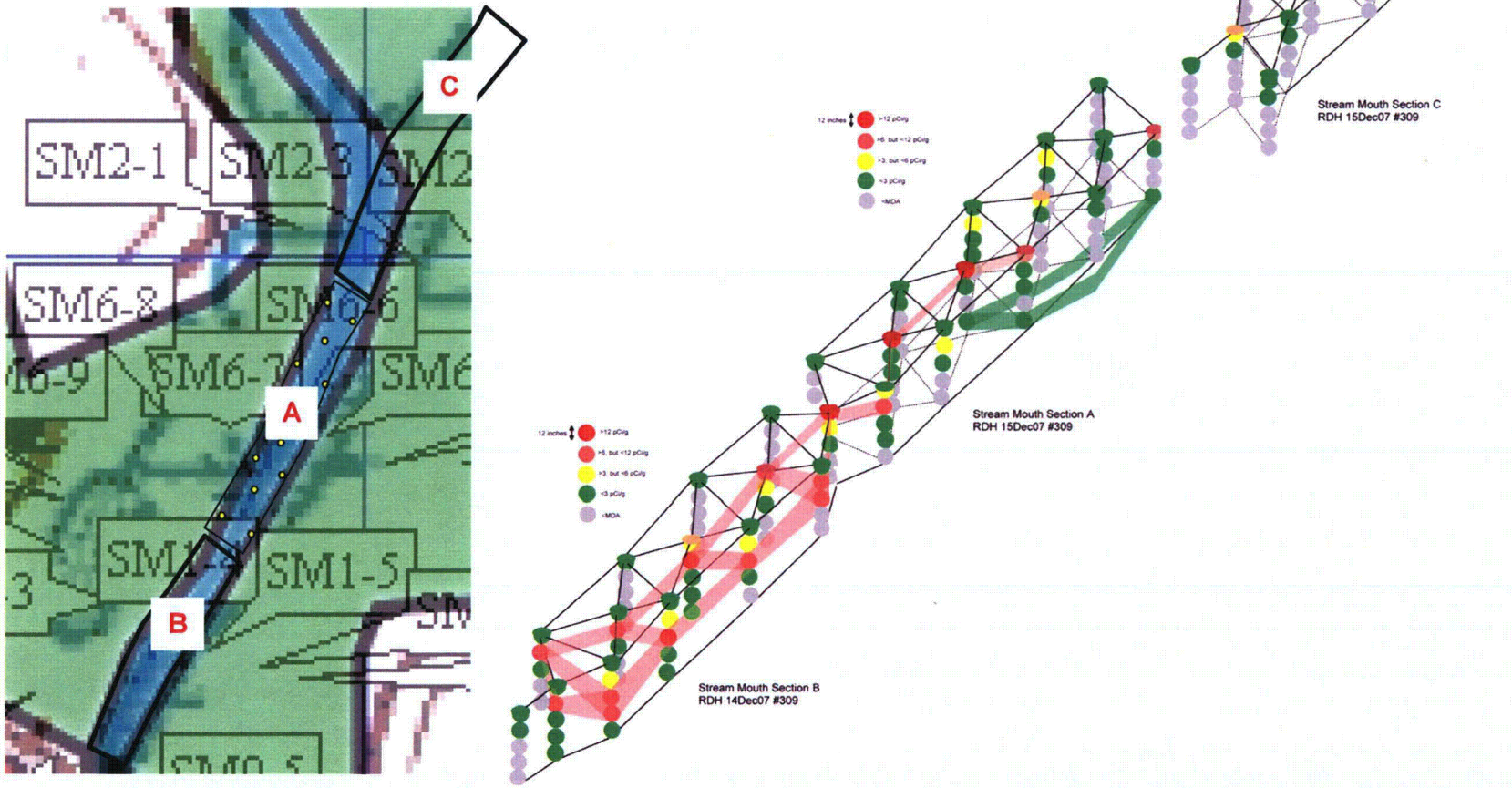


FIGURE 36 – COMBINED RESULTS FOR STREAM SECTION B, A, AND C



OBSERVATIONS RELATED TO DATA QUALITY INDICATORS (DQIs)

The performance of the measurement system, as expressed by the various DQIs, was evaluated for the laboratory alone, for the laboratory + soil processing, and for the laboratory + soil processing + sampling. Observations related strictly to the laboratory were included in the third edition of the PBRF Laboratory Quality Assurance Report. The laboratory report identified no issues that would adversely affect the results employed in this Stream Mouth report.

DQI observations more specifically related to the Stream Mouth work are discussed below. In the Stream Mouth work, a total of 569 original field samples were tested. Recounts were performed on 24 of those samples, or 1 in 24. QC duplicates were prepared, after processing, for 50 samples, or 1 in 11.

Precision – Laboratory recounts were performed on 24 samples. Four of the RPDs calculated for these 24 samples (one in 6) exceeded the criterion that the original and the duplicate should be within 20% of one another. In all of the cases where the RPD exceeded 20%, the original and the duplicate results were less than about 1 pCi/g. RPD comparison after log transformation yielded more values over the 20% limit, so this criterion was set aside as not useful.

QC duplicates, or "splits" were prepared, during sample processing, for 50 samples. Six of the RPDs calculated for these 50 samples (about one in 8) exceeded the criterion that the original and the duplicate should be within 20% of one another. In all of the cases where the RPD exceeded 20%, the original and the duplicate results were less than about 1 pCi/g. RPD comparison after log transformation yielded more values over the 20% limit, so this criterion was set aside as not useful.

Four field duplicates, or "co-located" samples, were obtained at locations chosen by HaagEnviro. The selections included 3 locations sampled earlier during the bay investigation, and 1 location from the Stream Mouth investigation that had produced low core recoveries. The 3 samples that duplicated bay locations were labeled: SM-DUP-BY37, SM-DUP-BY43, and SM-DUP-BY44. Geoprobe sample location SM5-3 had low recovery and was re-sampled with the vibracore device. The vibracore duplicate was labeled SM5-5. Depths analyzed from the 3 co-located samples in the bay did not match the depths from those locations analyzed during the bay investigation. The depth intervals covered by the co-located vibracore sample on transect 5 were slightly different from the original Geoprobe sample intervals. However, when the corresponding layers from the two locations were compared, the RPD results were nearly within the 20% limit (20.5%).

All recounts, splits and co-located sample results are included in the spreadsheet file attached as Appendix B.

Accuracy – The scatter of measurements about the "true" or "representative" result was estimated after the results had been transformed to log(results). The following two examples illustrate what this means in terms of the scatter of results.

On Figure 34, the best-fit line was placed at about 0.95. Transformed back to pCi/g, that gave a "representative" value of 8.9 pCi/g. One can observe that the upper error band above the best-fit line is at about 1.2. Transformed back to pCi/g, this would be 15.8 pCi/g. The lower error band below the best-fit line is at about 0.7. Transformed back to pCi/g, this would be 5 pCi/g. Thus, one might estimate that the error about a best-fit value of about 9 pCi/g is 7 pCi/g above 9, and 5 pCi/g below 9. Another way to express this is that one may expect some values to be as high as 177% of the representative value, and some values to be as low as 56% of the representative value.

On the right side of Figure 34, the best-fit line for section A was placed at about 0.4. Transformed back to pCi/g, that gave a representative value of 2.5 pCi/g. One can observe that the upper error band above a best-fit value of 0.4 is at about 0.8. Transformed back to pCi/g, this would be 6.3 pCi/g. The lower error band below the best-fit line is at about 0.1. Transformed back to pCi/g, this would be 1.25 pCi/g. Thus, one might estimate that the error about a best-fit value of about 2.5 pCi/g is about 4 pCi/g above 2.5, and about 1 pCi/g below 2.5. Another way to express this is that one may expect some values to be as much as 250% of the representative value, and some values to be as low as 50% of the representative value.

From these two examples one may observe that, in this lognormal distribution, one can expect some elevated measurements to be twice as high as the "representative" value. One can also expect that some of the lowest measurements will be as little as half of the "representative" value.

Our DQI for accuracy is that values should lie within 80% to 120% of the "true" value, after log transformation. In the first example above, the "true" value was 0.95, the upper error limit was at 1.2, and the lower error limit was at 0.7. The upper value of 1.2 is only slightly more than 120% (1.2/0.95 = 1.26, or 126%). The lower value of 0.7 is slightly less than 80% (0.7/0.95 = 0.74, or 74%).

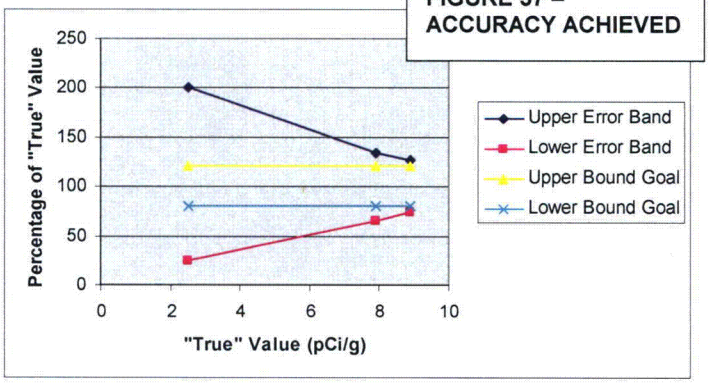
In the second example above, the "true" value was 0.4, the upper error limit was at 0.8, and the lower error limit was at 0.1. The upper value of 0.8 is substantially more than 120% (0.8/0.4 = 2.00, or 200%). The lower value of 0.1 is also substantially less than 80% (0.1/0.4 = 0.25, or 25%).

A third example can be drawn from the center of Figure 34. By inspection of the combined plots for sections A+B, it is reasonable to use 0.9 as the "true" value. The upper error limit appears to be at about 1.2, and the lower error limit appears to be at about 0.6. The upper value of 1.2 is slightly more than 120% (1.2/0.9 = 1.33, or 133%). The lower value of 0.6 is also slightly less than 80% (0.6/0.9 = 0.66, or 66%).

These examples are summarized in Figure 37. From this graph, it appears that the DQIs are likely to be achieved only when the representative value exceeds 9 pCi/g. From earlier observations, this means that we can achieve our accuracy target when the range of values is roughly 18 pCi/g (200% of representative) to 4.5 pCi/g (50% of representative).

The sample variance for the log-transformed results in section B was 0.02, which was acceptably less than the target of 0.4. The sample variance for the log-transformed trend residuals in section A was 0.09, which was acceptably less than the target of 0.4.

FIGURE 37 – ACCURACY ACHIEVED



As noted in the Methods section, when no trends were noted in a deposit, HaagEnviro considered accuracy acceptable if the standard deviation of the log-transformed results was less than half the following: the log of the regulatory threshold of 12 pCi/g (1.08), minus the mean of the log-transformed results. This was based upon a simple formula for defining confidence intervals, taken from USEPA's SW-846, and the assumption that the mean plus two standard deviations represents at least a 95% confidence interval.

For the results in Stream Mouth section B, no trend was present. In that data set, the "representative" log-transformed value was 0.95, the standard deviation of the log-transformed results was 0.153, and the mean of the log-transformed results was 0.893. To apply the test above to determine whether accuracy was sufficient, the following question was to be answered using the mean:

Is s(log transformed results) < (log(12pCi/g) – mean (log transformed results))
Is 0.153 < (1.08-0.893)/2 ?
Is 0.153 < 0.0935 ?

Using the "representative" best-fit value of 0.95, instead of the mean of 0.893, the question would be as follows:

Is 0.153 < (1.08-0.95)/2 ?
Is 0.153 < 0.065 ?

In both trials, the answer was no, so this test of accuracy suggests that the scatter about the "representative" log value of 0.95 may be too large to support a conclusion that the "representative" log value of 0.95 is less than the regulatory threshold log value of 1.08, at a 95% confidence level. The result might be more favorable if more than only the most elevated activities were included in the assessment.

Completeness – Defining completeness is an assessment of whether we have a sufficient number of samples to support a determination that the "representative" value is less than the regulatory threshold. The preceding assessment of accuracy suggests that the number of samples obtained in section B (14 samples) is not sufficient to make that determination. The preceding discussion of sample variances supports the assumption underlying the sample-number calculation, that variance is less than 0.40. The other assumption underlying the sample-number calculation was that the "effect size" between the "representative" value and the regulatory threshold was a least |log(3 pCi/g) – log(12 pCi/g)| = |0.48-1.08| = 0.6. As the log of the "representative" value was taken to be 0.95 (not 0.48), this criterion was clearly not met. It is generally true that, the smaller the "effect size" is, the greater is the number of samples needed to achieve the desired confidence in a decision. In the minimum samples task, it was noted that as many as 50 samples would be needed to support the decision that 8 pCi/g "representative" value was less than a 12 pCi/g regulatory threshold, with a confidence of 95%, and a power of 0.9. For section B, a required number of 25 samples was obtained by re-running the minimum samples statistical analysis with the following values: standard deviation = 0.15, effect size = <0.6, power =0.9, alpha = 0.05, two-tailed.

Representativeness – The posting of field-screening results, in Appendix B, allowed HaagEnviro to observe the sample recoveries achieved. In the initial round of transect sampling, 11 Geoprobe samples (from 8 locations), out of 27 samples taken, produced a recovery of less than 50%. One low-recovery Geoprobe-sampled location (SM5-3) was re-sampled with the vibracore device (SM5-5). One vibracore sample, out of 47 taken, produced a recovery of less than 50% (SM8-7: 49%, a water filled gap of 16.5" was noted in the sample tube). Core photographs were examined for all of these samples, and no problems in using them were evident. In general, the low recoveries were related to peat, which is recovered much better by the vibracore sampler than by the GeoProbe sampler. Recoveries from the remaining Stream Mouth samples were acceptable.

Laboratory blanks tested during the stream mouth wetlands investigation all produced results that were either less than the MDA, or were rejected upon data review. Blank results are included in the spreadsheet provided in Appendix B. Review of cores and corresponding testing results suggested that carry-down generally did not occur to a significant extent. Two examples in which drag-down did occur are shown in Figure 38.

FIGURE 38 -

SIGNIFICANT DRAGDOWN (LEFT), AND

MINOR DRAGDOWN (RIGHT)

Comparability – The procedures discussed in this report were consistently followed, by a fairly consistent set of sampling team members. Hydrogeologist Bob Haag and Principal Scientist Ruth Haag were personally involved in some of the later sampling efforts, replacing Scientists Ben Patterson and Phil Weimer, as well as Environmental Technician Ryan Bloom. RP Technician Rich Dzvonar and D&D Technician Greg Struck were involved in all of the sampling efforts, and most of the sample processing work. The PBRF onsite laboratory analyst changed during the course of this work, but the procedures remained constant. Analytical oversight and data review continued to be provided by Assistant RSO Rod Case. Some minor adjustments were made along the way, such as eliminating the duct-taping of tube caps. When Hydrogeologist Bob Haag became personally involved in the last few rounds of sample processing, some of the PID testing of sample cuts was adjusted at his discretion.

OBSERVATIONS FROM PREPARING SAMPLES FOR ANALYSIS

Screening for Radioactivity – Initial scanning for radioactivity produced no readings sufficiently above background to warrant concern or further inquiry. RP personnel therefore suspended scanning.

Screening for Organic Chemicals – During soil processing, some samples produced elevated readings on a HaagEnviro 11.7 eV PID. Often, readings taken in the opening of a freshly cut sample interval produced a response on the HaagEnviro PID that exceeded the meter's upper limit, which was 2000 ppm. Comparison readings with the NASA-provided PID were not similarly elevated. Both meters calibrated properly, using the same 100-ppm isobutylene gas. Both meters responded similarly to periodic checks in which the tip of a Sharpie™ pen was placed in front of each meter's probe. In such checks, both meters responded with readings ranging up to nearly 100 ppm.

With the NASA-provided 10.2 eV PID, the highest reading obtained was 40 ppm at the 42" depth in sample location SM6-4. The highest reading with the NASA 10.2 eV PID at any other sample location was 8 ppm, at the bottom of sample location SM6-3. With the HaagEnviro 11.7 eV PID, many readings caused the meter to "peg," exceeding the maximum reading of 2000 ppm. When the NASA-provided PID was outfitted with an 11.7 eV lamp, no similarly elevated readings were obtained with the NASA meter, which routinely read either 0.0 ppm, or a few ppm, up to a maximum of about 5 ppm in ambient air.

When Bob Haag periodically took the HaagEnviro PID outside the soil-processing trailer, outdoor ambient-air readings of approximately 200 ppm were obtained on occasion.

In the field, when Bob Haag took the HaagEnviro 11.7 eV PID through tall reeds to the stream's edge, the HaagEnviro PID produced readings up to 200 ppm, with background readings outside the reeds of approximately 40-50 ppm. As breezes passed, the meter readings spiked up to 100-200 ppm.

With the probe held at face level as Bob Haag walked next to the stream, the HaagEnviro PID readings dropped to 0.0 ppm. With the probe held a few inches off the ground at the stream's edge, the HaagEnviro PID "pegged" over 2000 ppm, just as it often did in the sample-processing trailer.

An air sample obtained by NASA Safety Officer Hank Bayes, from a sample cut that had produced an elevated reading with the HaagEnviro PID, produced a detection only for acetone, which was reportedly found at a level of 0.6 ppm.

The elevated-reading phenomenon first appeared during the processing of samples from the Flood Plain area, which is discussed in a separate report. Laboratory testing of Flood Plain samples for organic chemicals resulted in the following positive detections:

- Phenol, at a level of 2.9 ppm in soil (2,900 parts per billion, or ppb)
- Acetone, at an estimated level of 0.0052 ppm in soil (5.2 ppb)
- A few unidentified SVOC compounds
- An "Unknown Aldol condensate," which the laboratory interpreted was created when the laboratory added acetone in the testing process, and this added acetone reacted with natural soil materials

In response to the periodically elevated PID readings, ventilation in the soil-processing trailer was increased.

Peat Volume and Density Upon Drying for Testing - HaagEnviro's original estimate, before detailed volume and density reduction measurements were made, was that the

typical weight reduction due to sample processing would be 5 to 1. Reductions documented in this study were as follows:

1. Peat – length reduced from 12" to 5"; weight reduced from 1515g to 369g

2. Peat – length reduced from 12" to 4.5"; weight reduced from 1502g to 331g

3. Peat/Sand mixture – length reduced from 12" to 10.75"; weight reduced from 1120g to 1009g

These results showed that processing reduced the peat weight by a factor of approximately 3 to 1. This suggested that the activity per unit weight of peat could be overstated by a factor of 3, compared with mineral soil types, such as sand, silt, or clay.

OBSERVATIONS ON OTHER RADIONUCLIDES

Besides Cs-137, other radionuclides of interest are defined in FSSP Table A-7, and include the following:

- ^{60}Cobalt (Co-60)
- ^{154}Europium (Eu-154)
- ^{3}H (Tritium)
- ^{129}Iodine (I-129)
- ^{90}Strontium (Sr-90)
- ^{233}Uranium and ^{234}Uranium (U-233/234)
- ^{235}Uranium and ^{236}Uranium (U-235/236)

Of these radionuclides of interest, only the following were included in the PBRF laboratory reports:

- ^{137}Cesium (Cs-137)
- ^{60}Cobalt (Co-60)
- ^{154}Europium (Eu-154)
- ^{235}Uranium (U-235)

In the original transect and first bounding results, the following occurrences of Co-60 were reported:

SM1-2 54-66: 0.26 pCi/g (Cs-137 was 7.7 pCi/g, the most elevated in this pond)
SM1-4 6-18: 0.25 pCi/g (Cs-137 was 11.7 pCi/g)
SM1-4Bound3 6-18: 0.085 pCi/g (Cs-137 was 11.9 pCi/g)
SM1-4Bound3 18-30: 0.138 pCi/g (Cs-137 was 3.5 pCi/g)
SM1-4Bound5 18-30: 0.23 pCi/g (Cs-137 was 13.5 pCi/g)
SM1-4Bound4 6-18: 0.26 pCi/g (Cs-137 was 11.4 pCi/g)
SM6-6 30-42QC: 0.27 pCi/g (Cs-137 was 0.73 pCi/g, Co-60 was not in the duplicate)

In the grid-sampling results for Areas A, B, and C, only 1 detection of a non-Cs-137 radionuclide of interest was reported. That was a Co-60 value of 0.68 pCi/g, in the QC duplicate for sample SMG2 0-6. The corresponding value of Cs-137 was 2.81 pCi/g. Co-60 was not detected in the original sample of this duplicate pair.

INTERPRETATIONS

The interpretations provided in this section are intended to respond to the topics listed under the heading "Characterization Plan Objectives".

MECHANISM OF CS-137 TRANSPORT

The proposed mechanism of Cs-137 transport appeared to be confirmed by this work. It continued to appear that clays bearing Cs-137 from the PBRF were deposited in the Stream Mouth depositional environment. It continued to appear that higher-than-typical amounts of Cs-137 discharged in 1968 were transported downstream by the area's largest recorded flood, in 1969. Details of these interpretations follow.

Background Cs-137 – It was assumed that atmospheric testing of nuclear weapons during the time that the PBRF operated contributed a Cs-137 background, which was assumed to average 0.3 pCi/g over the top 6 inches of soil. This was based on soil testing by others on Star Island in nearby Old Woman Creek, where the upper 4 inches of soil showed a peak value of about 0.6 pCi/g, and an average of roughly 0.3 pCi/g or less; and the soil below a 6-inch depth contributed almost no activity. These estimates were based upon Figure 3 on page 58 of Volume 31 of the Journal of Environmental Quality (Jan.-Feb. 2002). The NASA RSO for the PBRF decommissioning project indicated that values up to 1 pCi/g had appeared to represent background conditions in other parts of the PBRF work. In this investigation, it was interpreted that any Cs-137 values that exceeded 1 pCi/g were attributable to the PBRF. Below 1 pCi/g, this study lacked solid data for making the split between background and PBRF. For estimating purposes, a background value of 0.5 pCi/g was assumed in the section entitled, "ACCOUNTING FOR CS-137 KNOWN TO BE RELEASED."

It is important to recall that the practical quantitation limit (PQL) for this project's total measurement system (sampling + processing + laboratory) was estimated to be 3 pCi/g, meaning that all measurements in this study below 3 pCi/g are essentially the same. Values less than 3 pCi/g may be considered as qualitative estimates at some risk, since values below this level were not consistently reproducible.

Another way to distinguish Cs-137 attributable to PBRF from background Cs-137 is to look for other radionuclides characteristic of PBRF. Among the other radionuclides listed in FSSP Table A-7, only Co-60 appears offsite. When Co-60 does appear, it is always in association with elevated levels of Cs-137. This is not consistent with the expected behavior of Co-60, which is expected to behave like calcium. There is no reason to expect Co-60 to adsorb to clay minerals, as is expected for Cs-137. Based on this assumption, a strong correlation between Cs-137 and Co-60 results would not be expected. However, in the results reported here, and in other results nearer the PBRF, it does appear that Co-60 and Cs-137 are positively correlated, and Co-60 activities are typically about 1.5% of Cs-137 activities (this ratio is based upon Pentolite Ditch results, evaluated elsewhere). Co-60 does not always appear when Cs-137 levels are elevated, but Co-60 only appears when Cs-137 levels are elevated. Thus, it is interpreted that the

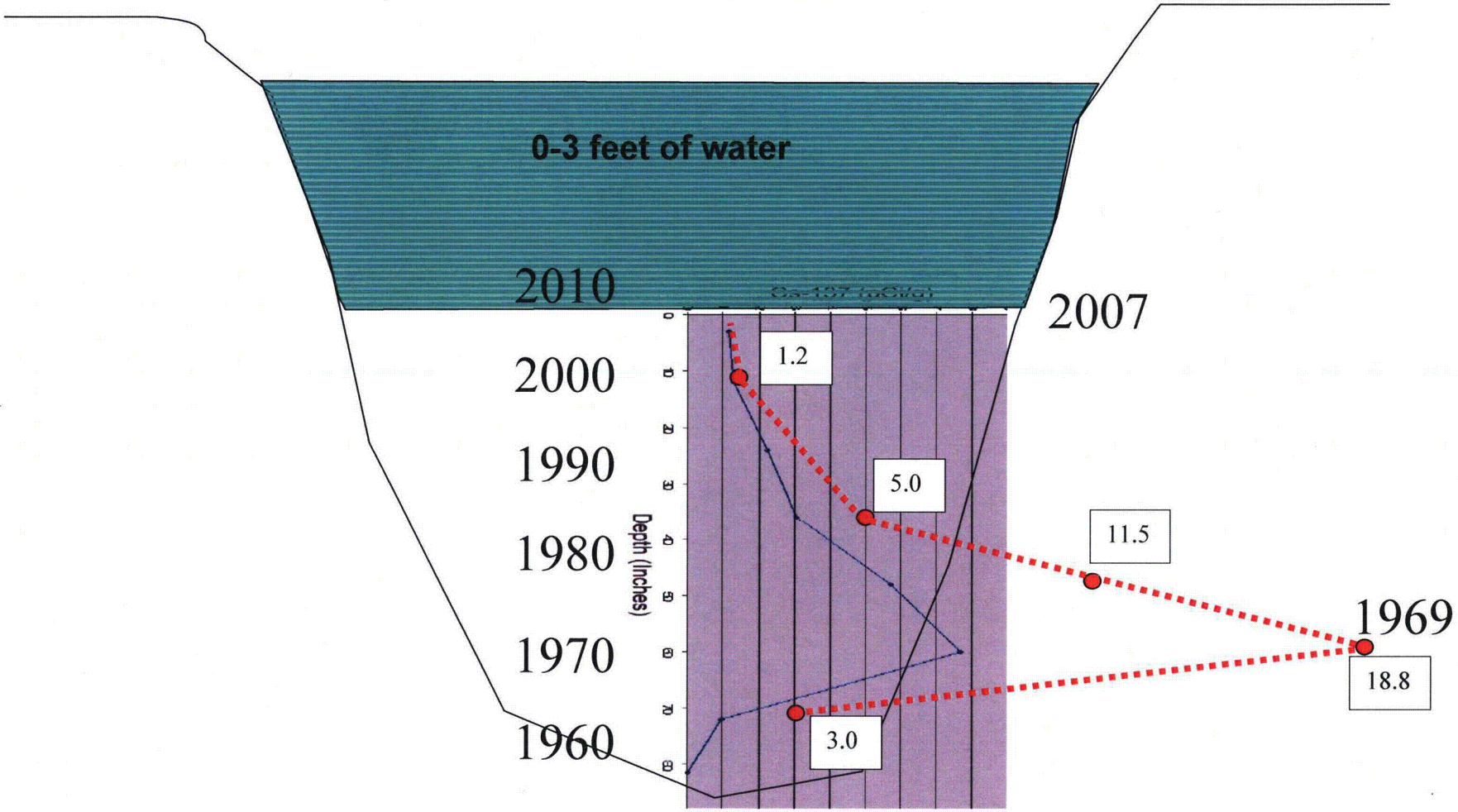
mechanism of Co-60 migration is similar to that for Cs-137. If Cs-137 is adsorbing on clay minerals, this means that Co-60 is also adsorbing on clay minerals.

The presence of Co-60 is not a useful way to distinguish PBRF Cs-137 from background Cs-137. This is due to the observation that Co-60 only becomes reliably detectable by the project's total measurement system when Cs-137 activities exceed 1 pCi/g.

Cs-137 Deposition Over Time - An underlying postulate of this work is that the peak Cs-137 levels were deposited downstream in 1969. Based upon this assumption, and drawing upon results obtained in the earlier Ponds report, Figure 39 provides an estimate of the activity deposited versus time. The solid line in the graph represents the actual testing results obtained, without correcting for nuclear decay. The dashed red line represents the Cs-137 activities at the time of deposition, correcting for decay using an Excel spreadsheet program supplied by NASA's Assistant RSO, Rod Case. This figure suggests that the activity in sediment being carried by floods peaked at 18.8 pCi/g in 1969, had dropped to less than 3 pCi/g by 1995, and was approaching a steady-state value just over 1 pCi/g by the year 2000.

Based on this rationale, it was interpreted that 2006 measurements of Cs-137 exceeding 3 pCi/g represented pond deposition during the 11 years between 1969 and 1980. During that time, it was interpreted that the activities in clay being deposited ranged from a high of 18.8 pCi/g, to a low of 5 pCi/g. Following 1990, it appears that values less than 3 pCi/g were deposited. Extending the interpretation cautiously below the PQL, it was estimated that Cs-137 activities of roughly 1 pCi/g continued to be transferred downstream in 2006/2007, where they continued to be widely distributed during flood events.

FIGURE 39 – INTERPRETED DEPOSITION RECORD IN A POND



Location and Significance of Delta – In the Characterization Plan, it was assumed that the final resting place of clays bearing Cs-137 would be a delta, which would occur at the juncture of the stream and the bay. It was assumed that the delta would advance into the bay by laying down deposits of sand over silt, and silt over clay. It was expected that the Cs-137 would be trapped in the clay deposits, at the bottom of the delta sequence. However, no delta was found in the bay. A delta did appear to be present in the middle of the Stream Mouth area, as shown by Figure 40. The delta deposits in the Stream Mouth appeared to be composed only of mixed silt and clay, deposited over peat. Sand was found in other locations, but did not appear to be part of the delta sequence.

The interpretation that the area marked in Figure 40 was a delta was reinforced by the observation that this was the primary area in which the stream channel frequently moved from east (1969 topographic map) to west (2005 airphoto).

Whereas locating the delta postulated in the Characterization Plan was useful in confirming the conceptual model, the expected sequence of deposits, with clay at the bottom, did not appear. Instead, it appeared that sand was mostly deposited in the stream channel further upstream, in the Flood Plain environment. The delta deposit was made only of silt, possibly gradational with clay. At the downstream end of the delta, in the vicinity of transects 3 and 5, this silt + clay deposit appeared to be roughly 2 feet thick. In transect 8 across the delta interval, in which land-derived materials interfingered with bay peat, the delta thickness appeared to increase to about 3 feet. In transect 7, the bottom of the delta interval appeared to be occurring in the deepest interval tested, with Cs-137 detected in some samples at 42-54". Based on Cs-137 detected in the bottom interval of samples SMG6, SMG8 and SMG14, it appears that the delta deposits are thicker than 54" from the SR-6 bridge on the South, to transect 7 on the North. Based upon the preceding interpretations, it appears that the sampling effort likely did not span the entire thickness of the delta between the bridge and transect 7, as shown by the dotted red line on Figure 40. Some deeper samples from this area were retained, available for analysis in the event that this situation should arise. It appears that the sampling effort did penetrate entirely through the delta materials of interest north of transect 7, and on toward the bay.

As shown by Figure 40, the most concentrated amounts of Cs-137 in the Stream Mouth appear to have been deposited in the bottom of the stream channel, between U.S. 6 and the delta.

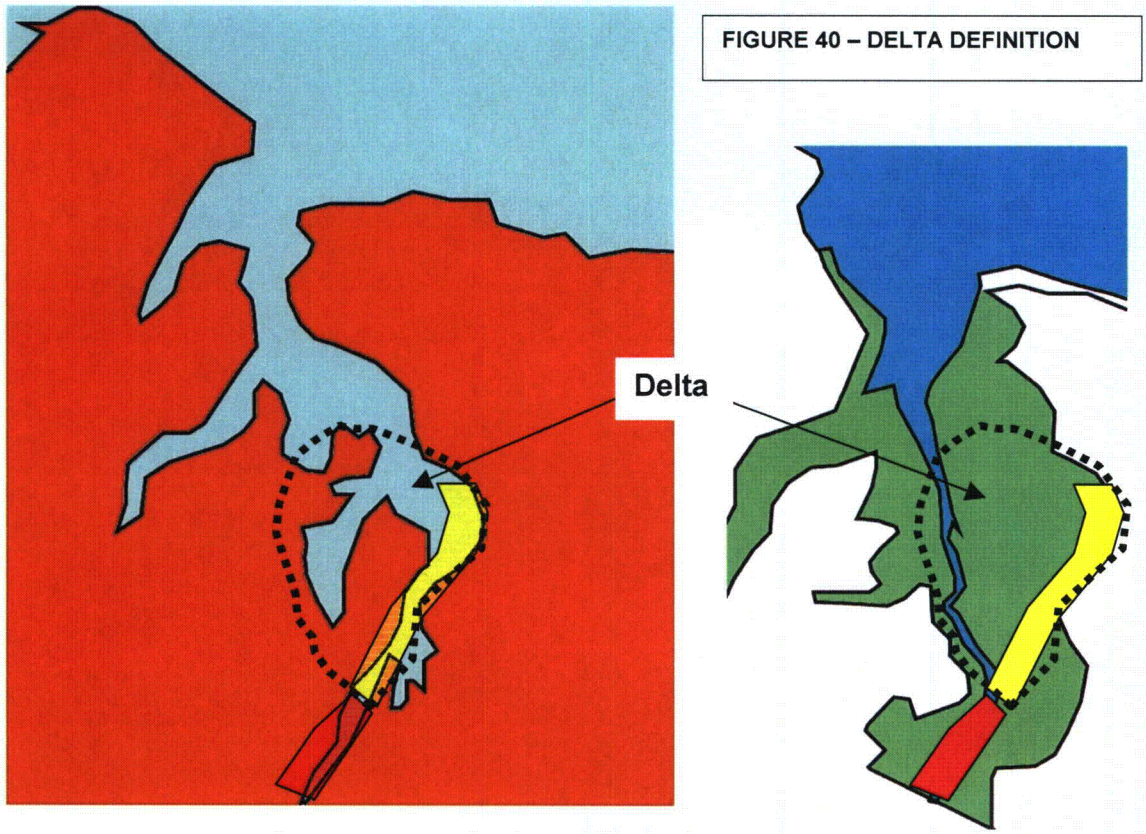
The delta represents the boundary between a normally standing-water environment (the bay), and a normally moving-water environment (the stream). However, depending upon the average and daily level of Lake Erie, the actual boundary between stream deposition and standing-water deposition may move upstream or downstream. Thus, temporary standing-water deposits may have been laid down upstream from the delta, and would then likely be eroded and redeposited downstream during periods of lower lake level.

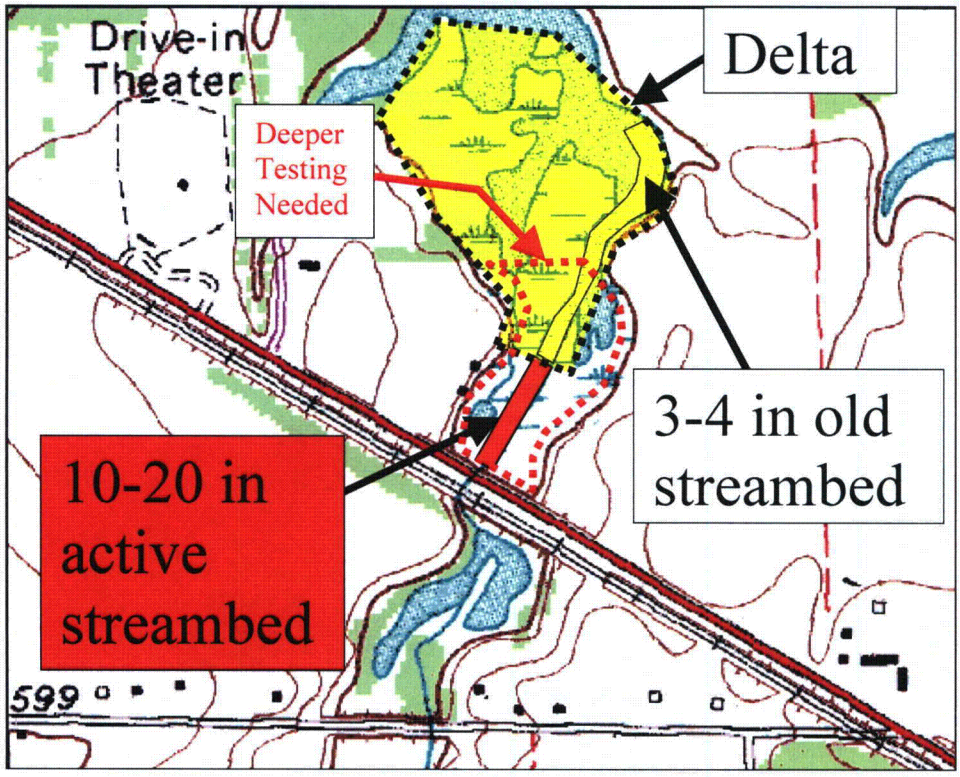
In particular, it appears that such erosion and re-deposition occurred in the Stream Mouth, in the area labeled "SCOUR AREA" on Figure 13, where there was evidence of scouring in the channel (the water was deeper there). In this area, values of Cs-137

approaching 3 pCi/g were found at greater depths than was typical in most other locations (2.6 pCi/g at 42-56.5" below the stream bottom surface). Thus, it was interpreted that higher levels of Cs-137 were temporarily deposited here during periods of low streamflow or high lake level, then were scoured and re-deposited a short distance downstream during periods of greater streamflow or lower lake level. The downstream location for deposition appears to be where an EMA occurred at location SM6-6. The re-deposition of scoured Cs-137 was spread over part of section A, upstream from the delta. Through the delta, represented by section C and the downstream values of 3.4 and 3.9 pCi/g, the scoured material was also redeposited, with lower Cs-137 activities (3-6 pCi/g).

The clays bearing low levels of Cs-137 appear to have been confined to a channel that extended all the way through the delta, and on out into the Bay. Through the delta and bay, the highest values of Cs-137 encountered appear to be in the range of 3-4 pCi/g.

FIGURE 40 – DELTA DEFINITION





ACCOUNTING FOR CS-137 KNOWN TO BE RELEASED

Inputs to the mass balance for Cs-137 include the amount of Cs-137 per gram of sediment, and the size of areas in which Cs-137 was found. The mass balance assessment is complicated by Cs-137 that is still moving, and by the consideration of radioactive decay.

Two previous reports in this series on Cs-137 in Plum Brook have attempted to assess the total amounts of Cs-137 found. One report assessed the amount of Cs-137 found in 3 ponds; the second report assessed the amount of Cs-137 that might be present in the eastern end of Sandusky Bay. The estimating methods used in each of those reports resulted in the appearance that the amount of Cs-137 found in those environments might have exceeded the total amount estimated to have been released from the PBRF. This could lead to either of the following conclusions:

1. More Cs-137 might have been released than NASA was aware of, or
2. The estimating methods over-estimated the amount of Cs-137 found

Examining the first point more closely, HaagEnviro judged that the original estimate by Jack Crooks was reasonable, but possibly not comprehensive. Although the assessment of Cs-137 distribution focused upon events that occurred in 1968 and 1969, the Crooks calculation of Cs-137 released from the PBRF was not confined to those dates. The Crooks calculation considered water that was discharged during all of the fueling cycles, over the entire duration of the PBRF's operation. However, additional Cs-137 may have been released when the level of radioactivity present was not detectable by the monitoring systems.

Other potential pathways of Cs-137 release to Plum Brook, such as water released through the sanitary system, may be evaluated as decommissioning continues. However, at the time of this writing, it is appropriate to maintain the working hypothesis that all of the Cs-137 released to Plum Brook came through the Water Effluent Monitoring System (WEMS).

Examining the second point more closely, HaagEnviro decided that the following three corrections should be made in the Cs-137 estimating process:

1. The magnitude of peat volume reductions should be taken as a factor of 3, not the previously employed factor of 5.

2. Rather than using an average of Cs-137 measurements, the "representative value", as defined in this report, should be employed.

3. The effect of radioactive decay since deposition should be computed in more detail.

Using these concepts, HaagEnviro prepared an estimate of PBRF Cs-137 found in the Stream Mouth as shown in the following table:

Stream Mouth Section	Affected Depth (ft)	Affected Area (ft^2)	Dry Mass (g)	Representative Cs-137 Activity (pCi/g)	Total Cs-137 Activity, (mCi)
B (highest layer)	1	50 x 300 = 15,000	578,850,000	8.9-BKGND	4.9
B (rest)	1	50 x 300 = 15,000	578,850,000	4.5-BKGND	2.3
A (highest layer)	0.5	(5/14) x (50 x 300) = 5,357	103,363,315	6.3 to 2.5 (use 4.4-BKGND)	0.4
A (rest)	1	(5/14) x (50 x 300) = 5,357	206,726,630	4-BKGND	0.7
C (highest layer)	1	(2/14) x (50 x 300) = 2,143	82,698,370	7-BKGND	0.5
C (rest)	1	(2/14) x (50 x 300) = 2,143	82,698,370	4-BKGND	0.3
Delta Channel (highest layer)	1	50 x 1000 = 50,000	1,929,500,000	2-BKGND	2.9
Rest of Delta	1	24.11 acres = 1,050,232	40,528,452,880	1-BKGND	20.3
Tributaries	1	14.09 acres = 613,760	23,684,998,400	1-BKGND	11.8
Rest of Area	0.5	7.82 + 13.22 acres = 916,502	17,683,906,090	1-BKGND	8.8
				TOTAL=	53.0 mCi

The areas used in the table are illustrated by Figure 41. The following assumptions and conversion factors were used:

Dry weight of soil = 85 pound per cubic foot (PCF)
Conversion to grams = 454 g/pound
Conversion to milliCuries (mCi) = $pCi/(10^9)$
Conversion to Square Feet (SF) = 43,560 SF/acre

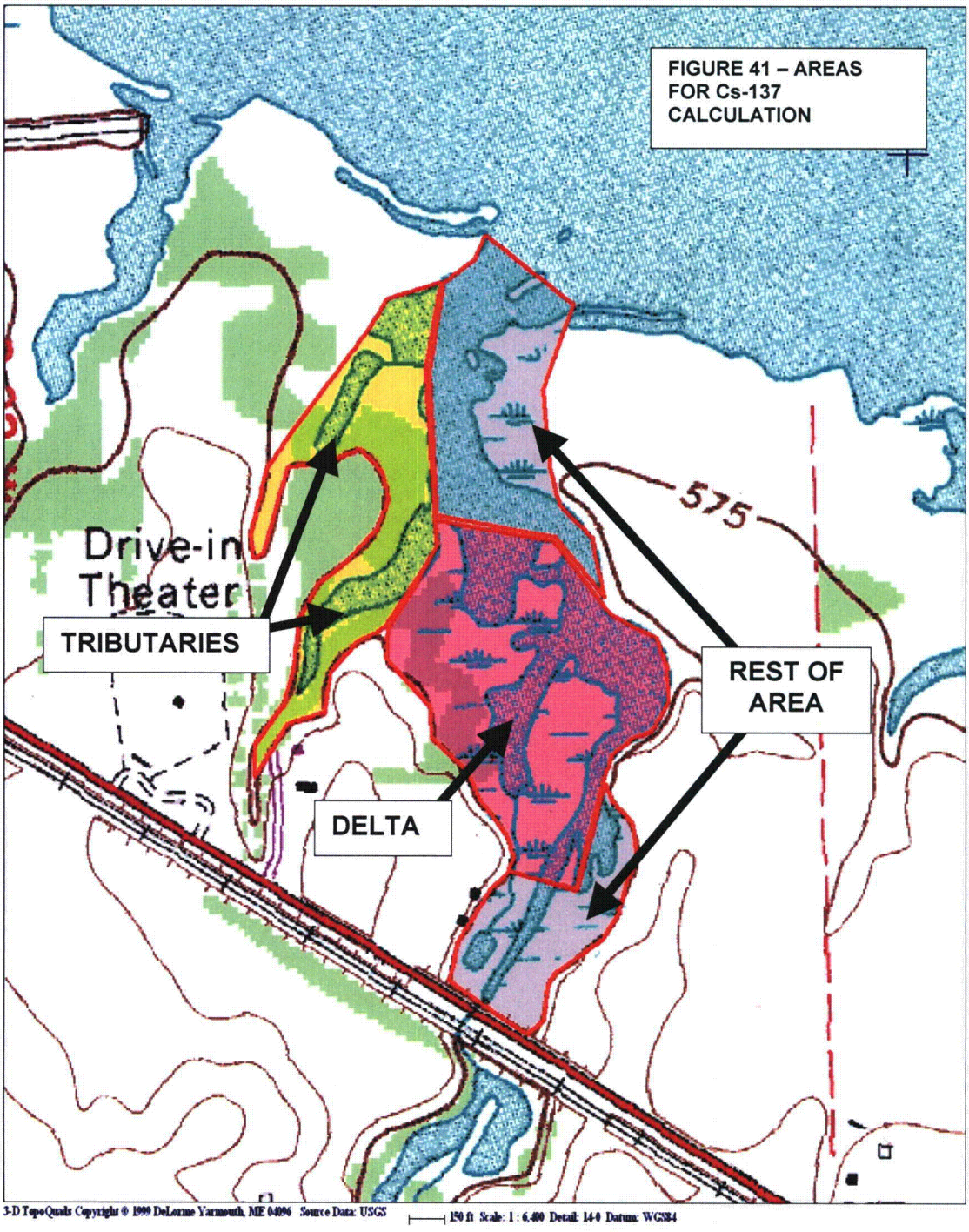
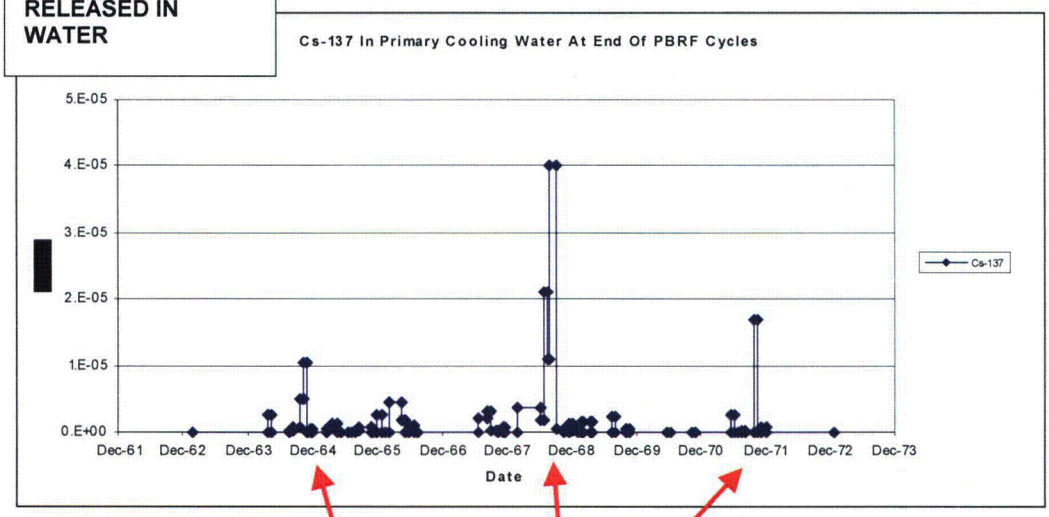


FIGURE 41 – AREAS FOR Cs-137 CALCULATION
575
Drive-in Theater
TRIBUTARIES
DELTA
REST OF AREA
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
150 ft Scale: 1 : 6,480 Detail: 14-0 Datum: WGS84

With these assumptions, the total Cs-137 activity found in the Stream Mouth area was 53 mCi . This value of 53 mCi is to be compared with the amount expected to remain from the original PBRF releases, which was roughly estimated as 2.5 mCi.

FIGURE 42 – Cs-137 RELEASED IN WATER



Year	% Cs-137 Released	mCi (released)	mCi (2007)
1964	14	0.7	0.26
1965	3	0.15	0.057
1966	6	0.3	0.12
1967	4	0.2	0.08
1968	55	2.75	1.13
1969	4	0.2	0.084
1970	0	0	0
1971	14	0.7	0.31
	100 % Total	5 mCi Total	2.041 mCi Total

The amount of Cs-137 that should be expected was computed in more detail as shown by Figure 42.

The result of the more detailed computation is an expected residual radioactivity of 2.04 mCi (round to 2 mCi), a 20% reduction from the prior rough estimate.

With the preceding assumptions, the PBRF Cs-137 that may be located in the Stream Mouth depositional environment (53 mCi) was much larger than the amount accounted for in our release estimates (2 mCi). Even the amount found in the 3 most thoroughly-assessed Stream Mouth areas (9.1 mCi) was 4 .5 times the amount attributed to the PBRF releases (2 mCi).

At the time of this writing, HaagEnviro estimated the amount of presently-measurable Cs-137 activity from the PBRF at roughly 100 mCi, distributed approximately as follows:

37% Excavated from Pentolite Ditch, placed near southern bank
9% Stream Mouth Areas A-C
42% Stream Mouth other areas
10% In front of WEMS
1%: Stream Meanders
1%: Stream Backwaters
Not estimated: Flood Plain
Not estimated: Bay

The estimating assumptions employed are detailed in Appendix C. In the calculation for the Stream Mouth, it should be noted that the largest contribution, by far, came from the assumption of a value of 1 pCi/g, to a depth of 6-12 inches, over the very large areas of the Delta, Tributaries, and Rest of Area.

IDENTIFY CS-137 DEPOSITS STILL IN TRANSIT

It appeared that the surface of the Stream Mouth depositional environment was continuing to receive PBRF Cs-137 at low levels (<3 pCi/g, most likely nearer 1 pCi/g). It appeared likely that most of this Cs-137 moved during flood events, when eroded from upstream deposits, and redistributed downstream. The most significant such flood events likely continued to cover the entire Stream Mouth area with water carrying clays with Cs-137.

The immediate downstream side of the bridge over U.S. Route 6 appeared to be a location in which clays bearing Cs-137 were deposited, then scoured out and redeposited. As illustrated schematically in Figure 43 below, the scoured area of the stream bottom appeared to constitute less than a third of Area B, at its southern end. The depositional area for this scoured material appeared to be the upstream half of section A, marked

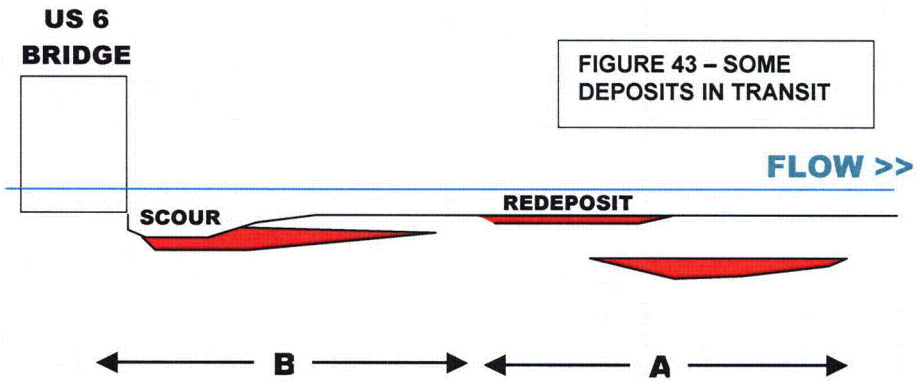


FIGURE 43 – SOME DEPOSITS IN TRANSIT

"redeposit" on Figure 43. The schematic illustrates two buried deposits that would not be expected to move unless they were reached by scour. The deeper deposit, in the

downstream part of section A, was barely revealed in testing results. The deposit illustrated in section B was quite clearly defined by testing results.

The soils bearing Cs-137 that are shown in the area marked "redeposit" would be available to move further downstream. Although this area contained the most elevated Cs-137 activity detected in the Stream Mouth (20.6 pCi/g), the "representative" value for this deposit, defined by the methods in this report, spanned a range of only 6.3 pCi/g (upstream) to 2.5 pCi/g (downstream).

LOCATE FINAL RESTING PLACES OF CS-137 NO LONGER IN TRANSIT

Based upon data presented here, it was interpreted that clays bearing Cs-137 in 1969 were deposited at depths later covered to 30-42 inches below the 2006/2007 stream bottom, in Section A. Those deposits appeared to be beyond the reach of scouring from the stream in 2007.

It was interpreted that, some time after 1969, clays bearing Cs-137 were deposited at depths later covered to 6-18 inches below the 2006/2007 stream bottom in section B. It was considered that those section B deposits may have been contemporaneous with clays bearing Cs-137 in area C and further downstream in the delta, at depths later covered to 18 inches below the in-filled ground surface levels found in 2007. It was considered that these section B, C, and delta deposits may have been derived from deposits further upstream, possibly originating in the part of the Flood Plain that was dredged sometime between 1969 and 2005 (see Flood Plain report).

Subsequent delta deposition covered those deposits with materials of lower Cs-137 activity. When the stream channel changed direction in the delta between 1969 and 2005, many of those deposits were removed from further potential erosion. As a result, low-level deposits of Cs-137 appeared to be trapped in buried parts of this channel that extended through the delta and on out into East Sandusky Bay. Peak Cs-137 activities in the now-buried channels appeared to be in the range of 3-6 pCi/g. It appeared likely that such buried deposits were scattered along the dashed blue line in Figure 44.

The preceding interpretations are summarized as follows:

1. 1969 Cs-137 deposition in section A, buried deeper than 30 inches below active stream bottom in 2007

2. 1969 Cs-137 deposition upstream in Flood Plain area

3. Post-1969 dredging of Flood Plain Cs-137, with re-deposition downstream in Stream Mouth sections B, C, delta, and bay

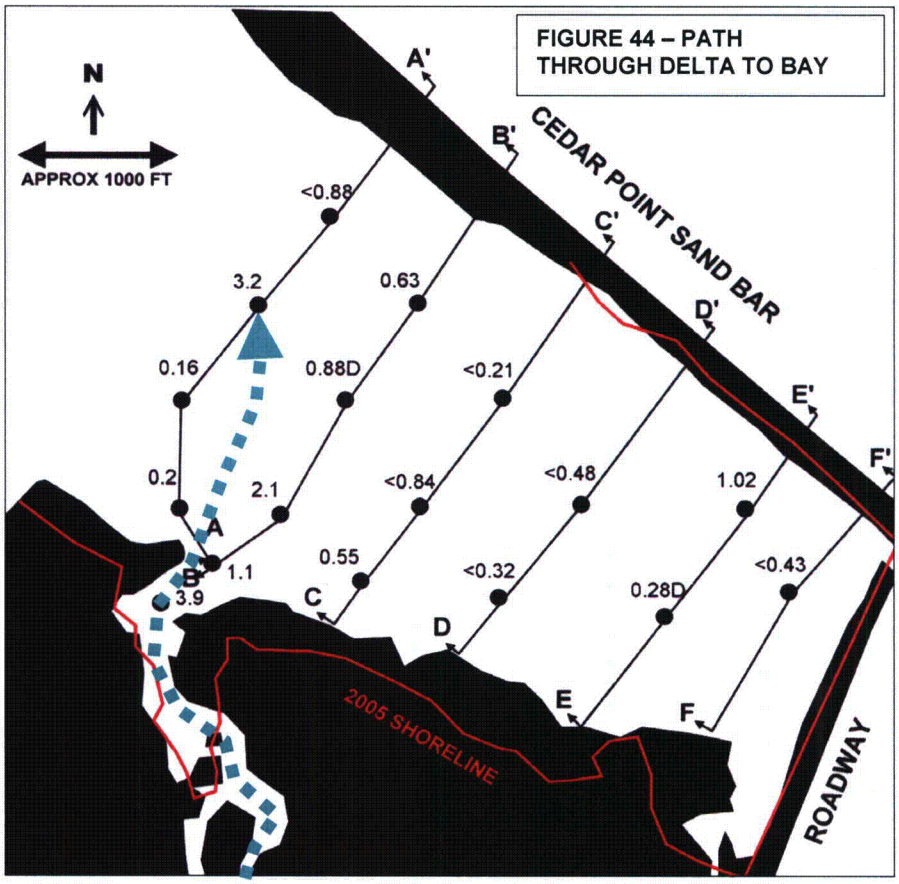
4. Post-1969 dredging re-deposits covered by materials of lesser Cs-137 activity; in 2007 buried deeper than 6 inches in active stream bottom, buried deeper than 18

inches in abandoned channel, and buried deeper than 54 inches in near-bay end of Stream Mouth

5. 2006/2007 scour from section B, with re-deposition in section A, responsible for highest Stream Mouth activity, found in upper 6 inches of stream bed

Reinterpretation of Bay Results - In light of the Stream Mouth interpretations, it became reasonable to interpret that Cs-137 values equaling or exceeding 3 pCi/g, found in the Bay, were a continuation of the pattern described in the Stream Mouth. Re-examining the data from the Bay report led to the interpretation that the main part of Cs-137 deposition in the Bay followed a channel to the west, as shown in Figure 44. The values found continued to be well below 12 pCi/g, and the conclusions of the Bay report continued to be valid, except that it did appear that PBRF Cs-137 might actually be distinguishable from background Cs-137 in the bay. The original bay report had concluded that a distinction between background and PBRF Cs-137 could not be made.

The fact that the bay value marked 3.2 pCi/g in Figure 44 occurred in the upper 6 inches of a bay sample indicates that some of the material eroded from Stream Mouth section B may have been delivered to the Bay as recently as 2006/2007.



CHARACTERISTICS OF CS-137 DEPOSITS THAT AFFECT REMOVAL

Lognormal Distribution – The distribution of Cs-137 testing results affects the decision on whether or not sediments should be removed. A key issue is that lognormally distributed results cannot be directly compared to a Derived Concentration Guideline Limit (DGCL) value. This is because the assumption that underlies the DCGL calculation is a uniform distribution, not the lognormal distribution observed in the field.

The key problem to be solved to make a reasonable comparison is to determine what is the "representative" activity or concentration being delivered by a deposit that contains Cs-137 in a lognormal distribution. In evaluating the geologic patterns of Cs-137 deposition, a trend line fit to log-transformed results typically delivers a useful "representative" value or pattern. In evaluating the radiation dose delivered by a lognormal distribution, the "representative" activity should be considered the center of gravity of the distribution. This center of gravity is not determined by the arithmetic mean of the measurements. It can be determined by finding the equation of the distribution's histogram curve, then finding the activity at which half the area under the curve lies to either side of that activity. An example follows.

After 4 values judged not part of the deposit were edited out, the following peak Cs-137 measurements, in pCi/g, were obtained in Section B of the Stream Mouth: 5, 5, 6, 7, 7, 7, 9, 9, 11, and 16. A histogram of those peak deposit values follows:

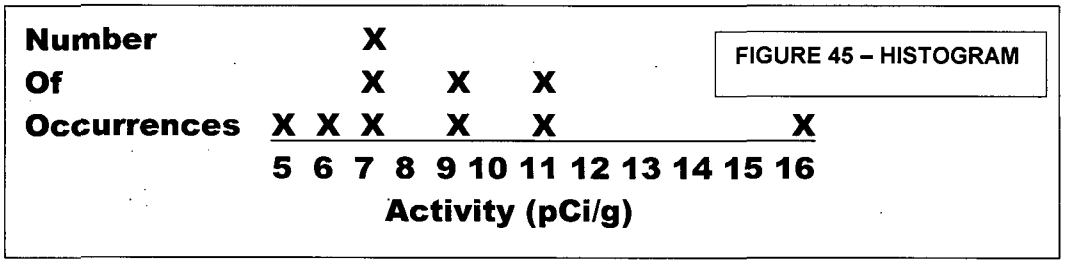


FIGURE 45 – HISTOGRAM

If we fill out this histogram to create a continuous curve, we obtain the following:

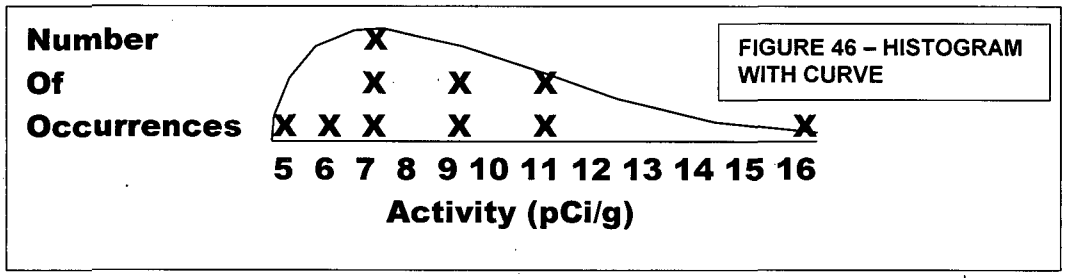


FIGURE 46 – HISTOGRAM WITH CURVE

Without the original observations, we have the following curve, which we can divide into equal areas to the left and right of the "center of gravity" of the area under the curve.

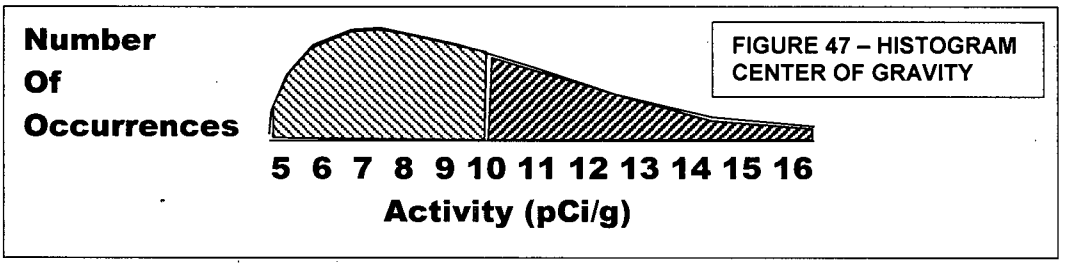


FIGURE 47 – HISTOGRAM CENTER OF GRAVITY

By this analysis, the "representative" activity in the Area B sediment layer with the highest Cs-137 activities would be slightly less than 10 pCi/g. Note that the "representative" value determined for this section, by fitting a line to the logs of the measurements, was 8.9 pCi/g (fairly close to 10, considering the simplicity of this example).

The direct exposure aspect of the DCGL calculation assumes that all of the soil in the area surrounding the maximally exposed individual has the same Cs-137 activity, as illustrated in Figure 48 for a DCGL of 12 pCi/g:

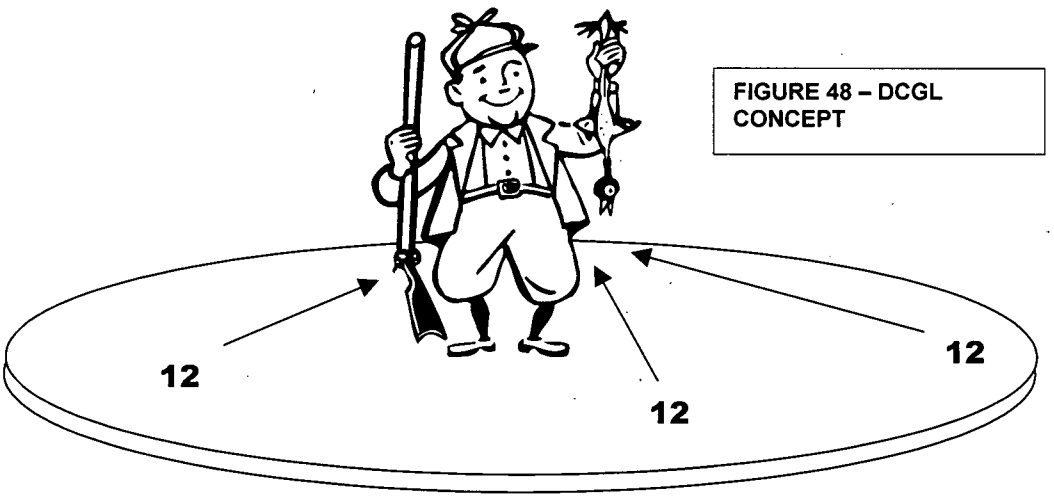


FIGURE 48 – DCGL CONCEPT

However, when the Cs-137 distribution is lognormal, and not uniform, the same individual might walk over individual activity measurements as high as 16 pCi/g, but be exposed to an equivalent radioactivity of only 10 pCi/g, as illustrated by Figure 49.

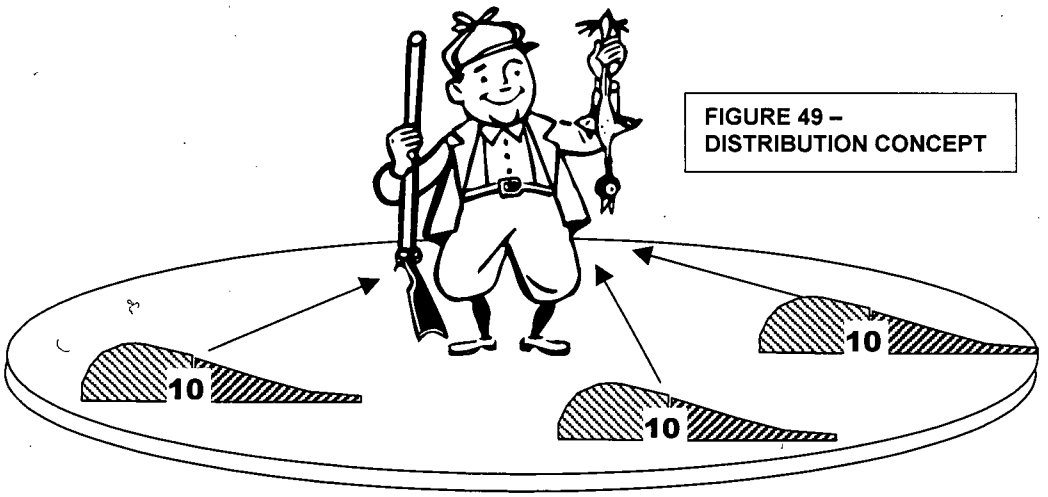


FIGURE 49 –
DISTRIBUTION CONCEPT

One way in which this discrepancy might be overcome would be to take a dose approach to determining what sediment should be removed, rather than employing the DCGL concept. Another approach might be to compare the "representative" value, as defined in this report, to the DCGL. Yet another approach would be to use a Cs-137 input with a lognormal distribution in the RESRAD computer model, to define the input that delivers a dose of 25 mRem/year. If any of these approaches were employed, it appears likely that the conclusion would be that removal of many sediment deposits would not be necessary in order to achieve the required dose <25 mRem/year.

Precision and Accuracy – It has been observed in prior studies in this series that the practical quantitation limit (PQL) for testing values in this project is 3 pCi/g. Below that value, the precision DQI of ±20% cannot be reliably achieved. In such cases, the differences between one result and another are only approximations, and cannot be relied upon as meaningful. Based upon the graph provided in the current study as Figure 37, it appears that the accuracy DQIs of 80-120% can only be achieved when the measured values span the range at least as high a 4.5-18 pCi/g, with a "representative" value at least as high as 9 pCi/g.

Number of Samples Required – As the "representative" value approaches the current remedial target of 12 pCi/g, the number of samples required to achieve 95% confidence, that the "representative" value is less than the target, increases. A trial calculation suggested that, when the variance of the log-transformed values is 0.15, the power of the statistical test is 1.0, and the "effect size" is |12-9| pCi/g, the number of samples required to achieve 95% confidence would be at least 25. These preliminary calculations employed only the most elevated activity values at each sampling location. If all of the samples containing Cs-137 from PBRF were employed, then it is possible that there would be a sufficient number of samples to support the conclusion at the 95% confidence level.

Ease of reaching the contaminated sediment with remediation equipment – Overland access to key parts of the Stream Mouth would be relatively straightforward. Overland access can be achieved from an Erie MetroParks parking area, illustrated in Figure 50. If fixed equipment could remain in that paved area, hoses could be extended roughly 200 feet to the stream, without significant impact to the vegetation.

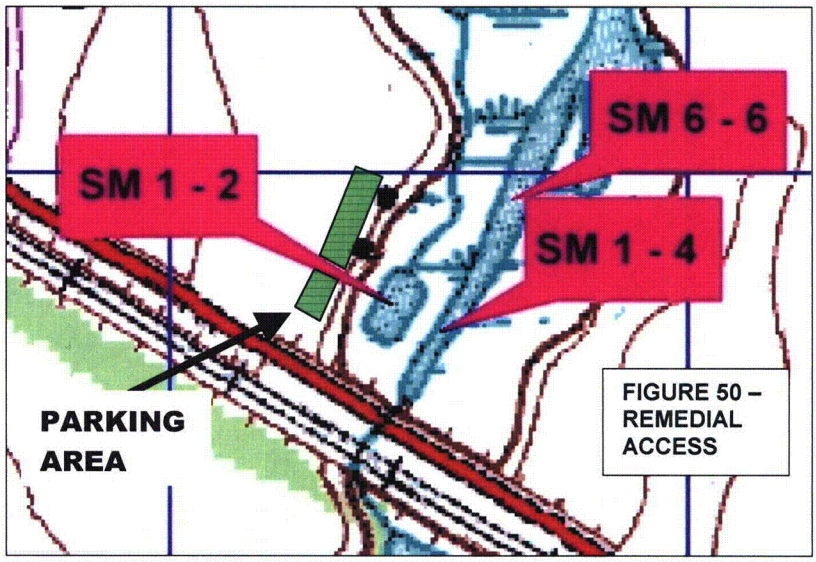


FIGURE 50 – REMEDIAL ACCESS

Water access can be achieved from East Sandusky Bay, but water depths in the Stream Mouth become very shallow, such that boats can draw only a few inches in some places. For this reason, MetroParks canoes were used to transport the sampling equipment for this study. The nearest commercial boat access is roughly 2 miles to the west, and is the point at which HaagEnviro put in its pontoon boat for bay sampling.

Ease of removing only the contaminated sediment – The lateral limits of deposits that contain individual results that may exceed cleanup standards can be defined by the methods used in this study. As illustrated by Figure 51, the parts of the sediment that

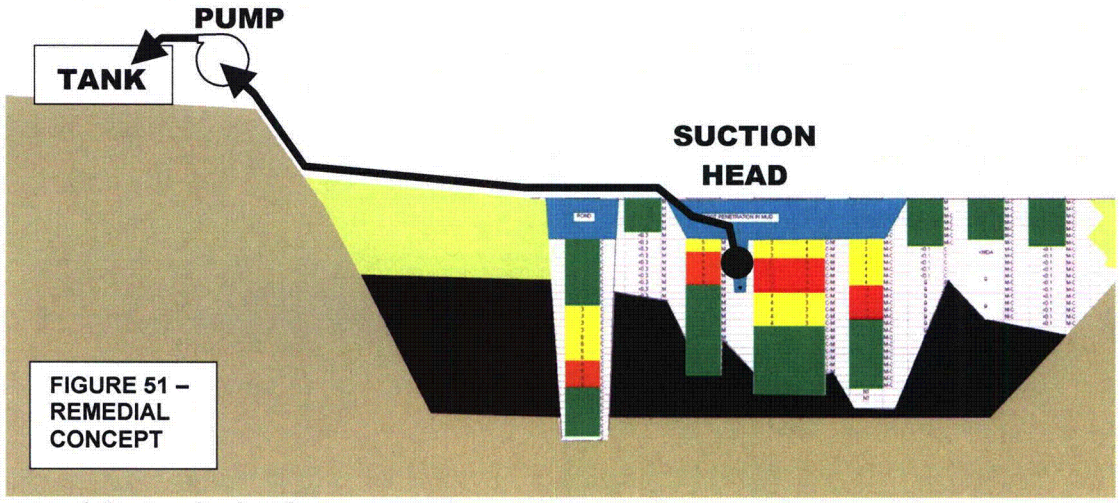


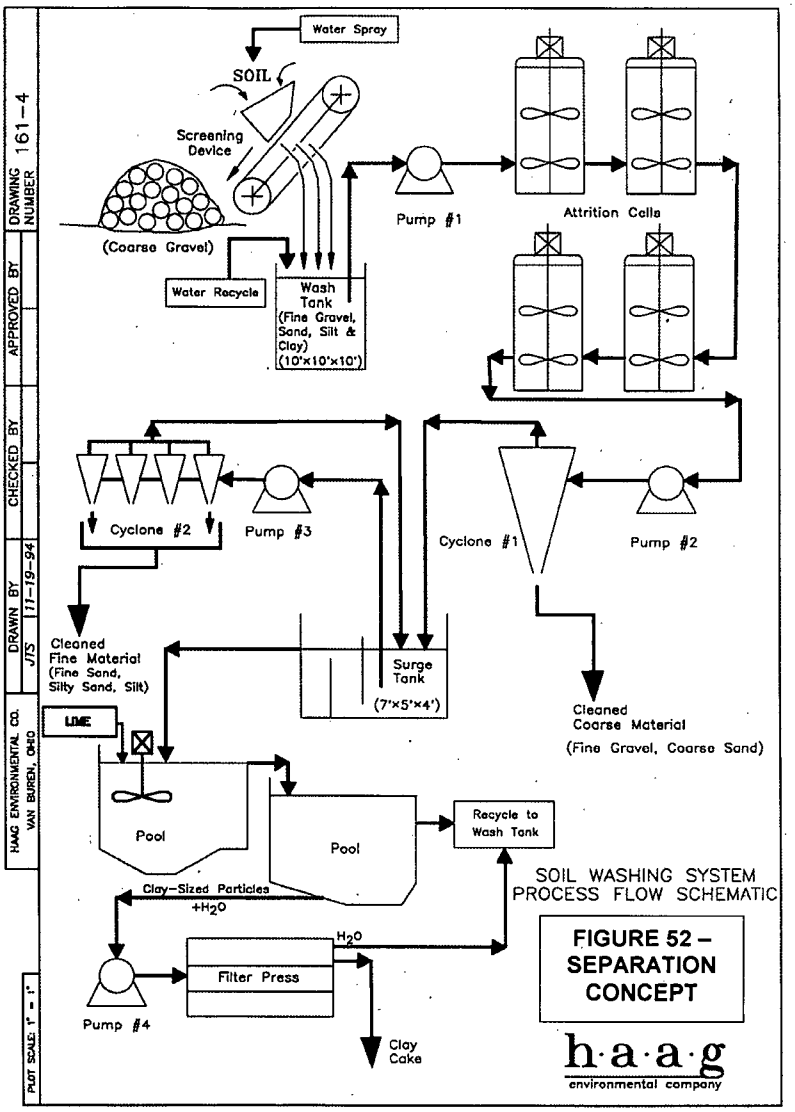
FIGURE 51 – REMEDIAL CONCEPT

exceed those criteria often occur in layers that underlie materials that might not exceed the standards. Segregation of these layers would not likely be feasible. Once the key layers are removed, it is likely that the combined material removed would no longer

exceed the cleanup criteria, due to mixing of the layers, and due to mixing of the lognormally distributed Cs-bearing particles.

Removal of contaminated layers, in the Stream Mouth setting, would most likely be performed using land-based hydraulic dredging equipment, such as that illustrated in Figure 51. This approach would generate a slurry of water and sediment. The sediment slurry would then be processed to remove water, at a minimum. Potentially, the processing could also segregate the Cs-bearing soils from the balance of the material.

Ease of separating contaminated clay from other materials – NASA has not studied segregation of clay particles from coarser materials on this project. However, others have performed such work, on other projects in the past. For example, HaagEnviro set up and operated a trial system of this type in 1994, as illustrated by Figure 52. The primary function of the system illustrated here was to segregate contaminated clays from other soil types, and to concentrate those contaminated clays in a dry cake, for disposal.



Summary of Interpretations – Cs-137 from the PBRF was found in the Stream Mouth depositional environment, at levels that appeared unlikely to deliver a dose >25 mRem/year to the maximally exposed individual. In some cases, Co-60 from the PBRF was also present. The most elevated levels of Cs-137 detected were in transit, through a process of sediment erosion and re-deposition. The highest Cs-137 activity in transit was 20.6 pCi/g, but the "representative" value for this deposit was a range of only 2.5-6.3 pCi/g. Downstream from the most elevated deposit, the erosion and re-deposition process was seen to have moved levels of Cs-137 in the stream mouth and bay that peaked in the range of 2-4 pCi/g.

APPENDIX A

FIELD PROCEDURES

PROCEDURE FOR SAMPLING EQUIPMENT DECONTAMINATION

This procedure describes the general method to be used for decontamination of sampling devices that are re-used, such as water level indicators or sampling pumps. The purpose of decontamination is to remove all solid and liquid residues from prior samples before taking a new sample.

PRIOR PROCEDURES REQUIRED

- None

EQUIPMENT REQUIRED

- Metal wash tub
- Boot sprayer
- Distilled water
- Detergent
- Sample gloves
- Paper towels
- Trash bag
- Knife or scissors
- Plastic sheeting

PROCEDURE

1. Don sample gloves, use knife or scissors to detach all sample string, and completely disassemble the sampling device.
2. Place device in tub, with a small amount of detergent and distilled water.
3. Scrub all parts with detergent and distilled water to remove visible solid residues.
4. Run detergent and water through interior of sampling equipment.
5. Remove equipment and rinse off detergent with distilled water.
6. Place equipment on clean plastic sheeting.
7. Dry equipment with paper towels, or allow to air dry.
8. Place all solid waste (sampling gloves, paper towels, string, etc.) into trash bag, to return to PBRF. Discard water on ground.

PROCEDURE FOR GEOPROBE DUAL-TUBE SAMPLING

This procedure is for sampling soils using Geoprobe tools, and a manual or powered driving device.

PRIOR PROCEDURES REQUIRED

- Sampling Equipment Decontamination

EQUIPMENT REQUIRED

- Clear 60" Geoprobe sampling tubes
- One red and one black sampling tube end caps
- 60" Geoprobe dual-tube sampler
- Geoprobe adapter from sampler to 1" drill rod
- Geoprobe drive cap
- 3' long by 1" diameter drill rods
- Manual driver, or hydraulic probe driver
- Tape measure
- Hacksaw
- Field notebook, Sharpie fine point marker
- Waterproof duct tape

PROCEDURE

For each 60-inch depth sampled, the following steps will be performed.

1. Assemble sampler by inserting inner plastic tube inside outer steel tube
2. Drive sampler into sediment
3. Extract inner plastic tube, with sample inside
4. Cut off tube to length of recovered sample ends with decontaminated hacksaw
5. Cap the top of the tube with a black cap, bottom with a red cap
6. Label tube with sample location and depth interval
7. Measure down 6" from top of sample and mark with Sharpie. Measure down 12" from that mark and make another mark. Continue making marks every 12" for the remaining core.
8. Tape the end caps to limit leakage
9. Record observations in field notebook

PROCEDURE FOR VIBRACORE SAMPLING

Sampling of soft sediments from a depth of 0-10 feet may be accomplished with a vibracore setup, involving a large-diameter (3-inch) aluminum tube, top caps to create a sample-retaining suction, and a vibration-inducing driver. The sampling tube will be driven to refusal or a maximum depth of 10 feet (120 inches). Some stick-up above the ground or water surface is needed, to facilitate retrieval. Sample recovery will be determined as length of sample recovered divided by length driven.

PRIOR PROCEDURES REQUIRED

- Sampling Equipment Decontamination

EQUIPMENT REQUIRED

- Clean, new aluminum sampling tubes, 3-inch diameter by 10-foot length
- Two end caps per sample
- Backpack-style gasoline-powered concrete consolidation vibrator
- Sharpie fine point marker
- Duct tape
- Tape measure
- Hacksaw

PROCEDURE

1. Assemble sampler by clamping vibrator to top of tubing.
2. Vibrate sampler into soft sediment, until refusal or full depth is reached.
3. After driving to total depth, measure depth to top of sample, inside tube.
4. Place end cap on top of tubing, to create an airtight seal.
5. Pull tube out of ground.
6. Place a cap on bottom end of tube (if sampling in water, put bottom cap on while tube end is still under the water surface, to maintain suction).
7. Remove top cap, again measure distance to top of sample, to determine if sample loss occurred during tube extraction.
8. Cut tubing to length of sample with decontaminated hacksaw; replace top cap.
9. Label the tube with sample location, depth interval, and "TOP".
10. (In sample processing trailer) Measure down 6" from top of sample and mark with Sharpie. Measure down 12" from that mark and make another mark. Continue making marks every 12" down to 54".
11. Tape the top and bottom caps to avoid leakage, if needed.
12. Record observations in field notebook.

APPENDIX B

LABORATORY RESULTS
(Provided as a separate computer file named 309PB-MouthResultsSpreadsheet_08FEB08.xls)

08-Feb-08

SM1-1A

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	~~0.242~~	0.148	#	**57.74**	0.14	**-0.046**	NO		
3-6									
6-9									
9-12	<MDA	0.115	B<						
12-15									
15-18									
18-21									
21-24	0.57	0.168	#	40	0.229	0.173	OK		
24-27									
27-28									
28-33									
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

(This location was re-sampled with Geoprobe: see SM1-1B)

= Vibracore

= Geoprobe

DETECTIONS ARE COLOR-CODED AS FOLLOWS:

IN TOP 6 INCHES
IN MID-CORE
AT BOTTOM OF CORE

08-Feb-08

SM1-1B

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6	0-6	~~0.218~~	0.123	#	**55.47**	0.121	**-0.026**	NO		
6-9										
9-12										
12-15	6-18	~~0.136~~	0.154	#A	**93.58**	0.128	**-0.146**	NO		
15-18										
18-21										
21-24										
24-27	18-30	<MDA	0.157	B<						
27-30										
30-33										
33-36										
36-37										
37-42										
42-45										
45-48										
48-51	30-42	<MDA	0.182	B<						
51-54										
54-57										
57-60										
60-63										
63-65										
65-69										
69-72										
72-75	42-58.5	<MDA	0.051	B<						
75-78										
78-81.5										
81.5-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM1-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3	1.153	0.17	#	28.28	0.328	0.655	OK			0.945
3-6										
6-9										
9-12	1.66	0.105		13.28	0.226	1.329				1.315
12-15										
15-18										
18-21										
21-24	2.23	0.09		10.64	0.247	1.893				2.196
24-27										
27-30										
30-33										
33-36	3.052	0.076		9.16	0.294	2.682				3.177
36-39										
39-42										
42-45										
45-48	5.718	0.121		6.93	0.434	5.163				5.471
48-51										
51-54										
54-57										
57-60	7.737	0.159		6.38	0.544	7.034				
60-63										
63-66										
66-69										
69-72	0.958	0.149		22.27	0.215	0.594				
72-75										
75-78										
78-81										
81-84	<MDA	0.042	B<							
84-85										
85-87										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM1-3

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6	0-6	0.935	0.222		35.92	0.337	0.376			
6-9										
9-12										
12-15	6-18	<MDA	0.268	B<						
15-18										
18-21										
21-22										
22-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45	18-30	~~0.386~~	0.236	#	**57.74**	0.223	**-0.073**	NO		
45-48										
48-49										
51-54										
54-57										
57-60										
60-63										
63-66										
66-68										
68-72										
72-75										
75-78	30-42	<MDA	0.234	B<						
78-80										
80-84	42-49	<MDA	0.14	B<						
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM1-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	3.349	0.088		8.32	0.296	2.965			
3-6									
6-9	11.698	0.122		4.51	0.639	10.937			
9-12									
12-15									
15-18									
18-21	4.11	0.117		7.8	0.343	3.65			
21-24									
24-27									
27-30									
30-33	2.882	0.094		9.65	0.292	2.496			
33-36									
36-39									
39-42									
42-45	2.022	0.08		10.68	0.225	1.717			
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-77									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-4Relocate

Depth (inches)	Original SM1-4 Result (Cs-137)	Relocate Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3	3.349	4.18	0.122		12.6	0.541	3.517				3.557
3-6											
6-9	11.698	15.661	0.141		5.51	0.989	14.531			15.014	14.835
9-12											
12-15											
15-18											
18-21	4.11	3.333	0.086		11.85	0.407	2.84				3.429
21-24											
24-27											
27-30											
30-33	2.882	2.4	0.138		15.21	0.372	1.89				2.253
33-36											
36-39											
39-42											
42-45	2.022	1.933	0.138		17.02	0.334	1.461				1.938
45-48											
48-51											
51-54											
54-57											
57-60											
60-62											
62-66											
66-69											
69-72											
72-75											
75-78											
78-81											
81-84											
84-87											
87-90											
90-93											
93-96											
96-99											
99-102											
102-105											
105-108											
108-111											
111-114											
114-117											
117-120											

08-Feb-08

SM1-4Bound1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	5.313	0.091		9.64	0.538	4.684			
3-6									
6-9	5.278	0.129		9.47	0.524	4.625			
9-12									
12-15									
15-18									
18-21	3.418	0.094		12.24	0.431	2.893			
21-24									
24-27									
27-30									
30-33	<	0.203	B<						
33-36									
36-39									
39-42									
42-45	<	0.167	B<						~~0.098~~
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-67									
67-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-4Bound2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	5.137	0.136		9.89	0.53	4.471			
3-6									
6-9	8.53	0.124		7.28	0.67	7.736			
9-12									
12-15									
15-18									
18-21	1.879	0.076		14.78	0.284	1.519			
21-24									
24-27									
27-30									
30-33	1.064	0.108		20.91	0.225	0.731			
33-36									
36-39									
39-42									
42-45	1.185	0.118		23.25	0.278	0.789			
45-48									
48-51									
51-54									
54-57									
57-60									
60-62									
62-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-4Bound3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	4.035	0.082		10.53	0.443	3.51			
3-6									
6-9	11.926	0.142		6.15	0.814	10.97			
9-12									
12-15									
15-18									
18-21	3.513	0.083		11.34	0.412	3.018			
21-24									
24-27									
27-30									
30-33	2.46	0.089		14.04	0.354	2.017			
33-36									
36-39									
39-42									
42-45	2.631	0.135		13.59	0.366	2.13			
45-48									
48-51									
51-54									
54-56									
56-60									
60-62									
62-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-4Bound4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3									
3-6	2.474	0.115		13.38	0.339	2.02			
6-9									
9-12									
12-15	6.672	0.081		8.11	0.577	6.014			
15-18									
18-21									
21-24									
24-27	8.486	0.075		6.94	0.645	7.766			
27-30									
30-33									
33-36									
36-39	3.061	0.088		12.52	0.394	2.579			
39-42									
42-45									
45-48									
48-51	2.199	0.084		14.4	0.323	1.792			
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-4Bound5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	3.017	0.081		12.1	0.377	2.559			
3-6									
6-9	4.268	0.127		10.43	0.463	3.678			
9-12									
12-15									
15-18									
18-21	13.502	0.143		6.04	0.909	12.45			
21-24									
24-27									
27-30									
30-33	2.719	0.084		12.96	0.362	2.273			
33-36									
36-39									
39-42									
42-45	2.455	0.144		14.48	0.363	1.948			
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-65									
65-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-4Bound6

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	3.102	0.087		12.31	0.393	2.622			2.769
3-6									
6-9	11.435	0.087		6.43	0.816	10.532			
9-12									
12-15									
15-18									
18-21	2.667	0.084		13.1	0.358	2.225			
21-24									
24-27									
27-30									
30-33	1.752	0.089		16.61	0.296	1.367			
33-36									
36-39									
39-42									
42-45	1.878	0.129		16.56	0.316	1.433			
45-48									
48-51									
51-54									
54-55.5									
55.5-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.609	0.056		22.36	0.137	0.416			
3-6									
6-9	0.21	0.053	#	37.14	0.078	0.079	OK		
9-12									
12-15									
15-18									
18-21	<MDA	0.093	B<						
21-24									
24-27									
27-30									
30-33	~~0.151~~	0.085	#	**55.47**	0.084	**-0.018**	NO		
33-36									
36-39									
39-42									
42-45	~~0.111~~	0.117	#A	**75.59**	0.084	**-0.09**	NO		
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-76									
78-81									
81-84									
84-87									
87-90									
90-93									
93-94									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-6

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.907	0.082		18.86	0.173	0.652			
3-6									
6-9	0.833	0.081		19.58	0.165	0.587			
9-12									
12-15									
15-18									
18-21	<MDA	0.06	B<						
21-24									
24-27									
27-30									
30-33	~~0.245~~	0.134	#	**62.72**	0.154	**-0.043**	NO		
33-36									
36-39									
39-42									
42-45	~~0.042~~	0.078	#A	**100**	0.042	**-0.078**	NO		
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-92.5									
93-94									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM1-7

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.941	0.078		17.49	0.167	0.696			
3-6									
6-9	0.176	0.078	#	46.77	0.082	0.016	OK		
9-12									
12-15									
15-18									
18-21	<MDA	0.09	B<						
21-24									
24-27									
27-30									
30-33	<MDA	0.059	B<						
33-36									
36-39									
39-42									
42-45	<MDA	0.086	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM2-1

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0-6	~~0.196~~	0.235	#A	**93.81**	0.184	**-0.223**	NO		
3-6										
6-9	6-18	<MDA	0.062	B<						
9-12										
12-15										
15-18										
18-21	18-30	~~0.064~~	0.05	#	**70.71**	0.045	**-0.031**	NO		
21-24										
24-27										
27-30										
30-33	30-47	~~0.062~~	0.064	#A	**88.81**	0.055	**-0.057**	NO		
33-36										
36-39										
39-42										
42-45										
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69										
69-71										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM2-2

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0-6	0.3	0.13	#	48.51	0.146	0.024	OK		
3-6										
6-9										
9-12	6-18	~~0.083~~	0.047	#	**55.47**	0.046	**-0.01**	NO		
12-15										
15-18										
18-21										
21-24	18-30	<MDA	0.038	B<						
24-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45										
45-48										
48-51	30-47	<MDA	0.063	B<						
51-54										
54-57										
57-60										
60-63										
63-66										
66-71										
71-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM2-3

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6	0-6	0.76	0.316		45.08	0.343	0.101			
6-9										
9-12										
12-15	6-18	~~0.343~~	0.23	#	**66.14**	0.227	**-0.114**	NO		
15-18										
18-21										
21-24										
24-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45										
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69	18-30	<MDA	0.174	B<						
69-72										
72-75										
75-78										
78-81	30-42	<MDA	0.04	B<						
81-84										
84-87										
87-90	42-49.75	<MDA	0.139	B<						
90-91.75										
91.75-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM2-4

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6	0-6	0.847	0.259		40.82	0.347	0.241			
6-9										
9-12										
12-15	6-18	~~0.495~~	0.235	#	**51.61**	0.256	0.004	NO		
15-18										
18-21										
21-24										
24-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45	18-30	~~0.452~~	0.304		**59.65**	0.27	**-0.122**		**Reject**	
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75	30-42	<MDA	0.192	B<						
75-78										
78-81										
81-84										
84-87	42-49.5	<MDA	0.195	B<						
87-88.5										
88.5-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM2-5

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6	0-6	1.281	0.205		29.49	0.38	0.696			
6-9										
9-12										
12-15	6-18	~~0.317~~	0.179	#	**55.47**	0.176	**-0.038**	NO		
15-18										
18-21										
21-24										
24-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45	18-30	~~0.501~~	0.347	#	**68.06**	0.341	**-0.187**	NO		
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75	30-42	<MDA	0.461	B<						
75-78										
78-81										
81-84	42-48.5	<MDA	0.168	B<						
84-87.5										
87.5-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM2-6

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6	0-6	1.264	0.33	#	35.34	0.448	0.486	OK		
6-9										
9-12										
12-15	6-18	<MDA	0.247	B<						
15-18										
18-21										
21-24										
24-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45										
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69	18-30	~~0.286~~	0.246	#	**72.84**	0.209	**-0.169**	NO		
69-72										
72-75										
75-78	30-38.5	<MDA	0.177	B<						
78-80.5										
80.5-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM3-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3									
3-6	<MDA	0.174	B<						
6-9									
9-12									
12-15	<MDA	0.046	B<						
15-18									
18-21									
21-24	<MDA	0.146	B<						
24-27									
27-30									
30-33									
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM3-2

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0-6	1.026	0.222		34.3	0.353	0.451			
3-6										
6-9										
9-12										
12-13.5										
13.5-18										
18-21										
21-24	6-18	<MDA	0.189	B<						
24-27										
27-30										
30-33										
33-36										
36-39										
39-40.5										
40.5-45										
45-48										
48-51	18-33	<MDA	0.059	B<						
51-54										
54-55.5										
55.5-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM3-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.894	0.11		20.24	0.183	0.601			
3-6									
6-9	0.773	0.044		17.61	0.138	0.591			
9-12									
12-15									
15-18									
18-21	<MDA	0.062	B<						
21-24									
24-27									
27-30									
30-33	0.228	0.102		50	0.114	0.012			
33-36									
36-39									
39-42									
42-45	<MDA	0.074	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM3-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3 3-6	0.676	0.178	#	37.8	0.256	0.242	OK			0.554
6-9 9-12 12-15 15-18	<MDA	0.243	B<						<MDA	~~0.487~~
18-21 21-24 24-27 27-30	<MDA	0.228	B<							<0.255
30-33 33-36 36-39 39-42	<MDA	0.229	B<							<0.264
42-45 45-48 48-51 51-54	<MDA	0.23	B<							~~0.209~~
54-57 57-60 60-63 63-66 66-69 69-72 72-75 75-76										
78-81 81-84 84-87 87-90 90-93 93-96 96-99										
99-102 102-105 105-108 108-111 111-114 114-117 117-120										

08-Feb-08

SM4-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.451	0.207	#	50	0.226	0.018	OK		
3-6									
6-9									
9-12	~~0.081~~	0.063	#	**71.39**	0.058	**-0.04**	NO		
12-15									
15-18									
18-21									
21-24									
24-27	<MDA	0.061	B<						
27-30									
30-33									
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM4-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	<MDA	0.216	B<						
3-6									
6-9									
9-12	<MDA	0.061	B<						
12-15									
15-18									
18-21									
21-24									
24-27	<MDA	0.059	B<						
27-30									
30-31									
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM4-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.431	0.049	#	25	0.108	0.274	OK		
3-6									
6-9	2.32	0.091		12.03	0.287	1.942			
9-12									
12-15									
15-18									
18-21	0.49	0.144	#	40	0.197	0.149	OK		
21-24									
24-27									
27-30									
30-33	~~0.413~~	0.252	#	**60.91**	0.252	**-0.091**	NO		
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-62									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM5-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3									
3-6	<MDA	0.173	B<						
6-9									
9-12									
12-15	~~0.061~~	0.051		**75.59**	0.046	**-0.036**		**Reject**	
15-18									
18-21									
21-24									
24-27	<MDA	0.047	B<						~~0.084~~
27-30									
30-33									
33-36	<MDA	0.126	B<						
36-38.5									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM5-2

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0-6	0.536	0.171	#	41.7	0.224	0.141	OK		
3-6										
6-9										
9-12	6-18	<MDA	0.139	B<						
12-15										
15-18										
18-21										
21-24										
24-27										
27-30										
30-33										
33-36										
36-39										
39-42										
42-45										
45-48										
48-51										
51-54	18-29.5	<MDA	0.152	B<						
54-59.5										
59.5-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM5-3

Depth (inches)	Samples After Processing	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0-6	~~0.839~~	0.421	#	**50.24**	0.422	**-0.004**	NO		
3-6										
6-9										
9-12										
12-13										
13-18										
18-21										
21-24										
24-27										
27-28	6-18	1.3	0.209		25.93	0.339	0.752			
30-33										
33-36										
36-39										
39-42										
42-45										
45-48										
48-51										
51-53										
53-57										
57-60	18-28	0.802	0.197		36.51	0.294	0.311			
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

(This location was re-sampled with vibracore: see SM5-5)

08-Feb-08

SM5-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.362	0.095	#	37.8	0.137	0.13	OK		
3-6									
6-9									
9-12	~~0.122~~	0.075	#	**57.74**	0.07	**-0.023**	NO		
12-15									
15-18									
18-21									
21-24	<MDA	0.109	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.058	B<						
36-39									
39-42									
42-45									
45-48	~~0.113~~	0.07	#	**57.74**	0.066	**-0.023**	NO		
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-70									
72-75									
75-78									
78-80									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM5-5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.837	0.075		18.77	0.159	0.603			
3-6									
6-9	2.542	0.056		10.99	0.29	2.196			
9-12									
12-15									
15-18									
18-21	0.214	0.06		39.22	0.084	0.07			
21-24									
24-27									
27-30									
30-33	<MDA	0.294	B<						
33-36									
36-39									
39-42									
42-45	~~0.467~~	0.246	#	**53.45**	0.25	**-0.029**	NO		
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.341	0.096		33.01	0.113	0.132			
3-6									
6-9	0.453	0.052		25	0.114	0.287			
9-12									
12-15									
15-18									
18-21	~~0.086~~	0.045	#	**53.45**	0.046	**-0.005**	NO		
21-24									
24-27									
27-30									
30-33	<MDA	0.045	B<						
33-36									
36-39									
39-42									
42-45	~~0.037~~	0.049	#A	**99.14**	0.037	**-0.049**	NO		
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-65.5									
66-69									
69-70									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.612	0.107		25.21	0.155	0.35			
3-6									
6-9	0.503	0.049	#	23.09	0.117	0.337	OK		
9-12									
12-15									
15-18									
18-21	~~0.06~~	0.066	#A	**89.52**	0.053	**-0.059**	NO		
21-24									
24-27									
27-30									
30-33									
33-35.5									
36-39									
39-40									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.552	0.053	#	22.79	0.127	0.372	OK		
3-6									
6-9	0.294	0.085	#	37.64	0.111	0.098	OK		
9-12									
12-15									
15-18									
18-21	<MDA	0.119	B<						<0.080
21-24									
24-27									<0.066
27-30									
30-33	~~0.101~~	0.083	#	**66.67**	0.067	**-0.049**	NO		
33-36									
36-39									
39-42									
42-45	<MDA	0.102	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-73									
75-78									
78-81									
81-84									
84-85									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.59	0.055	#	22.5	0.134	0.401	OK		
3-6									
6-9	0.315	0.064		33.33	0.105	0.146			
9-12									
12-15									
15-18									
18-21	<MDA	0.112	B<						
21-24									
24-27									
27-30									
30-33	<MDA	0.114	B<						
33-36									
36-39									
39-42									
42-45	<MDA	0.083	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84.5									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.492	0.118	#	31.2	0.154	0.22	OK		
3-6									
6-9	0.283	0.056		32.88	0.093	0.134			
9-12									
12-15									
15-18									
18-21	<MDA	0.112	B<						
21-24									
24-27									
27-30									
30-33	~~0.08~~	0.084	#A	**75.59**	0.061	**-0.065**	NO		
33-36									
36-39									
39-42									
42-45	<MDA	0.082	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90.5									
90-93									
93-96									
96-99									
99-102									
102-103									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-6

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3	20.58	0.146		6.2	1.401	19.033				19.3
3-6										
6-9	1.263	0.27	#	31.11	0.395	0.598	OK			1.258
9-12										
12-15										
15-18										
18-21	3.221	0.157		16.28	0.532	2.532				2.963
21-24										
24-27										
27-30										
30-33	0.626	0.221	#	42.89	0.269	0.136	OK			0.727
33-36										
36-39										
39-42										
42-45	<MDA	0.217	B<							<0.249
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-86.5										
87-90										
90-92										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM6-6Relocate2

Depth (inches)	Original SM6-6 Result (Cs-137)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3	20.58	6.094	0.177		9.2	0.589	5.328				7.265
3-6											
6-9	1.263	1.664	0.094		17.54	0.296	1.274				1.755
9-12											
12-15											
15-18											
18-21	3.221	0.313	0.136	#	48.51	0.152	0.025	OK		<MDA(0.296)	0.487
21-24											
24-27											
27-30											
30-33	0.626	<	0.18	B<							<0.194
33-36											
36-39											
39-42											
42-45	<MDA	<	0.125	B<							<0.113
45-48											
48-51											
51-54											
54-57											
57-60											
60-63											
63-66											
66-69											
69-72											
72-75											
75-78											
78-81											
81-84											
84-87											
87-90											
90-93											
93-96											
96-99											
99-102											
102-105											
105-108											
108-111											
111-114											
114-117											
117-120											

08-Feb-08

SM6-6BoundA

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3									
3-6	3.24	0.086		12	0.4	2.754			
6-9									
9-12									
12-15	7.307	0.093		8.3	0.645	6.569			
15-18									
18-21									
21-24									
24-27	1.629	0.142		18.01	0.298	1.189			
27-30									
30-33									
33-36									
36-39	0.949	0.121	#	26.26	0.251	0.577	OK		
39-42									
42-45									
45-48									
48-51	<	0.205	B<						
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-6BoundB

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	3.482	0.094		12.13	0.436	2.952			
3-6									
6-9									
9-12	6.4	0.086		8.52	0.577	5.737			6.127
12-15									
15-18									
18-21									
21-24	0.9	0.171		29.15	0.264	0.465			
24-27									
27-30									
30-33									
33-36	<	0.191	B<						
36-39									
39-42									
42-45									
45-48									
48-51	~~0.121~~	0.128	#A	**75.59**	0.092	**-0.099**	NO		
51-54									
54-56									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-6BoundC

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	11.693	0.129		6.25	0.809	10.755			
3-6									
6-9	2.277	0.084		14.14	0.329	1.864			
9-12									
12-15									
15-18									
18-21	0.678	0.135	#	32.88	0.224	0.319	OK		
21-24									
24-27									
27-30									
30-33	<	0.183	B<						<0.174
33-36									
36-39									
39-42									
42-45	~~0.14~~	0.114	#	**66.67**	0.093	**-0.067**	NO		
45-48									
48-51									
51-55									
55-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-6BoundD

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	7.091	0.094		8.48	0.638	6.359			
3-6									
6-9	0.744	0.105		27.74	0.207	0.432			
9-12									
12-15									
15-18									
18-21	~~0.257~~	0.158	#	**57.74**	0.149	**-0.05**	NO		
21-24									
24-27									
27-30									
30-33	~~0.152~~	0.16	#A	**75.59**	0.115	**-0.123**	NO		
33-36									
36-39									
39-42									
42-45	<	0.125	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-65									
65-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-6BoundE

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	4.151	0.083		10.4	0.449	3.619			
3-6									
6-9	1.748	0.078		15.57	0.278	1.392			
9-12									
12-15									
15-18									
18-21	0.311	0.115	#	44.72	0.139	0.057	OK		
21-24									
24-27									
27-30									
30-33	~~0.157~~	0.144	#	**70.71**	0.111	**-0.098**	NO		
33-36									
36-39									
39-42									
42-45	<	0.128	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-62									
62-65									
65-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-6BoundF

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3	12.252	0.139		6.2	0.842	11.271				
3-6										
6-9	2.437	0.14		14.54	0.362	1.935				
9-12										
12-15										
15-18										
18-21	0.32	0.139	#	48.51	0.155	0.026				
21-24										
24-27										
27-30										
30-33	~~0.108~~	0.132	#A	**81.65**	0.088	**-0.112**	NO			
33-36										
36-39										
39-42										
42-45	<	0.161	B<							
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-64										
64-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM6-6Bound1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3										
3-6	7.592	0.143		8.46	0.681	6.768				
6-9										
9-12										
12-15	7.813	0.106		8.6	0.711	6.996				
15-18										
18-21										
21-24										
24-27	2.564	0.132		16.72	0.436	1.996				
27-30										
30-33										
33-36										
36-39	~~0.094~~	0.173	#A	**100**	0.094	**-0.173**	NO			
39-42										
42-45										
45-48										
48-51	<	0.15	B<							
51-55										
55-57										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM6-6Bound2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3										
3-6	6.842	0.101		8.95	0.648	6.093				
6-9										
9-12										
12-15	8.51	0.16		7.83	0.713	7.637				
15-18										
18-21										
21-24										
24-27	2.309	0.106		15.76	0.37	1.833			2.008	
27-30										
30-33										
33-36										
36-39	<	0.188	B<							
39-42										
42-45										
45-48										
48-51	<	0.2	B<							
51-54										
54-56.5										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM6-7

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	<MDA	0.213	B<						
3-6									
6-9									
9-12	0.303	0.12		41.63	0.127	0.056			
12-15									
15-18									
18-21									
21-24	~~0.125~~	0.061	#	**51.64**	0.064	**0**	NO		
24-27									
27-30									
30-33									
33-36	~~0.087~~	0.092	#A	**75.59**	0.066	**-0.071**	NO		
36-39									
39-42									
42-45									
45-48	~~0.102~~	0.107	#A	**75.59**	0.077	**-0.082**	NO		
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81.5									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-8

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.671	0.089		23.4	0.158	0.424			
3-6									
6-9									
9-12	~~0.134~~	0.09	#	**66.14**	0.089	**-0.045**	NO		
12-15									
15-18									
18-21									
21-24	<MDA	0.085	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.302	B<						
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM6-9

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.787	0.097		22.74	0.181	0.509			
3-6									
6-9									
9-12	0.175	0.069	#	45.9	0.081	0.025	OK		
12-15									
15-18									
18-21									
21-24	<MDA	0.074	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.07	B<						
36-39									
39-42									
42-45									
45-48									
48-51	<MDA	0.087	B<						
51-54									
54-57									
57-58.5									
58.5-60									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM7-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.702	0.09		21.43	0.152	0.46			
3-6									
6-9	0.641	0.088		24.16	0.156	0.397			
9-12									
12-15									
15-18									
18-21	<MDA	0.073	B<						
21-24									
24-27									
27-30									
30-33	~~0.112~~	0.075	#	**65.36**	0.073	**-0.036**	NO		
33-36									
36-39									
39-42									
42-45	<MDA	0.092	B<						
45-48									
48-51									
51-53.5									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM7-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.659	0.098	#	24.97	0.166	0.395	OK		
3-6									
6-9									
9-12	0.388	0.109		34.74	0.135	0.144			
12-15									
15-18									
18-21									
21-24	0.266	0.07	#	37.8	0.101	0.095	OK		
24-27									
27-30									
30-33									
33-36	~~0.105~~	0.07	#	**60.3**	0.064	**-0.029**	NO		~~0.112~~
36-39									
39-42									
42-45									
45-48	~~0.124~~	0.089	#	**68.52**	0.085	**-0.05**	NO		
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-95									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM7-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.337	0.079		33.07	0.112	0.146			
3-6									
6-9									
9-12	~~0.105~~	0.075	#	**69.28**	0.073	**-0.043**	NO		
12-15									
15-18									
18-21									
21-24	<MDA	0.077	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.071	B<						
36-39									
39-42									
42-45	<MDA	0.234	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM7-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.393	0.086		29.19	0.115	0.192			
3-6									
6-9	0.24	0.082	#	39.22	0.094	0.064	OK		
9-12									
12-15									
15-18									
18-21	<MDA	0.054	B<						
21-24									
24-27									
27-30									
30-33	<MDA	0.036	B<						
33-36									
36-38									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-59									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM7-5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.825	0.056		19.25	0.161	0.608	OK		
3-6									
6-9	3.872	0.103		8.37	0.345	3.424			
9-12									
12-15									
15-18									
18-21	1.091	0.062		14.74	0.164	0.865			
21-24									
24-27									
27-30									
30-33	~~0.064~~	0.043	#	**60.3**	0.039	**-0.018**	NO		
33-36									
36-39									
39-42									
42-44									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-67									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM7-6

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.215	0.07	#	40.9	0.088	0.057	OK		
3-6									
6-9									
9-12	~~0.122~~	0.071	#	**59.31**	0.072	**-0.021**	NO		
12-15									
15-18									
18-21									
21-24	<MDA	0.063	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.095	B<						
36-39									
39-42									
42-45									
45-48	<MDA	0.061	B<						
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72.5									
72.5-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3									
3-6	1.182	0.08		16.39	0.197	0.905			
6-9									
9-12									
12-15	0.787	0.151		25.75	0.204	0.432			
15-18									
18-21									
21-24									
24-27	~~0.279~~	0.171	#	**57.74**	0.161	**-0.053**	NO		
27-30									
30-33									
33-36									
36-39	<MDA	0.218	B<						
39-42									
42-45									
45-48									
48-51	<MDA	0.29	B<						
51-54									
54-57									
57-60									
60-63									
63-65.5									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-85									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.698	0.056		20.85	0.147	0.495			
3-6									
6-9	0.55	0.083		25.47	0.141	0.326			
9-12									
12-15									
15-18									
18-21	~~0.105~~	0.086	#	**66.67**	0.07	**-0.051**	NO		
21-24									
24-27									
27-30									
30-33	~~0.284~~	0.19	#	**60.3**	0.172	**-0.078**	NO		
33-36									
36-39									
39-42									
42-45	<MDA	0.344	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-82									
84-87									
87-90									
90-91									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	1.208	0.079		15.36	0.189	0.94			
3-6									
6-9	0.27	0.081		38.94	0.105	0.084	OK		
9-12									
12-15									
15-18									
18-21	<MDA	0.127	B<						
21-24									
24-27									
27-30									
30-33	<MDA	0.066	B<						
33-36									
36-39									
39-42									
42-45	<MDA	0.073	B<						<0.078
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-85.5									
87-90									
90-93									
93-96									
96-99									
99-102									
102-103									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.895	0.082		19.33	0.175	0.638			
3-6									
6-9	0.767	0.083		20.87	0.162	0.522			
9-12									
12-15									
15-18									
18-21	~~0.176~~	0.11	#	**59.27**	0.105	**-0.039**	NO		
21-24									
24-27									
27-30									
30-33	~~0.158~~	0.103	#	**65.11**	0.103	**-0.048**	NO		
33-36									
36-39									
39-40									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-64									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	1.304	0.071		14.91	0.198	1.035			
3-6									
6-9									
9-12	~~0.235~~	0.12		**51.73**	0.122	**-0.007**		**Reject**	
12-15									
15-18									
18-21									
21-24	~~0.098~~	0.06	#	**57.74**	0.057	**-0.019**	NO		
24-27									
27-30									
30-33									
33-36	~~0.15~~	0.118	#	**75.86**	0.114	**-0.082**	NO		
36-39									
39-42									
42-45									
45-48	~~0.109~~	0.089	#	**66.67**	0.073	**-0.053**	NO		
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-92									
93-96									
96-99									
99-102									
102-104									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-6

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.902	0.046		16.72	0.153	0.703			
3-6									
6-9	1.122	0.077		16.27	0.185	0.86			
9-12									
12-15									
15-18									
18-21	~~0.146~~	0.116		**72.11**	0.106	**-0.076**		**Reject**	
21-24									
24-27									
27-30									
30-33	~~0.128~~	0.072	#	**55.47**	0.071	**-0.015**	NO		
33-36									
36-39									
39-42									
42-45	<MDA	0.138	B<						
45-48									
48-51									
51-54									
54-57									
57-60.5									
60-63									
63-66									
66-67									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM8-7

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.899	0.08	#	18.58	0.169	0.65	OK		
3-6									
6-9	1.911	0.121		12.7	0.249	1.541			
9-12									
12-15									
15-18									
18-21	3.42	0.051		9.02	0.325	3.044			
21-24									
24-27									
27-30									
30-33									
33-36	Water, No Sample								
36-39									
39-42									
42-45	Water, No Sample								
45-48									
48-49.5									
51-54									
54-57									
57-60									
60-63									
63-66									
66-67									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.492	0.059		25.61	0.127	0.306			
3-6									
6-9	0.394	0.052		26.73	0.106	0.236			
9-12									
12-15									
15-18									
18-21	<MDA	0.065	B<						
21-24									
24-27									
27-30									
30-33	~~0.118~~	0.082	#	**66.38**	0.078	**-0.042**	NO		
33-36									
36-39									
39-42									
42-45	<MDA	0.075	B<						
45-48									
48-51									
51-54.5									
54-57									
57-58									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.529	0.084	#	26.32	0.14	0.305	OK		
3-6									
6-9	0.831	0.067		17.79	0.15	0.614			
9-12									
12-15									
15-18									
18-21	0.157	0.051	#	40.78	0.064	0.042	OK		
21-24									
24-27									
27-30									
30-33	0.66	0.114		23.85	0.159	0.387			
33-36									
36-39									
39-42									
42-45	1.226	0.078		15.37	0.192	0.956			
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-82.5									
84-87									
87-90									
90-93									
93-96									
96-97									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.372	0.051		27.22	0.102	0.219			
3-6									
6-9									
9-12	<MDA	0.092	B<						
12-15									
15-18									
18-21									
21-24	<MDA	0.047	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.061	B<						
36-39									
39-42									
42-45									
45-48	<MDA	0.05	B<						
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-74.5									
75-78									
78-81									
81-84									
84-87									
87-90									
90-91									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-4

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	1.147	0.102		16.45	0.192	0.853			
3-6									
6-9	5.869	0.101		6.57	0.423	5.345			
9-12									
12-15									
15-18									
18-21	2.126	0.044		10.56	0.233	1.849			
21-24									
24-27									
27-30									
30-33	2.435	0.095		10.8	0.274	2.066			
33-36									
36-39									
39-42									
42-45	2.627	0.104		10.14	0.277	2.246			
45-48									
48-51									
51-54									
54-56.5									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-5

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.706	0.097		23.53	0.168	0.441			
3-6									
6-9	0.389	0.084	#	31.5	0.123	0.182	OK		
9-12									
12-15									
15-18									
18-21	<MDA	0.077	B<						
21-24									
24-27									
27-30									
30-31.5									
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-6

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	1.298	0.119		16.97	0.224	0.955			
3-6									
6-9	0.285	0.097		41.9	0.12	0.068			
9-12									
12-15									
15-18									
18-21	~~0.091~~	0.056	#	**57.74**	0.053	**-0.018**	NO		
21-24									
24-27									
27-30									
30-33	<MDA	0.101	B<						
33-36									
36-39									
39-42									
42-45	<MDA	0.067	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-80.5									
81-84									
84-87									
87-90									
90-93									
93-94									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM9-7

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC Result (pCi/g)
0-3	1.306	0.239		29.21	0.384	0.683				1.118
3-6										
6-9	0.524	0.184	#	43.64	0.229	0.111	OK			0.505
9-12										
12-15										
15-18										
18-21	<MDA	0.335	B<							<0.204
21-24										
24-27										
27-30										
30-33	<MDA	0.283	B<							~~0.408~~
33-36										
36-39										
39-42										
42-45	~~0.18~~	0.221	#A	**81.65**	0.147	**-0.188**	NO			<0.295
45-48										
48-51										
51-54										
54-57										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-76										
78-80										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM-DUP-BY37

Depth (inches)	Original Bay Result(s) (Cs-137)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6		0.188	0.049	#	37.8	0.071	0.068	OK		
6-9										
9-12										
12-15		~~0.12~~	0.088	#	**63.25**	0.076	**-0.044**	NO		
15-18										
18-21										
21-24										
24-27		<MDA	0.124	B<						
27-30										
30-33										
33-36										
36-39		<MDA	0.076	B<						
39-42										
42-45										
45-48										
48-51		0.175	0.064	#	44.72	0.079	0.032	NO	Why Reject?	
51-54										
54-57										
57-60	3.881, <MDC (**4.7**)									
60-62										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108										
108-111										
111-114										
114-117										
117-120										

08-Feb-08

SM-DUP-BY-43

Depth (inches)	*Depth (inches)*	Original Bay Result(s) (Cs-137)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3			0.212	0.085		46.68	0.099	0.028			
3-6											
6-9											
9-12			~~0.059~~	0.108	#A	**100**	0.059	**-0.108**	NO		
12-15											
15-18											
18-21											
21-24			<MDA	0.085	B<						
24-27											
27-30											
30-33											
33-36			<MDA	0.121	B<						
36-39											
39-42											
42-45											
45-48											
48-51			<MDA	0.103	B<						
51-54											
54-57											
57-60											
60-63											
63-66											
66-69											
69-72											
72-75											
75-78											
78-81											
81-84											
84-87											
87-90											
90-93											
93-96											
96-99	*95-98*	~~0.318~~, 0.146									
99-102	*98-101*										
102-105	*101-104*										
105-108	*104-107*	<MDA (0.221)									
108-111	*107-110*										
111-114	*110-113*										
114-117	*113-116*	0.207, <MDC(0.17)									
117-120	*116-119*										

08-Feb-08

SM-DUP-BY-44

Depth (inches)	Original Bay Result(s) (Cs-137)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3										
3-6		0.307	0.101		40.93	0.126	0.08			
6-9										
9-12										
12-15		<MDA	0.067	B<						
15-18										
18-21										
21-24										
24-27		<MDA	0.114	B<						
27-30										
30-33										
33-36										
36-39		~~0.095~~	0.078	#	**66.67**	0.063	**-0.046**	NO		
39-42										
42-45										
45-48										
48-50		<MDA	0.259	B<						
51-54										
54-57										
57-60										
60-63										
63-66										
66-69										
69-72										
72-75										
75-78										
78-81										
81-84										
84-87										
87-90										
90-93										
93-96										
96-99										
99-102										
102-105										
105-108	0.971, <MDC (0.29)									
108-111										
111-114	0.795, <MDC (0.23)									
114-117										
117-120										

08-Feb-08

SM-TRIB-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.524	0.051		23.09	0.122	0.351			
3-6									
6-9	1.154	0.106		16.69	0.196	0.852			
9-12									
12-15									
15-18									
18-21	0.452	0.087		29.19	0.133	0.232			
21-24									
24-27									
27-30									
30-33	<MDA	0.062	B<						
33-36									
36-39									
39-42									
42-45	<MDA	0.065	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-61.5									
61.5-65									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM-TRIB-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.607	0.101		23.4	0.143	0.363			
3-6									
6-9	0.758	0.093		20.16	0.155	0.51			
9-12									
12-15									
15-18									
18-21	<MDA	0.053	B<						
21-24									
24-27									
27-30									
30-33	<MDA	0.041	B<						
33-36									
36-39									
39-45.5									
42-45									
45-48									
48-49									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM-TRIB-3

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.454	0.084		28.37	0.13	0.24	OK		
3-6									
6-9	1.192	0.11		17.03	0.206	0.876			
9-12									
12-15									
15-18									
18-21	<MDA	0.078	B<						
21-24									
24-27									
27-30									
30-33	<MDA	0.069	B<						
33-36									
36-39									
39-42									
42-45	<MDA	0.059	B<						
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM-BOGERT-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	0.232	0.097	#	44.58	0.104	0.031	OK		
3-6									
6-9	0.726	0.112		22.09	0.162	0.452			
9-12									
12-15									
15-18									
18-21	0.336	0.066	#	29.76	0.1	0.17	OK		
21-24									
24-27									
27-30									
30-33	0.321	0.111		38.59	0.124	0.086			
33-36									
36-39									
39-42									
42-45									
45-48									
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM-GB-1

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3	~~0.227~~	0.115		**50.99**	0.116	**-0.004**		Reject	
3-6									
6-9									
9-12	<MDA	0.219	B<						
12-15									
15-18									
18-21									
21-24	<MDA	0.167	B<						
24-27									
27-30									
30-33									
33-36	<MDA	0.322	B<						
36-39									
39-42									
42-45									
45-48	<MDA	0.376	B<						
48-51									
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-72									
72-75									
75-78									
78-81									
81-84									
84-85									
85-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SM-GB-2

Depth (inches)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
0-3									
3-6	<MDA	0.369	B<						
6-9									
9-12									
12-15	<MDA	0.083	B<						
15-18									
18-21									
21-24									
24-27	~~0.075~~	0.055	#	**63.25**	0.047	**-0.027**	NO		
27-30									
30-33									
33-36									
36-39	~~0.073~~	0.089	#A	**81.65**	0.06	**-0.076**	NO		
39-42									
42-45									
45-48									
48-51	~~0.045~~	0.066	#A	**89.44**	0.04	**-0.061**	NO		
51-54									
54-57									
57-60									
60-63									
63-66									
66-69									
69-70									
70-72									
75-78									
78-81									
81-84									
84-87									
87-90									
90-93									
93-96									
96-99									
99-102									
102-105									
105-108									
108-111									
111-114									
114-117									
117-120									

08-Feb-08

SMG1 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC (pCi/g)
PB07-02928	SR53-1	0-3 3-6	1.62	0.101		18.4	0.303	1.216			1.34
PB07-02929	SR53-1	6-9 9-12 12-15 15-18	<	0.112	B<						<0.103
PB07-02930	SR53-1	18-21 21-24 24-27 27-30	<	0.141	B<						<0.118
PB07-02931	SR53-1	30-33 33-36 36-39 39-42	<	0.092	B<						<0.129
PB07-02932	SR53-1	42-45 45-48 48-51 51-54	<	0.165	B<						<0.173
		54-57 57-60 60-63 63-66 *66-68* *68-72* *72-75.5* *75.5-78* 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG2 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC or Recount (pCi/g)
PB07-02897	SR53-2	0-3 3-6	3.04	0.113		14.2	0.443	2.484			2.81
PB07-02898	SR53-2	6-9 9-12 12-15 15-18	8.88	0.162		7.64	0.736	7.982			7.92
PB07-02899	SR53-2	18-21 21-24 24-27 27-30	1.83	0.094		16.7	0.312	1.424			2.24
PB07-02900	SR53-2	30-33 33-36 36-39 39-42	0.578	0.137		35.9	0.209	0.232			0.410
PB07-02902	SR53-2	42-45 45-48 48-51 51-54	<	0.069	B<						<0.141
		54-57 57-60 60-63 63-67									
		67-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG3 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC or Recount (pCi/g)
PB07-02938	SR53-3	0-3 3-6	13.7	0.206		7.16	1.06	12.434			14.5
PB07-02939	SR53-3	6-9 9-12 12-15 15-18	2.49	0.094		14.30	0.364	2.032			2.55
PB07-02940	SR53-3	18-21 21-24 24-27 27-30	1.15	0.189		21.7	0.252	0.709			0.931
PB07-02942	SR53-3	30-33 33-36 36-39 39-42	<	0.130	<						<0.227
PB07-02943	SR53-3	42-45 45-48 48-51 51-54	<	0.384	B<						<0.154
		54-57 57-60 60-63 63-66 66-69 69-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG4 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC or Recount (pCi/g)
PB07-02908	SR53-4	0-3 3-6	1.14	0.090		20.7	0.240	0.810			
PB07-02909	SR53-4	6-9 9-12 12-15 15-18	2.89	0.087	-	12.80	0.380	2.423			
PB07-02910	SR53-4	18-21 21-24 24-27 27-30	<	0.148	B<						
PB07-02911	SR53-4	30-33 33-36 36-39 39-42	<	0.150	B<						
PB07-02912	SR53-4	42-45 45-48 48-51 51-54	<	0.109	B<						
		54-57 57-60 60-63 63-66 66-69									
		69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG5 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC or Recount (pCi/g)
PB07-02969	SR53-5	0-3 3-6	0.698	0.137	#	29.8	0.209	0.352	OK		
PB07-02970	SR53-5	6-9 9-12 12-15 15-18	5.82	0.143		9.17	0.566	5.111			
PB07-02971	SR53-5	18-21 21-24 24-27 27-30	1.10	0.135		25.8	0.287	0.678			
PB07-02972	SR53-5	30-33 33-36 36-39 39-42	<	0.119	B<						
PB07-02973	SR53-5	42-45 45-48 48-51 51-54	<	0.126	B<						
		54-57 57-60 60-63 63-66 66-69 69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG6 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC or Recount (pCi/g)
PB07-02913	SR53-6	0-3 3-6	11.5	0.139		6.32	0.814	10.547			
PB07-02914	SR53-6	6-9 9-12 12-15 15-18	2.64	0.131		13.70	0.371	2.138			
PB07-02915	SR53-6	18-21 21-24 24-27 27-30	<	0.138	B<						
PB07-02916	SR53-6	30-33 33-36 36-39 39-42	0.238	0.073	#	40.8	0.097	0.068	OK		
		42-45 45-48 48-51 51-54 54-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG7 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC or Recount (pCi/g)
PB07-02974	SR53-7	0-3 3-6	1.83	0.110		18.1	0.336	1.384			
PB07-02975	SR53-7	6-9 9-12 12-15 15-18	3.40	0.083		11.6	0.407	2.910			
PB07-02976	SR53-7	18-21 21-24 24-27 27-30	1.04	0.098	#	22.7	0.238	0.704	OK		
PB07-02977	SR53-7	30-33 33-36 36-39 39-42	0.355	0.154	#	48.5	0.172	0.029	OK		
PB07-02978	SR53-7	42-45 45-48 48-51 51-54	<	0.138	B<						
		54-57 57-60 60-63 63-66 66-68 68-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG8 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-02980	SR53-8	0-3 3-6	6.04	0.109		9.89	0.627	5.304			6.35
PB07-02982	SR53-8	6-9 9-12 12-15 15-18	1.62	0.138		18.4	0.302	1.180			
PB07-02983	SR53-8	18-21 21-24 24-27 27-30	0.624	0.228	#	44.1	0.276	0.120	OK		
PB07-02984	SR53-8	30-33 33-36 36-39 39-42	<	0.204	B<						
PB07-02985	SR53-8	42-45 45-48 48-51 51-54	0.164	0.053		41.7	0.069	0.042			
		54-57 57-60 60-63 63-66 66-70 70-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG9 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-02988	SR53-9	0-3 3-6	4.23	0.196		11.40	0.502	3.532			
PB07-02989	SR53-9	6-9 9-12 12-15 15-18	1.32	0.107		21.0	0.281	0.932			
PB07-02990	SR53-9	18-21 21-24 24-27 27-30	<	0.138	B<						
PB07-02991	SR53-9	30-33 33-36 36-39 39-42	<	0.116	B<						
PB07-02992	SR53-9	42-45 45-48 48-51 51-54	<	0.181	B<						
		54-57 57-60 60-63 63-66 66-69 69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG10 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-02997	SR53-10	0-3 3-6	2.96	0.089		12.80	0.387	2.484			
PB07-02998	SR53-10	6-9 9-12 12-15 15-18	3.07	0.088		12.5	0.394	2.588			
PB07-02999	SR53-10	18-21 21-24 24-27 27-30	0.355	0.119	#	42.6	0.152	0.084	OK		
PB07-03000	SR53-10	30-33 33-36 36-39 39-42	<	0.141	B<						<0.096
PB07-03002	SR53-10	42-45 45-48 48-51 51-54	<	0.099	B<						
		54-57 57-60 60-63 63-65 65-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG11 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03004	SR53-11	0-3 3-6	1.96	0.131		16.20	0.324	1.505			
PB07-03005	SR53-11	6-9 9-12 12-15 15-18	0.450	0.111	#	36.5	0.165	0.174	OK		
PB07-03006	SR53-11	18-21 21-24 24-27 27-30	<	0.129	B<						
PB07-03007	SR53-11	30-33 33-36 36-39 39-42	<	0.123	B<						
PB07-03008	SR53-11	42-45 45-48 48-51 51-54	<	0.128	B<						
		54-57 57-60 60-63 63-66 66-69 69-73									
		73-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG12 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03009	SR53-12	0-3 3-6	1.50	0.074		16.4	0.250	1.176			
PB07-03010	SR53-12	6-9 9-12 12-15 15-18	0.391	0.167		45.5	0.178	0.046			
PB07-03011	SR53-12	18-21 21-24 24-27 27-30	<	0.098	B<						
PB07-03012	SR53-12	30-33 33-36 36-39 39-42	<	0.098	B<						
PB07-03013	SR53-12	42-45 45-48 48-51 51-54	<	0.084	B<						
		54-57 57-60 60-63 63-67									
		67-69 69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG13 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03014	SR53-13	0-3	1.30	0.097		20.1	0.265	0.938			
		3-6									
		6-9									
PB07-03015	SR53-13	9-12	<	0.097	B<						
		12-15									
		15-18									
		18-21									
PB07-03016	SR53-13	21-24	<	0.071	B<						
		24-27									
		27-30									
		30-33									
PB07-03017	SR53-13	33-36	<	0.075	B<						
		36-39									
		39-42									
		42-45									
PB07-03018	SR53-13	45-48	<	0.108	B<						
		48-51									
		51-54									
		54-56.5									
		56.5-60									
		60-63									
		63-66									
		66-69									
		69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG14 (Section A)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03022	SR53-14	0-3 3-6	7.13	0.086		8.11	0.622	6.422			
PB07-03023	SR53-14	6-9 9-12 12-15 15-18	1.33	0.096	#	19.8	0.266	0.968	OK		
PB07-03024	SR53-14	18-21 21-24 24-27 27-30	<	0.088	B<						
PB07-03025	SR53-14	30-33 33-36 36-39 39-42	<	0.158	B<						
PB07-03026	SR53-14	42-45 *45-* *48.5-51* 51-54 54-57 57-60 60-63 *63-67* *67-69* 69-72	2.77	0.094		13.6	0.387	2.289			
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG15 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC (pCi/g)
PB07-03151	SR53-16	0-3 3-6	16.5	0.157		5.67	1.070	15.273			
PB07-03152	SR53-16	6-9 9-12 12-15 15-18	3.64	0.105		12.5	0.470	3.065			
PB07-03153	SR53-16	18-21 21-24 24-27 27-30	1.93	0.147		17.1	0.337	1.446			
PB07-03154	SR53-16	30-33 33-36 36-39 39-42	<	0.083	B<						
PB07-03155	SR53-16	42-45 45-48 48-51 51-54	<	0.118	B<						
		54-57 57-60 60-63									
		63-66 66-69 69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG16 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC (pCi/g)
PB07-03156	SR53-17	0-3 3-6	0.333	0.111	#	42.6	0.142	0.080	OK		
PB07-03157	SR53-17	6-9 9-12 12-15 15-18	<	0.129	B<						
PB07-03158	SR53-17	18-21 21-24 24-27 27-30	<	0.099	B<						
PB07-03159	SR53-17	30-33 33-36 36-39 39-42	<	0.178	B<						
PB07-03162	SR53-17	42-45 45-48 48-51 51-54	<	0.139	B<						
		54-57 57-60 60-63 63-66 66-70 70-72 72-74 74-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG17 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC (pCi/g)
PB07-03167	SR53-18	0-3 3-6	0.690	0.111	#	29.5	0.205	0.374	OK		
PB07-03168	SR53-18	6-9 9-12 12-15 15-18	5.69	0.124		10.9	0.644	4.922			
PB07-03169	SR53-18	18-21 21-24 24-27 27-30 30-34.5	6.75	0.102		9.04	0.647	6.001			
		34.5-36 36-39 39-42 42-45 45-48 48-50									
		50-54 54-57 57-60 60-63 63-66 66-69 69-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG18 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	QC (pCi/g)
PB07-03170	SR53-19	0-3 3-6	6.87	0.149		9.01	0.657	6.064			
PB07-03171	SR53-19	6-9 9-12 12-15 15-18	4.76	0.168		11.2	0.555	4.037			
PB07-03172	SR53-19	18-21 21-24 24-27 27-30	2.67	0.161		18.1	0.490	2.019			
PB07-03173	SR53-19	30-33 33-36 36-39 39-42	<	0.104	B<						
PB07-03174	SR53-19	42-45 45-48 48-51 51-55	<	0.127	B<						
		55-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG19 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03177	SR53-20	0-3 3-6	0.260	0.113	#	48.5	0.126	0.021	OK		
PB07-03178	SR53-20	6-9 9-12 12-15 15-18	<	0.119	B<						
PB07-03179	SR53-20	18-21 21-24 24-27 27-30	<	0.106	B<						
PB07-03180	SR53-20	30-33 33-36 36-39 39-42	<	0.139	B<						<0.151
PB07-03182	SR53-20	42-45 45-48 48-51 51-54	<	0.150	B<						
		54-57 57-60 *60-64.5* *64.5-66* 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG20 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03183	SR53-21	0-3 3-6	0.924	0.102		24.4	0.227	0.595			
PB07-03184	SR53-21	6-9 9-12 12-15 15-18	4.62	0.116		11.7	0.560	3.944			
PB07-03185	SR53-21	18-21 21-24 24-27 27-30	9.44	0.198		7.63	0.781	8.461			
PB07-03186	SR53-21	30-33 33-36 36-39 39-42 42-45	2.20	0.194		16.9	0.378	1.628			
		45-48 48-51 51-54									
		54-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG21 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03187	SR53-22	0-3 3-6	5.00	0.099		10.4	0.542	4.359			
PB07-03188	SR53-22	6-9 9-12 12-15 15-18	11.5	0.110		7.19	0.909	10.481			
PB07-03189	SR53-22	18-21 21-24 24-27 27-30	2.61	0.104		14.7	0.391	2.115			
PB07-03190	SR53-22	30-33 33-36 36-39 39-42	2.02	0.101		16.5	0.339	1.580			
PB07-03191	SR53-22	42-45 45-48 48-51 51-54 54-57.75-60	1.53	0.106		19.4	0.301	1.123			
		60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG22 (Section B)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03192	SR53-23	0-3 3-6	0.311	0.119		45.1	0.141	0.051			
PB07-03193	SR53-23	6-9 9-12 12-15 15-18	<	0.212	B<						
PB07-03194	SR53-23	18-21 21-24 24-27 27-30	<	0.109	B<						
PB07-03205	SR53-23	30-33 33-36 36-39 39-42	<	0.121	B<						
PB07-03206	SR53-23	42-45 45-48 48-51 51-54	<	0.145	B<						
		54-57 57-60 60-63 63-66 *66-68* *68-73*									
		73-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG23 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03208	SR53-24	0-3 3-6	1.39	0.097		19.5	0.275	1.018			
PB07-03209	SR53-24	6-9 9-12 12-15 15-18	5.45	0.116		10.8	0.612	4.722			
PB07-03210	SR53-24	18-21 21-24 24-27 27-30	16.8	0.232		5.87	1.10	15.468			
PB07-03211	SR53-24	30-33 33-36 36-39 39-42	2.44	0.103		15.2	0.378	1.959			
PB07-03212	SR53-24	42-45 45-48 48-51 51-54 54-57.5	1.84	0.105		17.6	0.329	1.406			
		57.5-61 61-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG24 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03213	SR53-25	0-3 3-6	2.90	0.149		13.7	0.406	2.345			
PB07-03214	SR53-25	6-9 9-12 12-15 15-18	10.5	0.167		7.73	0.881	9.452			
PB07-03215	SR53-25	18-21 21-24 24-27 27-30 30-33 33-35	2.85	0.166		14.6	0.424	2.260			
		35-39 39-42 42-45 45-48 48-51 51-54 54-57 57-59.5 59.5-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG25 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03216	SR53-26	0-3 3-6	1.83	0.154		17.7	0.331	1.345			
PB07-03217	SR53-26	6-9 9-12 12-15 15-18	6.94	0.243		10.00	0.729	5.968			
PB07-03218	SR53-26	18-21 21-24 24-27 27-30	0.305	0.125		47.1	0.144	0.036			
PB07-03219	SR53-26	30-33 33-36 36-39 *39-41*	<	0.099	B<						
		41-45 45-48 48-51 51-54 54-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG26 (Section B)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03220	SR53-27	0-3 3-6	0.411	0.101	#	36.5	0.151	0.159	OK		0.393
PB07-03222	SR53-27	6-9 9-12 12-15 15-18	3.17	0.115		14.00	0.455	2.600			
PB07-03223	SR53-27	18-21 21-24 24-27 27-30	8.80	0.118		8.52	0.793	7.889			
PB07-03224	SR53-27	30-33 33-36 36-39 39-42	9.18	0.106		7.92	0.784	8.290			
PB07-03225	SR53-27	42-45 *45-49.5*	1.61	0.110	#	19.3	0.313	1.187	OK		
		49.5-51 51-54 54-57 57-60 60-63									
		63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG27 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03226	SR53-28	0-3 3-6	1.02	0.118		25.0	0.257	0.645			
PB07-03227	SR53-28	6-9 9-12 12-15 15-18	6.49	0.176		10.1	0.687	5.627			
PB07-03228	SR53-28	18-21 21-24 24-27 27-30	2.40	0.099		15.0	0.366	1.935			
PB07-03229	SR53-28	30-33 33-36 36-39 39-42	1.73	0.162		19.4	0.339	1.229			
PB07-03230	SR53-28	42-45 *45-49*	1.04	0.185		28.0	0.293	0.562			
		49-51 51-54 54-57 *57-59*									
		59-63 *63-67*									
		67-69 69-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG28 (Section B)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03231	SR53-29	0-3 3-6	0.474	0.160	#	41.5	0.197	0.117	OK		
PB07-03232	SR53-29	6-9 9-12 12-15 15-18 *18-20*	1.54	0.105	#	19.3	0.300	1.135	OK		
		20-24 24-27 27-30 30-33 33-36 36-39 39-42 *42-46*									
		46-48 48-51 51-54 54-57 57-60 60-63 63-66 66-69 69-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG29 (Section C)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03439	SR53-30	0-3 3-6	0.500	0.080		29.5	0.148	0.272			
PB07-03440	SR53-30	6-9 9-12 12-15 15-18	<	0.129	B<						<0.061
PB07-03442	SR53-30	18-21 21-24 24-27 27-30	<	0.129	B<						
PB07-03443	SR53-30	30-33 33-36 36-39 39-42	<	0.097	B<						
PB07-03444	SR53-30	42-45 45-48 48-51 51-54 *54-* *56.25-60* 60-63 63-66 66-69 69-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120	<	0.091	B<						

08-Feb-08

SMG30 (Section C)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03445	SR53-31	0-3 3-6	4.51	0.140		10.5	0.495	3.875			
PB07-03446	SR53-31	6-9 9-12 12-15 15-18	1.86	0.098		16.9	0.321	1.441			
PB07-03447	SR53-31	18-21 21-24 24-27 27-30	<	0.122	B<						
PB07-03448	SR53-31	30-33 33-36 36-39 39-42	<	0.140	B<						
PB07-03449	SR53-31	42-45 45-48 48-51 51-54	<	0.086	B<						
		54-57 57-60									
		60-63 63-66 66-69 69-72									
		72-75									
		75-78									
		78-81									
		81-84									
		84-87									
		87-90									
		90-93									
		93-96									
		96-99									
		99-102									
		102-105									
		105-108									
		108-111									
		111-114									
		114-117									
		117-120									

08-Feb-08

SMG31 (Section C)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03450	SR53-32	0-3 3-6	0.445	0.126	#	37.5	0.168	0.151	OK		
PB07-03451	SR53-32	6-9 9-12 12-15 15-18	0.689	0.145	#	33.8	0.234	0.310	OK		
PB07-03453	SR53-32	18-21 21-24 24-27 27-30	<	0.125	B<						
PB07-03454	SR53-32	30-33 33-36 36-39 39-42	<	0.172	B<						
PB07-03455	SR53-32	42-45 45-48 48-51 51-54	<	0.073	B<						
		54-57 57-61 61-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG32 (Section C)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03458	SR53-33	0-3 3-6	1.44	0.086		18.0	0.264	1.090			
PB07-03459	SR53-33	6-9 9-12 12-15 15-18	<	0.078	B<						
PB07-03460	SR53-33	18-21 21-24 24-27 27-30	<	0.084	B<						<0.079
PB07-03462	SR53-33	30-33 33-36 36-39 *39-43.5*	<	0.081	B<						
		43.5-45.5 *45.5-48* 48-51 51-54 54-57 57-60 60-63 63-66 66-69 69-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG33 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03474	SR53-34	0-3 3-6	0.581	0.087		28.6	0.167	0.327			
PB07-03475	SR53-34	6-9 9-12 12-15 15-18	0.667	0.096		28.0	0.188	0.383			
PB07-03476	SR53-34	18-21 21-24 24-27 27-30	<	0.108	B<						
PB07-03477	SR53-34	30-33 33-36 36-39 *39-42.75*	<	0.124	B<						
		42.75-45 45-48 48-51 51-54 54-57 57-60 *60-62.5*									
		62.5-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG34 (Section C)

Lab Number	COC Number	Dpth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03480	SR53-35	0-3 3-6	0.496	0.094	#	32.0	0.160	0.242	OK		0.649
PB07-03482	SR53-35	6-9 9-12 12-15 15-18	0.829	0.119		25.3	0.211	0.499			
PB07-03483	SR53-35	18-21 21-24 24-27 27-30	<	0.121	B<						
PB07-03484	SR53-35	30-33 33-36 36-39 39-42	<	0.124	B<						
PB07-03485	SR53-35	42-45 45-48 48-51 51-54	<	0.114	B<						
		54-57 57-60 60-63 63-66 66-68 68-72 72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG35 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03487	SR53-36	0-3 3-6	0.654	0.112		30.5	0.201	0.341			
PB07-03488	SR53-36	6-9 9-12 12-15 15-18	0.569	0.081	#	27.7	0.159	0.329	OK		
PB07-03489	SR53-36	18-21 21-24 24-27 27-30	6.21	0.099		9.30	0.611	5.500			
PB07-03490	SR53-36	30-33 33-36 36-39 39-42	1.64	0.177	#	20.4	0.337	1.126	OK		
PB07-03491	SR53-36	42-45 45-48 *48-51.5*	<	0.065	B<						
		51.5-54 54-57 57-60 60-63 *63-65*									
		65-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG36 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03492	SR53-37	0-3 3-6	0.509	0.145	#	37.5	0.191	0.173	OK		
PB07-03493	SR53-37	6-9 9-12 12-15 15-18	0.845	0.136		26.5	0.226	0.483			
PB07-03494	SR53-37	18-21 21-24 24-27 27-30	<	0.109	B<						
PB07-03495	SR53-37	30-33 33-36 36-39 39-42	<	0.137	B<						
PB07-03496	SR53-37	42-45 45-48 48-51 51-54 54-57	<	0.172	B<						
		57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG37 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03543	SR53-38	0-3 3-6	0.523	0.113		34.3	0.180	0.230			
PB07-03544	SR53-38	6-9 9-12 12-15 15-18	3.08	0.183		13.4	0.425	2.472			
PB07-03549	SR53-38	18-21 21-24 24-27 27-30	1.26	0.207		26.6	0.337	0.716			
PB07-03550	SR53-38	30-33 33-36 36-39 39-42	<	0.175	B<						
PB07-03551	SR53-38	42-45 45-48 48-51 51-54 54-57	<	0.150	B<						
		57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG38 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03552	SR53-39	0-3 3-6	0.412	0.098		35.9	0.149	0.165			
PB07-03553	SR53-39	6-9 9-12 12-15 15-18	1.43	0.106		20.0	0.290	1.034			
PB07-03554	SR53-39	18-21 21-24 24-27 27-30	6.57	0.098		9.01	0.628	5.844			
PB07-03555	SR53-39	30-33 33-36 36-39 39-42	<	0.169	B<						
PB07-03556	SR53-39	42-45 *45-47*	<	0.144	B<						
		47-51 51-54 54-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG39 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03557	SR53-40	0-3 3-6	0.458	0.096		33.8	0.156	0.206			
PB07-03558	SR53-40	6-9 9-12 12-15 15-18	1.25	0.111		22.0	0.278	0.861			
PB07-03559	SR53-40	18-21 21-24 24-27 27-30	<	0.202	B<						
PB07-03560	SR53-40	30-33 33-36 36-39 39-42	<	0.188	B<						<0.172
PB07-03562	SR53-40	42-45 45-48 *48-50*	<	0.192	B<						
		50-54 54-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG40 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03587	SR53-41	0-3 3-6	0.280	0.086	#	40.8	0.115	0.079	OK		
PB07-03588	SR53-41	6-9 9-12 12-15 15-18	0.955	0.117		25.8	0.248	0.590			
PB07-03589	SR53-41	18-21 21-24 24-27 27-30	<	0.141	B<						
PB07-03590	SR53-41	30-33 33-36 36-39 39-42	<	0.180	B<						
PB07-03591	SR53-41	42-45 *45-49*	<	0.222	B<						
		49-51 51-54 54-57 57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG41 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-03592	SR53-42	0-3 3-6	0.583	0.116	#	32.9	0.192	0.275	OK		
PB07-03593	SR53-42	6-9 9-12 12-15 15-18	0.261	0.101	#	45.9	0.120	0.040	OK		
PB07-03594	SR53-42	18-21 21-24 24-27 27-30	<	0.153	B<						
PB07-03595	SR53-42	30-33 33-36 36-39 39-42	<	0.181	B<						
PB07-03596	SR53-42	42-45 45-48 48-51 51-54 54-57	<	0.121	B<						
		57-60 60-63 63-66 66-69 69-72									
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120									

08-Feb-08

SMG42 (Section C)

Lab Number	COC Number	Depth (in.)	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)	QC (pCi/g)
PB07-03597	SR53-43	0-3 3-6	0.497	0.102		33.3	0.167	0.228				0.395
PB07-03598	SR53-43	6-9 9-12 12-15 15-18	0.906	0.100		24.4	0.223	0.583				0.688
PB07-03599	SR53-43	18-21 21-24 24-27 27-30	<	0.089	B<							<0.087
PB07-03600	SR53-43	30-33 33-36 36-39 39-42	<	0.100	B<						<0.103	<0.119
PB07-03602	SR53-43	42-45 45-48 48-51 51-54	<	0.193	B<							<0.145
		54-57 57-60 60-63 63-66 66-69 69-72										
		72-75 75-78 78-81 81-84 84-87 87-90 90-93 93-96 96-99 99-102 102-105 105-108 108-111 111-114 114-117 117-120										

08-Feb-08

BLANKS

Lab Number	Date	Sample Result (Cs-137)	MDA (pCi/g)	Lab Flag	Uncertainty 2 Sigma (%)	2 Sigma (pCi/g)	(Result - 2 Sigma) - MDA (+ = good, - = bad)	R.Case Note	Haag Note	Recount (pCi/g)
PB07-00154	23-Jan-07	~~0.03~~	0.035	A	**93.54**	0.028	**-0.033**		Reject	
PB07-00308	31-Jan-07	~~0.037~~	0.041	#A	**97.6**	0.036	**-0.04**	NO		
PB07-00359	6-Feb-07	~~0.054~~	0.033	#	**57.74**	0.031	**-0.01**	NO		
PB07-00513	12-Feb-07	~~0.043~~	0.029	#	**60.3**	0.026	**-0.012**	NO		
PB07-00567	15-Feb-07	<MDA	0.029	B<						
PB07-00566	15-Feb-07	~~0.037~~	0.03	#	**66.67**	0.024	**-0.017**	NO		
PB07-01665	30-May-07	<MDA	0.061	B<						
PB07-01704	31-May-07	<MDA	0.066	B<						
PB07-01722	4-Jun-07	<MDA	0.062	B<						
PB07-01704	4-Jun-07	<MDA	0.063	B<						
PB07-01766	5-Jun-07	<MDA	0.059	B<						
PB07-01767	5-Jun-07	<MDA	0.055	B<						
PB07-01844	12-Jun-07	<MDA	0.067	B<						
PB07-02949	25-Sep-07	<MDA	0.034	B<						
PB07-02979	26-Sep-07	<MDA	0.029	B<						
PB07-03003	27-Sep-07	<MDA	0.028	B<						
PB07-03175	10-Oct-07	<MDA	0.031	B<						
PB07-03207	11-Oct-07	<MDA	0.034	B<						
PB07-03233	11-Oct-07	<MDA	0.034	B<						
PB07-03234	11-Oct-07	<MDA	0.033	B<						
PB07-03497	31-Oct-07	<MDA	0.018	B<						
PB07-03498	31-Oct-07	<MDA	0.014	B<						
PB07-03499	31-Oct-07	<MDA	0.025	B<						
PB07-03563	6-Nov-07	<MDA	0.019	B<						
PB07-03608	13-Nov-07	<MDA	0.024	B<						
PB07-03609	13-Nov-07	<MDA	0.025	B<						

APPENDIX C

ESTIMATION OF WATER-BORNE Cs-137 ACTIVITY BEYOND WEMS
(Also provided as a separate computer file named 309mCicalc_08JAN08.xls)

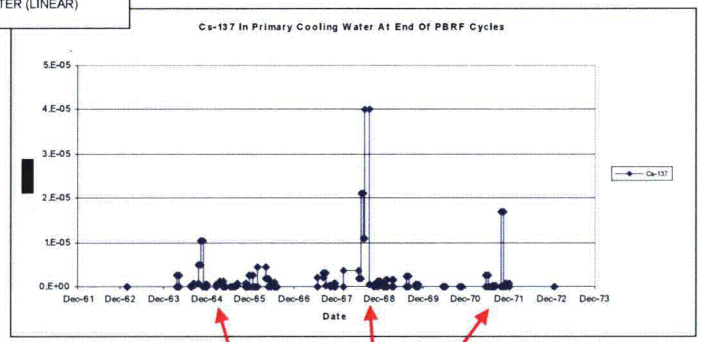
08-Feb-08 Estimation of Water-Borne Cs-137 Activity Beyond WEMS by: RDH ck:RSH app:RSH

BKGND= 0.5 pCi/g

STREAM MOUTH AREA	CF	PCF	G/POUND	G	pCi/G	pCi	mCi		
B highest	15000	85	454	578,850,000	8.4	4862340000	4.9		
B rest	15000	85	454	578,850,000	4	2315400000	2.3		
A highest	2678.5	85	454	103,363,315	3.9	403116928.5	0.4		
A rest	5357	85	454	206,726,630	3.5	723543205	0.7		
C highest	2143	85	454	82,698,370	6.5	537539405	0.5		
C rest	2143	85	454	82,698,370	3.5	289444295	0.3	Subtotal SM(A+B+C) 9.1	9%
Delta chan	50000	85	454	1,929,500,000	1.5	2894250000	2.9		
Delta rest	1050232	85	454	40,528,452,880	0.5	20264226440	20.3		
Tribs	613760	85	454	23,684,998,400	0.5	11842499200	11.8		
Rest	458251	85	454	17,683,906,090	0.5	8841953045	8.8	Subtotal SM Large Areas 43.8	42%
					Stream Mouth Total		53.0	51% SM	
OTHER AREAS									
Bay and Flood Plain (No Estimate)							0.0	0% BY, FP	
Pentolite AOC1BC									
Highest	2200	85	454	84,898,000	249.5	21182051000	21.2	20% AOC1BC	
Rest	19400	85	454	748,646,000	5.5	4117553000	4.1	4% AOC1BC	
Pentolite AOC1A									
Highest	1958.4	85	454	75,574,656	124.5	9409044672	9.4	9% AOC1A	
Rest	17625.6	85	454	680,171,904	5.5	3740945472	3.7	4% AOC1A	
Stream Areas	1200	85	454	46,308,000	24.5	1134546000	1.1	1% Meanders	
Backwater Areas	1250	85	454	48,237,500	24.5	1181818750	1.2	1% Backwaters	
WEMS	675	85	454	26,048,250	399.5	10406275875	10.4	10% WEMS-front	
					Total Accounted For		104.1	100%	104 mCi

FIGURE FROM CONCEPT REPORT

FIGURE 9 – Cs-137 IN WATER (LINEAR)



Year	% Cs-137 Released	mCi (released)	mCi (2007)
1964	14	0.7	0.26
1965	3	0.15	0.057
1966	6	0.3	0.12
1967	4	0.2	0.08
1968	55	2.75	1.13
1969	4	0.2	0.084
1970	0	0	0
1971	14	0.7	0.31
	100 % Total	5 mCi Total	2.041 mCi Total

ASSUMPTIONS:
1. Stream Mouth (SM) areas defined in SM report.
2. Pentolite AOC1A, B, C in blocks 20'x20'x6" deep; activities from MWH report on Survey Package A23000 101C5, and from MOTA drawing "PENTOLITE DITCH POSTING PLOT.DWG (1 OF 2)"
3. Representative activities for AOC1 A, B, C by methods defined in SM report, otherwise assumed 6 pCi/g.
4. 30 Stream Meander areas, each measuring 40 CF, with representative activity of 25 pCi/g.
5. One Stream Backwater area measuring 50'x50'x6", with representative activity of 25 pCi/g.
6. 25 CY in front of WEMS with most elevated activity.
7. Activities measured between 2004-2007, not adjusted for decay in 2008.