Response to the Approval with Modifications for the Supplemental Interim Measure Report for Solid Waste Management Unit 01-001(f), Revision 1, Los Alamos National Laboratory, EPA ID No. NM0890010515, HWB-LANL-03-007, Dated June 2, 2011

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment.

COMMENTS

NMED Comment

1. MI Sampling, Response 1

The Permittees' response to NMED's March 4, 2011 NOD, Comment 1 states, "NMED did not require the Laboratory to submit a work plan before source removal and did not specify a method for confirmation sampling. During a site visit at SWMU 01-001(f) on December 2, 2009, NMED personnel suggested the Laboratory use multi-increment (MI) sampling for confirmation at SWMU 01-001(f)." NMED's administrative record does not include a proposal from the Permittees to use the MI sampling or contain a written approval by NMED that MI sampling is acceptable for use for confirmation sampling at SWMU 01-001(f). The use of the MI sampling approach was not an appropriate method to confirm the removal of PCB contaminated materials. Regardless, the Permittees did not correctly apply the MI sampling method. The Permittees must resample the areas where MI sampling was used as part of the approved Phase II Investigation for Upper Los Alamos Canyon Aggregate Area. The Permittees must determine the vertical and lateral extent of the PCB contamination at SWMU 01-001(f) at the top of the drainage, within the drainage, and below LA-SMA-2 as necessary and collect samples to confirm the removal of all soil and tuff containing contaminant concentrations greater than the applicable screening levels.

LANL Response

1. The Laboratory does not plan to use MULTI INCREMENT (MI) sampling during future work at Solid Waste Management Unit (SWMU) 01-001(f), based on the notice of disapproval (NOD) for the Supplemental Interim Measure Report for Solid Waste Management Unit 01-001(f), dated February 2, 2011 (NMED 2011, 111748). The Laboratory has already collected discrete samples from the areas where MI sampling was previously used in preparation for additional removal actions. In addition, the Laboratory will collect more discrete samples as necessary to confirm the effectiveness of the removal actions, define the lateral and vertical extent of chemicals of potential concern (COPCs), and conduct risk screening assessments at SWMU 01-001(f), as required for all Compliance Order on Consent (Consent Order) sites.

NMED Comment

2. MI Sampling, Response 2

The Permittees' response to NMED's March 4, 2011 NOD, Comment 2a states, "[n]either the supplemental interim measures (IM) report nor the State of Alaska Department of Environmental Conservation (DEC) Draft Guidance on MULTI INCREMENTAL Soil Sampling cite U.S. Environmental Protection Agency (EPA) Method 8330B, Appendix A." EPA Method 8330B, Appendix A has been reviewed by NMED and is an approved method for sampling in certain circumstances. The ADEC Draft Guidance document has neither been reviewed, nor approved by NMED.

LANL Response

2. Comment noted.

NMED Comment

3. MI Sampling, Response 3e

The Permittees' response to NMED's March 4,2011 NOD, Comment 3e states, "[t]he Laboratory did not use the MI sampling guidance documents to perform the 95% upper confidence limit (UCL) calculations. The EPA program ProUCL was used to calculate the 95% UCLs for SWMU 01-001(f) before and after cleanup activities ... [t]his calculation was performed using the characterization data presented in the investigation report for Upper Los Alamos Canyon Aggregate Area to represent the 'before' value and the confirmation data presented in Table 5.1-1 of the supplemental IM report to represent the 'after' value."

a. *The data packages containing analytical results for the confirmation samples are provided as Appendix D of the Report. It appears that analytical results for many samples containing significant concentrations of Aroclor-1254 and Aroclor-1260, were not included in Table 5.1-1 (PCBs Detected in Confirmation Samples from SWMU 01-001(f) Outfall and Drainage) and Plate 1 (PCBs detected in confirmation samples following interim removal activities implemented in 2009 and 2010 within the SWMU 01-001(f) outfall and drainage) for consideration in this report. The samples may have been omitted based on sampling depth and exposure intervals. A total of 150 samples were collected and sent to the laboratories for PCB analysis, 117 samples were selected for calculating the UCLs and from those 117 samples, 115 samples were used to calculate the UCL for Aroclor-1254 and 116 samples were used to calculate the UCL for Aroclor-1260. Explain the rationale used to determine which samples would be used to calculate the UCLs. Also, 111 samples (including seven without reported results) are depicted on Plate 1. Explain the criteria used to select the samples depicted on Plate 1.*

b. *Section 5.1 of the report provides a "before" value for the UCL calculation, which is based on characterization data collected before the removal action; and an 'after' value for the UCL which is based on confirmation data collected after the removal action. The response to comment 3(e) states that the 'after' UCL is calculated based on data provided in Table 5.1-1. The 'before' value was calculated using characterization data from the* Investigation Report for Upper Los Alamos Canyon, Revision 1 *(IR). In the response letter, indicate if the UCL was reported in the IR or if the data was used for calculation only and not reported in the IR.*

c. It appears that there are inconsistencies with the data that were included in the UCL calculations based on the ProUCL output spreadsheets provided.

1. For Aroclor-1254, the ProUCL output spreadsheet indicates that 115 records were utilized to calculate the UCL, and 12 of those records were non-detects. This is inconsistent with the data provided in Table 5.1-1, which indicates that there are 105 records, all of which are positive detections (i.e., no non-detect values). The analytical data spreadsheet provided in Appendix D indicates 117 records and all of the data report detections of Aroclor-1254. Explain this discrepancy in the response letter.

2. For Aroclor-1260, the ProUCL output spreadsheet indicates that 116 records were utilized to calculate the UCL, and that 52 of those records were non-detects. This is inconsistent with the data provided in Table 5.1-1, which indicates that there are 105 records where 40 were non-detects. The analytical data spreadsheet provided in Appendix D indicates 117 records and all of the data report detections of Aroclor-1260. Explain this discrepancy in the response letter.

Based on these inconsistencies, and without the provision of the ProUCL input files, it is not clear which data were utilized to calculate the "after" UCLs provided in Attachment 1. The ProUCL output files in Attachment 1 indicate that the data used to calculate UCLs are inconsistent with data provided in Table 5.1-1. Based on the data in Table 5.1-1, UCLs are likely to be significantly lower than the "before" values. However, a risk assessment is not appropriate or warranted at this time because all hazardous constituents have not been analyzed at the site. The Permittees must conduct a complete risk assessment after the Phase II investigation has been completed for the Upper Los Alamos Canyon Aggregate Area. The risk assessment must include all constituents of concern present at the site.

LANL Response

3. a. Both Tables 4.1-1 and 5.1-1 contain sample-specific information: Table 4.1-1 presents information about the confirmation samples (i.e., unexcavated samples) collected and the analysis requested, and Table 5.1-1 presents a summary of the detected analytical results for material left in place (i.e., polychlorinated biphenyls [PCBs] detected in unexcavated confirmation samples). However, three samples originally included in Table 4.1-1 (CALA-10-4618, CALA-10-4619, and CALA-10-11254) were excavated during removal efforts at SWMU 01-001(f) and should not have been included in Table 4.1-1. Two of these samples (CALA-10-4619 and CALA-10-11254) had detections of PCBs and were therefore inadvertently included in Table 5.1-1, which presents only the detected results for unexcavated samples. These samples are correctly excluded from Plate 1 because they were excavated and should not have been included in Table 5.1-1. Tables 4.1-1 and 5.1-1 have been corrected to exclude the excavated samples, and replacement tables are provided in Attachment 1 of this response. Note that, because Aroclor-1254 is the predominant PCB present at SWMU 01-001(f), all of the samples presented in Table 5.1-1 contain detected concentrations of Aroclor-1254, whereas less than half of the samples contain detected concentrations of Aroclor-1260. In other words, every time Aroclor-1260 was detected, Aroclor-1254 was detected, but the converse is not true.

   Appendix D provides the analytical results for all of the samples collected, regardless of whether the results were above the detection limit or the sampling locations were subsequently excavated. A total of 151 samples were collected and submitted to the laboratory for analysis of PCBs at SWMU 01-001(f). Of these 151 samples, 24 samples were originally flagged as excavated and 10 samples were field duplicates, leaving 117 samples to be used for the evaluation of current PCB concentrations in the drainage at SWMU 01-001(f). However, the excavation flags have now been

corrected for samples CALA-10-4618, CALA-10-4619, and CALA-10-11254. Therefore, the corrected sample count is 114 confirmation samples for evaluation of current PCB concentrations, 27 excavated samples, and 10 field duplicates, resulting in a total of 151 samples. The revised Appendix D files are included in Attachment 1 of this response (on CD).

Plate 1 presents all unexcavated locations sampled but only presents PCB data above detection limits; nondetect data are not presented. There are 105 locations presented on the plate, with a total of 114 samples collected (i.e., 9 of the 105 locations were sampled at 2 depths, neither of which were excavated). Three of the nine locations sampled at two depths did not have detections of PCBs in the deeper samples, and therefore the data for the deeper samples are not presented. However, the total depths of sampling at these three locations should have been included on the plate, in accordance with recent NMED direction. Therefore, revised Plate 1, including the total depths sampled at locations 00-603832, 00-603834, and 00-603835, is included in Attachment 1 of this response.

There are a total of 12 samples that did not contain detectable concentrations of either Aroclor-1254 or Aroclor-1260, which is why only 105 of the 117 samples (and 1 duplicate sample, per NMED's direction [NMED 2011, 111748]) were included in Table 5.1-1. This has now been corrected to 11 unexcavated samples without detected concentrations of either Aroclor-1254 or Aroclor-1260, and 103 of 114 samples (plus 1 duplicate sample) are included in the revised Table 5.1-1. Results for all 114 confirmation samples are presented in the core investigative data table in Appendix D, and all 114 results were used to calculate the "after" upper confidence limit (UCL), regardless of depth. The UCLs were calculated to indicate, for comparison purposes only, the relative decrease of PCB concentrations as a result of removal activities to date at SWMU 01-001(f).

b. The "before" UCL was not reported in the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1 (LANL 2010, 108528). It was calculated to indicate, for comparison purposes only, the relative decrease of PCB concentrations as a result of removal activities to date at SWMU 01-001(f).

c. All unexcavated results as presented in the core investigative data table in Appendix D were used to calculate the UCLs, regardless of detection status or depth. Table 5.1-1 summarizes all the detected results for unexcavated samples included in the evaluation of the interim measure for SWMU 01-001(f). That is why there is a discrepancy between the table and the UCL input data. However, because three samples were inadvertently retained in the unexcavated data set, ProUCL was rerun following correction of the excavation flags. The recalculated "after" exposure point concentrations (EPCs) are very similar to the original EPCs (8.55 mg/kg versus 8.49 mg/kg for Aroclor-1254; 1.57 mg/kg versus 1.58 mg/kg for Aroclor-1260). The revised ProUCL output is included in Attachment 1 of this response, along with a replacement page showing a minor revision to the text. It is unknown why the original ProUCL output indicated that fewer than 117 results were used to calculate the "after" EPCs (115 for Aroclor-1254 and 116 for Aroclor-1260); however, the revised ProUCL output shows that all 114 unexcavated results were used to calculate the EPCs for both Aroclors.

   Following these revisions, there are results for 103 samples (plus 1 duplicate) presented in Table 5.1-1, 114 samples are shown as unexcavated in Appendix D, and 114 sample results are included in the ProUCL input file.

   The Laboratory agrees that a risk assessment is not appropriate at this time. Risk evaluation of all COPCs will be conducted once the extent of contamination is defined.

NMED Comment

4. MI Sampling, Response 3e

The Permittees' response to NMED's March 4, 2011 NOD, Comment 3e states, "[t]he IM is not intended to be a final remedy, and risk-screening results and recommendations will be presented in the Phase II investigation report for Upper Los Alamos Canyon Aggregate Area." NMED agrees that the IM is not the final remedy; therefore, the Permittees are required to complete the following activities as part of the Phase II Investigation for Upper Los Alamos Canyon Aggregate Area (Phase II investigation):

1. *Define the lateral and vertical extent of PCB contamination associated with SWMU 01-001(f) at the top of the drainage, within the drainage, and below LA-SMA-2.*
2. *After completion of removal activities at locations LA-611150, LA-611183, and LA-611185, the Permittees must collect discrete confirmation samples in accordance with the approved Phase II Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area.*
3. *NMED's Comment 5 of the Approval with Modifications letter, dated August 25, 2010, directed the Permittees to collect five discrete confirmation samples at the location of the former septic tank to demonstrate that all PCB contaminated soils have been removed. However, the Permittees were unable to be complete the task at that time. As such, the Permittees must collect five discrete confirmation samples at the location of the former septic tank and provide the confirmation results in the Phase II investigation report for Upper Los Alamos Canyon Aggregate Area. The discrete confirmation samples must be collected in accordance with the approved Phase II Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area.*
4. *Collect appropriate discrete confirmation samples in accordance with the approved Phase II Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area at all locations where MI sampling was conducted.*
5. *Once the Phase II investigation has been completed, a risk assessment must be completed that includes all constituents of concern.*

LANL Response

4. 1. Comment noted.

   2. Following completion of removal activities at SWMU 01-001(f), confirmation samples will be collected from all excavated areas at a rate of at least 1 per 100 ft^2 of excavated area. Using all confirmation data, a risk screening assessment will be conducted to evaluate whether the site poses a potential unacceptable risk under the current and foreseeable future land use scenario (i.e., recreational).

   3. NMED's comment 5 of the direction to modify letter, dated August 25, 2010 (NMED 2010, 110469), directed the Laboratory to collect samples from the five locations marked as excavated in Figure 4.1-1 of the Interim Measure Report for Solid Waste Management Unit 01-001(f) and Los Alamos Site Monitoring Area 2 (LANL 2010, 109422). These locations, which actually total four on Figure 4.1-1, are located at the outfall where removal activities are ongoing. Although the comment indicates that the same locations must be sampled, these locations are not likely to be the best locations to determine lateral extent once the footprint of the excavation has reached its final dimensions. Regardless, following completion of the removal activity, an adequate number of

samples will be collected from the outfall area to (1) confirm that the removal action was effective and (2) define the lateral and vertical extent of contamination. These results will be presented in the Phase II Investigation Report for Upper Los Alamos Canyon Aggregate.

4. MI sampling locations have already been replaced with discrete samples, and no MI sampling will be conducted at SWMU 01-001(f) in the future without prior approval by NMED.

5. Once the nature and extent of contamination have been defined for SWMU 01-001(f), a risk screening assessment using all unexcavated samples and all COPCs will be conducted.

NMED Comment

5. *Table 5.1 (PCBs Detected in Confirmation Samples from SWMU 01-001(f) Outfall and Drainage) appears to be missing 12 samples (RE00-08-16151, RE00-08-16155, RE00-08-16157, RE01-10-5536, RE01-10-5539, CALA-10-4618, CALA-10-11201, CALA-10-11202, RE01-10-11576, CALA-10-11227, CALA-10-11228, and CALA-10-11232). Explain why these samples are not included in the table in the response letter and present the analytical results in the Phase II Investigation Report for the Upper Los Alamos Canyon Aggregate Area.*

LANL Response

5. The samples cited in the comment are not shown in Table 5.1-1 [PCBs Detected in Confirmation Samples from SWMU 01-001(f) Outfall and Drainage], because no PCBs were detected in these samples. Consistent with all previous reports prepared under the Consent Order, the main body of the report contains a summary table that presents only detected results for PCBs. Complete data sets, including results below detection limits for all samples cited in the comment, are included in Appendix D. Results will be presented in a similar manner in the Phase II Investigation Report for the Upper Los Alamos Canyon Aggregate Area.

REFERENCES

LANL (Los Alamos National Laboratory), February 2010. "Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-10-0422, Los Alamos, New Mexico. (LANL 2010, 108528)

LANL (Los Alamos National Laboratory), May 2010. "Interim Measure Report for Solid Waste Management Unit 01-001(f) and Los Alamos Site Monitoring Area 2," Los Alamos National Laboratory document LA-UR-10-2641, Los Alamos, New Mexico. (LANL 2010, 109422)

NMED (New Mexico Environment Department), August 25, 2010. "Direction to Modify Interim Measure Report, Solid Waste Management Unit 01-001(f) and Los Alamos Site Monitoring Area 2 (LA-SMA-2)," New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M.J. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 110469)

NMED (New Mexico Environment Department), February 2, 2011. "Notice of Disapproval, Supplemental Interim Measure Report, Solid Waste Management Unit 01-001(f)," New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M.J. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2011, 111748)

Attachment 1

Replacement Pages

Revised Text and Tables

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Figures

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Appendixes

Plates

Acronyms and Abbreviations

AOC	area of concern
ARS	American Radiation Services
BMP	best management practice
COC	chain of custody
Consent Order	Compliance Order on Consent
DOE	Department of Energy (U.S.)
DGPS	differential global-positioning system
EP	Environmental Programs Directorate
EPA	Environmental Protection Agency (U.S.)
FD	field duplicate (sample)
FFCA	Federal Facility Compliance Agreement
FR	field rinsate (sample)
GPS	global-positioning system
IA	Information Architecture
IDW	investigation-derived waste
IM	interim measure(s)
LA-SMA	Los Alamos Site Monitoring Area
LANL	Los Alamos National Laboratory
LLW	low-level radioactive waste
MI	multi-incremental (MULTI INCREMENT)
NMED	New Mexico Environment Department

5.0 SUPPLEMENTAL INTERIM MEASURE RESULTS

5.1 Confirmation of Supplemental Source Removal

Data from the supplemental confirmation samples collected on July 22, 2010, are presented in Table 5.1-1 and on Plate 1. Appendix D (on DVD) provides the analytical data, data packages, and data validation reports. Although Table 5.1-1 shows that Aroclor-1254 and Aroclor-1260 were the only Aroclors detected, review of the analytical data in Appendix D indicates that there were a number of instances where detection limits for other Aroclors were greater than cleanup levels. These elevated detection limits were associated with the analytical sample dilution needed because of high concentrations of Aroclor-1254 and/or Aroclor-1260. In no cases were there high detection limits for some Aroclors without at least one other Aroclor being detected at high concentrations. Therefore, although some Aroclors above cleanup levels may not have been quantified in all samples, the results were acceptable for identifying all locations requiring removal. Elevated detection limits were not an issue with the supplemental confirmation data set because samples were less contaminated and high sample dilution was not needed.

Sampling data for the 13 confirmation samples collected on July 22, 2010, show PCB concentrations above target cleanup levels (i.e., recreational SSLs). Aroclor-1254 was detected above the recreational SSL (6.65 mg/kg) in 9 of the 13 confirmation samples, and Aroclor-1260 was also detected above the recreational SSL (10.5 mg/kg) in 3 of the 9 samples. The combined concentrations of Aroclor-1254 and Aroclor-1260 in these nine samples are 1.3 to 10.7 times higher than recreational SSLs.

As described in section 3.0, the interim measure is not intended as a final remedy for the site and recreational SSLs are used to guide cleanup based on expected land use. Although PCB concentrations above recreational SSLs remain in some locations of the SWMU 01-001(f) outfall area and drainage, the interim measure has resulted in the reduction of PCB concentrations in soil, sediment, and tuff at and below SWMU 01-001(f). The 95% upper confidence limit (UCL) of the mean for Aroclor-1254 calculated using EPA's ProUCL software decreased from 46.0 mg/kg before the start of cleanup activities to 8.55 mg/kg following the supplemental interim measure activities. The "before" value was calculated using the characterization data presented for SWMU 01-001(f) in the Investigation Report for Upper Los Alamos Canyon, Revision 1 (LANL 2010, 108528); the "after" value was calculated using the confirmation data presented in this supplemental interim measure report.

Additional activities proposed to complete corrective actions at the site are discussed in section 6.0.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Implementation of the interim measures achieved the desired objectives of reducing the contaminant inventory in the drainage system below SWMU 01-001(f) and controlling contaminant migration. Recommendations for additional actions are associated with long-term controls for the site.

Additional removal and stabilization activities are recommended for the mesa-top portion of the site because of the accessibility of this area by the public. To assist in planning for these efforts, vertical-profile sampling is recommended around the area of the current excavation (Area 1 in Figure 4.1-1) to verify the volume of additional material to be removed and to define the lateral and vertical extent of PCBs. Final confirmation sampling will be performed, as necessary, to ensure decision-level data have been collected for every 100 ft^2 of excavated area.

To further control migration of residual contamination at the site, it is recommended that run-on be diverted from the outfall area and hillside drainage portions of the site and that additional stabilization measures be implemented within the hillside drainage. These activities will be coordinated with

installation of BMPs and other controls under the individual permit. To date, the individual permit has not required the installation of run-on controls or monitoring at the top of the SWMU 01-001(f) drainage.

To evaluate the potential need for further cleanup activities within the hillside drainage portion of the site, a risk assessment is recommended for this area. This risk assessment would evaluate the risk associated with current and potential future use of the site. It is recommended that this risk assessment be performed as part of the Phase II investigation for Upper Los Alamos Canyon Aggregate Area and that any additional cleanup activities be implemented as part of corrective measures for the aggregate area. The Phase II investigation will also address the determination of the nature and extent of contamination at SWMU 01-001(f), including at the former location of the SWMU 01-001(f) septic system.

Finally, it is recommended that monitoring be performed below the riparian vegetation zone. These monitoring results would be used to evaluate the effectiveness of the retention ponds and the riparian vegetation zone in controlling migration of contaminants in Los Alamos Canyon.

7.0 SCHEDULE FOR ADDITIONAL WORK

Additional sampling and cleanup of the mesa-top area would be implemented in advance of the Phase II investigation for Upper Los Alamos Canyon Aggregate Area to expedite final cleanup of this area. Actions for the hillside drainage would be integrated into the schedules for the Phase II investigation and implementation of individual permit requirements.

8.0 REFERENCES AND MAP DATA SOURCES

8.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Ahlquist, A.J., A.K. Stoker, and L.K. Trocki (Comp.), December 1977. "Radiological Survey and Decontamination of the Former Main Technical Area (TA-1) at Los Alamos, New Mexico," Los Alamos Scientific Laboratory report LA-6887, Los Alamos, New Mexico. (Ahlquist et al. 1977, 005710)

Buckland, C.W., April 21, 1964. "Final Radioactive Contamination Survey of Certain Structures in TA-1," Los Alamos Scientific Laboratory memorandum to S.E. Russo (ENG-3) from C.W. Buckland (H-1), Los Alamos, New Mexico. (Buckland 1964, 004810)

LANL (Los Alamos National Laboratory), May 21, 2001. "Los Alamos National Laboratory Structure History Book TA-01," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2001, 069946)

Table 4.1-1
Confirmation Samples Collected and Analysis Requested at SWMU 01-001(f)

Sample ID	Location ID	Depth (ft)	Media	PCB*
RE00-08-16146	00-603830	0–1.25	SED	09-242
RE00-08-16147	00-603830	1.25–3.25	QBT3	09-242
RE00-08-16150	00-603832	0–1.25	SED	09-236
RE00-08-16151	00-603832	1.25–2.5	QBT3	09-236
RE00-08-16152	00-603833	0–1	SED	09-236
RE00-08-16153	00-603833	1–2	QBT3	09-236
RE00-08-16154	00-603834	0–1	SED	09-236
RE00-08-16155	00-603834	1.25–2.25	QBT3	09-236
RE00-08-16156	00-603835	0–1	SED	09-236
RE00-08-16157	00-603835	1–2	QBT3	09-236
RE00-08-16158	00-603836	0–1	SED	09-220
RE00-08-16159	00-603836	1.75–2.75	QBT3	09-220
RE01-10-5536	01-609991	0–0.04	SED	10-525
RE01-10-5537	01-609992	0–5.25	SED	10-525
RE01-10-5538	01-609993	0–2	SED	10-525
RE01-10-5539	01-609994	0–1.41	QAL	10-525
RE01-10-5540	01-609995	0–4.13	SED	10-525
RE01-10-11576	01-611286	0–0.25	SOIL	10-1307
RE01-10-11577	01-611287	0–0.25	SOIL	10-1307
RE01-10-11578	01-611288	0–0.25	SOIL	10-1307
RE01-10-11579	01-611289	0–0.25	SOIL	10-1307
RE01-10-11580	01-611290	0–0.25	SOIL	10-1307
RE01-10-11581	01-611291	0–0.25	SOIL	10-1307
RE01-10-11582	01-611292	0–0.25	SOIL	10-1307
RE01-10-11583	01-611293	0–0.25	SOIL	10-1307
RE01-10-11584	01-611294	0–0.25	SOIL	10-1307
RE01-10-11585	01-611295	0–0.25	SOIL	10-1307
RE01-10-11586	01-611296	0–0.25	SOIL	10-1307
RE01-10-11587	01-611297	0–0.25	SOIL	10-1307
CALA-10-9847	LA-610960	0–0.25	SED	10-1064
CALA-10-9848	LA-610961	0–0.25	SED	10-1064
CALA-10-9849	LA-610962	0–0.25	SED	10-1064
CALA-10-9850	LA-610963	0–0.25	SED	10-1064
CALA-10-9851	LA-610964	0–0.25	SED	10-1064
CALA-10-9852	LA-610965	0–0.25	SED	10-1064
CALA-10-9853	LA-610966	0–0.25	SED	10-1064
CALA-10-9854	LA-610967	0–0.25	SED	10-1064
CALA-10-9855	LA-610968	0–0.25	SED	10-1064
CALA-10-9856	LA-610969	0–0.25	SED	10-1064

Table 4.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	PCB*
CALA-10-9857	LA-610970	0–0.25	SED	10-1064
CALA-10-9858	LA-610971	0–0.25	SED	10-1064
CALA-10-9859	LA-610972	0–0.25	SED	10-1064
CALA-10-9860	LA-610973	0–0.25	SED	10-1064
CALA-10-9862	LA-610975	0–0.25	SED	10-1064
CALA-10-9863	LA-610976	0–0.25	SED	10-1064
CALA-10-9864	LA-610977	0–0.25	SED	10-1064
CALA-10-9866	LA-610979	0–0.25	SED	10-1064
CALA-10-11201	LA-611127	0–1	SOIL	10-1308
CALA-10-11202	LA-611128	0–1	SOIL	10-1308
CALA-10-11203	LA-611126	0–0.5	QBT3	10-1691
CALA-10-11204	LA-611125	0–0.5	QBT3	10-1691
CALA-10-11205	LA-611129	0–0.5	QBT3	10-1691
CALA-10-11206	LA-611130	0–0.5	QBT3	10-1691
CALA-10-11207	LA-611131	0–0.5	QBT3	10-1691
CALA-10-11208	LA-611132	0–0.5	QBT3	10-1691
CALA-10-11209	LA-611133	0–0.5	QBT3	10-1691
CALA-10-11210	LA-611134	0–0.5	QBT3	10-1691
CALA-10-11211	LA-611135	0–0.5	QBT3	10-1691
CALA-10-11212	LA-611136	0–0.5	QBT3	10-1691
CALA-10-11213	LA-611137	0–0.5	QBT3	10-1691
CALA-10-11215	LA-611139	0–0.5	QBT3	10-1691
CALA-10-11216	LA-611140	0–0.5	QBT3	10-1691
CALA-10-11217	LA-611141	0–0.5	QBT3	10-1691
CALA-10-11218	LA-611142	0–0.5	QBT3	10-1691
CALA-10-11219	LA-611143	0–0.5	QBT3	10-1691
CALA-10-11220	LA-611144	0–0.5	QBT3	10-1691
CALA-10-11221	LA-611145	0–0.5	QBT3	10-1691
CALA-10-11226	LA-611150	0–0.5	SOIL	10-1889
CALA-10-11227	LA-611151	0–0.5	SOIL	10-1889
CALA-10-11228	LA-611152	0.5–1	SOIL	10-1889
CALA-10-11229	LA-611153	0–1	SOIL	10-1889
CALA-10-11230	LA-611154	0–0.25	SOIL	10-1889
CALA-10-11231	LA-611155	0–0.33	SOIL	10-1889
CALA-10-11232	LA-611156	0–0.33	SOIL	10-1889
CALA-10-11233	LA-611157	0–0.166	SOIL	10-1889
CALA-10-11234	LA-611158	0–0.5	SOIL	10-1889
CALA-10-11235	LA-611158	0.5–1.5	SOIL	10-1889
CALA-10-11236	LA-611160	0–0.5	SOIL	10-1889
CALA-10-11237	LA-611160	0.5–1.5	SOIL	10-1889

Table 4.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	PCB*
CALA-10-11238	LA-611162	0−0.5	SOIL	10-1889
CALA-10-11239	LA-611162	0.5−1.0	SOIL	10-1889
CALA-10-11240	LA-611164	0–0.5	QBT3	10-2100
CALA-10-11251	LA-611175	0–0.5	QBT3	10-2100
CALA-10-11252	LA-611176	0–0.5	QBT3	10-2100
CALA-10-11253	LA-611177	0–0.5	QBT3	10-2100
CALA-10-11255	LA-611179	0–0.5	QBT3	10-2100
CALA-10-11256	LA-611180	0–0.5	QBT3	10-2100
CALA-10-11257	LA-611181	0–0.5	QBT3	10-2100
CALA-10-11258	LA-611182	0–0.5	QBT3	10-2100
CALA-10-11259	LA-611183	0–0.5	SED	10-2100
CALA-10-11260	LA-611184	0–0.5	QBT3	10-2100
CALA-10-11261	LA-611185	0–0.5	QBT3	10-2100
CALA-10-11262	LA-611186	0–0.5	QBT3	10-2142
CALA-10-11263	LA-611187	0–0.5	SED	10-2142
CALA-10-11264	LA-611188	0–0.5	QBT3	10-2142
CALA-10-11265	LA-611189	0–0.5	QBT3	10-2142
CALA-10-11266	LA-611190	0–0.5	QBT3	10-2142
CALA-10-11267	LA-611191	0–0.5	QBT3	10-2142
CALA-10-11268	LA-611192	0–0.5	QBT3	10-2142
CALA-10-11269	LA-611193	0–0.5	QBT3	10-2142
CALA-10-11270	LA-611194	0–0.5	QBT3	10-2142
RE01-10-23245	01-612620	2.9−3.0	QBT3	10-3787
RE01-10-23246	01-612621	5.0−5.1	QBT3	10-3787
RE01-10-23247	01-612622	2.5−2.6	QBT3	10-3787
RE01-10-23248	01-612623	3.0−3.1	QBT3	10-3787
RE01-10-23249	01-612624	2.9−3.0	QBT3	10-3787
RE01-10-23250	01-612625	2.9−3.0	QBT3	10-3787
RE01-10-23251	01-612626	3.4−3.5	QBT3	10-3787
RE01-10-23252	01-612627	3.4−3.5	QBT3	10-3787
RE01-10-23253	01-612628	4.0−4.1	QBT3	10-3787
RE01-10-23254	01-612629	4.0−4.1	QBT3	10-3787
RE01-10-23255	01-612630	2.5−2.6	QBT3	10-3787
RE01-10-23256	01-612631	3.0−3.1	QBT3	10-3787
RE01-10-23257	01-612632	2.9−3.0	QBT3	10-3787

Note: QBT3 is the third cooling unit of the Quaternary Bandelier Tuff; SED is sediment.

* Numbers in this column are analytical request numbers.

Table 5.1-1
PCBs Detected in Confirmation Samples from SWMU 01-001(f) Outfall and Drainage

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Aroclor-1260
Recreational SSL[a]				**6.65**[b]	**10.5**
RE00-08-16146	00-603830	0–1.25	SED	5.4 (J)[c]	—[d]
RE00-08-16147	00-603830	1.25–3.25	QBT3	0.55 (J)	—
RE00-08-16150	00-603832	0–1.25	SED	0.17 (J)	0.094
RE00-08-16152	00-603833	0–1	SED	0.038 (J)	0.036
RE00-08-16153	00-603833	1–2	QBT3	0.038 (J)	—
RE00-08-16154	00-603834	0–1	SED	0.089 (J)	0.066
RE00-08-16156	00-603835	0–1	SED	0.067 (J)	0.036
RE00-08-16158	00-603836	0–1	SED	0.5 (J)	—
RE00-08-16159	00-603836	1.75–2.75	QBT3	0.82 (J)	—
RE01-10-5537	01-609992	0–5.25	SED	0.0215	0.0103
RE01-10-5538	01-609993	0–2	SED	0.0068	0.0057
RE01-10-5540	01-609995	0–4.13	SED	0.0028 (J)	0.0025 (J)
RE01-10-11577	01-611287	0–0.25	SOIL	0.36	—
RE01-10-11578	01-611288	0–0.25	SOIL	0.47	—
RE01-10-11579	01-611289	0–0.25	SOIL	0.23	—
RE01-10-11580	01-611290	0–0.25	SOIL	0.99	—
RE01-10-11581	01-611291	0–0.25	SOIL	0.32	—
RE01-10-11582	01-611292	0–0.25	SOIL	0.16	—
RE01-10-11583	01-611293	0–0.25	SOIL	5.4	—
RE01-10-11584	01-611294	0–0.25	SOIL	1.6	—
RE01-10-11585	01-611295	0–0.25	SOIL	0.26	—
RE01-10-11586	01-611296	0–0.25	SOIL	3.3	—
RE01-10-11587	01-611297	0–0.25	SOIL	5.8	—
CALA-10-9847	LA-610960	0–0.25	SED	**10 (J)**	—
CALA-10-9848	LA-610961	0–0.25	SED	0.6 (J)	—
CALA-10-9849	LA-610962	0–0.25	SED	3.6 (J)	—
CALA-10-9850	LA-610963	0–0.25	SED	0.37 (J)	—
CALA-10-9851	LA-610964	0–0.25	SED	**12 (J)**	—
CALA-10-9852	LA-610965	0–0.25	SED	5.4 (J)	—
CALA-10-9853	LA-610966	0–0.25	SED	**7.8 (J)**	—
CALA-10-9854	LA-610967	0–0.25	SED	0.34 (J)	—
CALA-10-9855	LA-610968	0–0.25	SED	1.7 (J)	—
CALA-10-9856	LA-610969	0–0.25	SED	2.8 (J)	—
CALA-10-9857	LA-610970	0–0.25	SED	0.76 (J)	—
CALA-10-9858	LA-610971	0–0.25	SED	0.16 (J)	—
CALA-10-9859	LA-610972	0–0.25	SED	0.42 (J)	—
CALA-10-9860	LA-610973	0–0.25	SED	0.51 (J)	—
CALA-10-9862	LA-610975	0–0.25	SED	1.6 (J)	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Aroclor-1260
Recreational SSL[a]				**6.65**	**10.5**
CALA-10-9863	LA-610976	0–0.25	SED	0.12 (J)	—
CALA-10-9864	LA-610977	0–0.25	SED	1.5 (J)	—
CALA-10-9866	LA-610979	0–0.25	SED	0.24 (J)	—
CALA-10-11204	LA-611125	0–0.5	QBT3	0.23 (J)	0.1
CALA-10-11203	LA-611126	0–0.5	QBT3	0.23 (J)	0.11
CALA-10-11205	LA-611129	0–0.5	QBT3	0.38 (J)	0.15 (J)
CALA-10-11206	LA-611130	0–0.5	QBT3	0.66 (J)	0.3 (J)
CALA-10-11207	LA-611131	0–0.5	QBT3	0.033 (J)	0.014 (J)
CALA-10-11208	LA-611132	0–0.5	QBT3	0.11 (J)	0.047
CALA-10-11209	LA-611133	0–0.5	QBT3	0.1 (J)	0.043
CALA-10-11210	LA-611134	0–0.5	QBT3	0.13 (J)	0.058
CALA-10-11211	LA-611135	0–0.5	QBT3	0.13 (J)	0.06
CALA-10-11212	LA-611136	0–0.5	QBT3	3.6 (J)	2.1 (J)
CALA-10-11213	LA-611137	0–0.5	QBT3	1.5 (J)	0.63 (J)
CALA-10-11215	LA-611139	0–0.5	QBT3	3.2 (J)	1.6 (J)
CALA-10-11216	LA-611140	0–0.5	QBT3	0.031 (J)	—
CALA-10-11217	LA-611141	0–0.5	QBT3	0.01 (J)	—
CALA-10-11218	LA-611142	0–0.5	QBT3	0.56 (J)	0.23
CALA-10-11219	LA-611143	0–0.5	QBT3	4.8 (J)	1.9 (J)
CALA-10-11220	LA-611144	0–0.5	QBT3	1.5 (J)	0.62 (J)
CALA-10-11221	LA-611145	0–0.5	QBT3	1.4 (J)	0.56 (J)
CALA-10-11226	LA-611150	0–0.5	SOIL	**22**	—
CALA-10-11229	LA-611153	0–1	SOIL	1.9	—
CALA-10-11230	LA-611154	0–0.25	SOIL	0.86	—
CALA-10-11231	LA-611155	0–0.33	SOIL	1.7	0.97
CALA-10-11233	LA-611157	0–0.166	SOIL	0.98	0.47
CALA-10-11234	LA-611158	0–0.5	SOIL	3	1.4
CALA-10-11235	LA-611158	0.5–1.5	SOIL	0.64	0.31
CALA-10-11236	LA-611160	0–0.5	SOIL	6.3	3
CALA-10-11237	LA-611160	0.5–1.5	SOIL	1.6	0.72
CALA-10-11238	LA-611162	0–0.5	SOIL	2.2	0.98
CALA-10-11239	LA-611162	0.5–1	SOIL	0.85	0.4
CALA-10-11240	LA-611164	0–0.5	QBT3	3.3	1.53
CALA-10-11251	LA-611175	0–0.5	QBT3	2.28	1.06
CALA-10-11252	LA-611176	0–0.5	QBT3	1.63	0.624
CALA-10-11253	LA-611177	0–0.5	QBT3	3.04	1.65 (J)
CALA-10-11255	LA-611179	0–0.5	QBT3	0.254	0.145

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Aroclor-1260
Recreational SSL[a]				**6.65**	**10.5**
CALA-10-11256	LA-611180	0–0.5	QBT3	0.163	0.0848
CALA-10-11257	LA-611181	0–0.5	QBT3	0.252	0.122
CALA-10-11258	LA-611182	0–0.5	QBT3	5.88	2.48
CALA-10-11259	LA-611183	0–0.5	SED	**12.6**	5.32
CALA-10-11260	LA-611184	0–0.5	QBT3	0.541	0.322
CALA-10-11261	LA-611185	0–0.5	QBT3	**16.9**	6.61
CALA-10-11262	LA-611186	0–0.5	QBT3	0.0362	0.0248
CALA-10-11263	LA-611187	0–0.5	SED	4.27	2.31
CALA-10-11264	LA-611188	0–0.5	QBT3	0.573	0.304
CALA-10-11265	LA-611189	0–0.5	QBT3	2.48	1.34
CALA-10-11266	LA-611190	0–0.5	QBT3	0.895	0.485
CALA-10-11267	LA-611191	0–0.5	QBT3	6.31	3.21
CALA-10-11268	LA-611192	0–0.5	QBT3	0.342	0.171
CALA-10-11269	LA-611193	0–0.5	QBT3	2.27	1.2
CALA-10-11270	LA-611194	0–0.5	QBT3	0.225	0.184
RE01-10-23245	01-612620	2.9−3.0	QBT3	0.311	0.116
RE01-10-23246	01-612621	5.0−5.1	QBT3	5.29	1.72
RE01-10-23247	01-612622	2.5−2.6	QBT3	**17.8**	5.86
RE01-10-23248	01-612623	3.0−3.1	QBT3	**30.9**	10.4
RE01-10-23249	01-612624	2.9−3.0	QBT3	**14.9**	5.06
RE01-10-23250	01-612625	2.9−3.0	QBT3	**7.13**	2.49
RE01-10-23251	01-612626	3.4−3.5	QBT3	1.72	0.778
RE01-10-23252	01-612627	3.4−3.5	QBT3	**12.2**	4.13
RE01-10-23253	01-612628	4.0−4.1	QBT3	**21.6**	7.79
RE01-10-23265[f]	01-612628	4.0−4.1	QBT3	**20.6**	7.31
RE01-10-23254	01-612629	4.0−4.1	QBT3	**58.8**	**19.4**
RE01-10-23255	01-612630	2.5−2.6	QBT3	**29.2**	9.99
RE01-10-23256	01-612631	3.0−3.1	QBT3	**30.9**	**10.8**
RE01-10-23257	01-612632	2.9−3.0	QBT3	0.414	0.159

Notes: Units are in mg/kg. QBT3 is the third cooling unit of the Quaternary Bandelier Tuff; SED is sediment. Shading indicates samples were collected during the supplemental interim measure.

[a] SSLs from LANL (2010, 108613).

[b] Sample values in bold exceed the recreational SSL.

[c] J = The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.

[d] — = Not detected.

[e] J+ = The analyte was positively identified, and the result is likely to be biased high.

[f] Duplicate of sample RE01-10-23253.

Appendix D Data Excel Files
(on CD included with this document)

ProUCL Results After Interim Measure

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	EPC after rev1.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aroclor-1260

General Statistics

Number of Valid Data	114	Number of Detected Data	64
Number of Distinct Detected Data	63	Number of Non-Detect Data	50
		Percent Non-Detects	43.86%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0025	Minimum Detected	-5.991
Maximum Detected	19.4	Maximum Detected	2.965
Mean of Detected	1.951	Mean of Detected	-0.771
SD of Detected	3.415	SD of Detected	1.997
Minimum Non-Detect	0.00343	Minimum Non-Detect	-5.675
Maximum Non-Detect	3	Maximum Non-Detect	1.099

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	102
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	12
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	89.47%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.284	Lilliefors Test Statistic	0.0664
5% Lilliefors Critical Value	0.111	5% Lilliefors Critical Value	0.111
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.193	Mean	-1.543
SD	2.7	SD	2.017
95% DL/2 (t) UCL	1.613	95% H-Stat (DL/2) UCL	3.086
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.143
		SD in Log Scale	2.301
		Mean in Original Scale	1.113
		SD in Original Scale	2.722
		95% t UCL	1.536

95% Percentile Bootstrap UCL	1.56
95% BCA Bootstrap UCL	1.646
95% H-UCL	3.689

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.438
Theta Star	4.453
nu star	56.1
A-D Test Statistic	0.858
5% A-D Critical Value	0.829
K-S Test Statistic	0.829
5% K-S Critical Value	0.119

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	19.4
Mean	1.11
Median	0.0525
SD	2.725
k star	0.127
Theta star	8.76
Nu star	28.9
AppChi2	17.63
95% Gamma Approximate UCL	1.82
95% Adjusted Gamma UCL	1.832

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1.126
SD	2.708
SE of Mean	0.256
95% KM (t) UCL	1.551
95% KM (z) UCL	1.547
95% KM (jackknife) UCL	1.549
95% KM (bootstrap t) UCL	1.778
95% KM (BCA) UCL	1.579
95% KM (Percentile Bootstrap) UCL	1.569
95% KM (Chebyshev) UCL	2.241
97.5% KM (Chebyshev) UCL	2.724
99% KM (Chebyshev) UCL	3.672

Potential UCLs to Use

95% KM (BCA) UCL	1.579

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Aroclor-1254

General Statistics

Number of Valid Data	114	Number of Detected Data	103
Number of Distinct Detected Data	88	Number of Non-Detect Data	11
		Percent Non-Detects	9.65%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0028	Minimum Detected	-5.878
Maximum Detected	58.8	Maximum Detected	4.074
Mean of Detected	4.2	Mean of Detected	-0.0821
SD of Detected	8.456	SD of Detected	1.984
Minimum Non-Detect	0.00343	Minimum Non-Detect	-5.675
Maximum Non-Detect	0.31	Maximum Non-Detect	-1.171

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	39
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	75
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	34.21%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.31	Lilliefors Test Statistic	0.0631
5% Lilliefors Critical Value	0.0873	5% Lilliefors Critical Value	0.0873
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.799	Mean	-0.457
SD	8.128	SD	2.256
95% DL/2 (t) UCL	5.061	95% H-Stat (DL/2) UCL	17.45
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1.044	Mean in Log Scale	-0.434
SD	10.68	SD in Log Scale	2.185
95% MLE (t) UCL	2.703	Mean in Original Scale	3.797
95% MLE (Tiku) UCL	2.822	SD in Original Scale	8.128
		95% t UCL	5.06
		95% Percentile Bootstrap UCL	5.155
		95% BCA Bootstrap UCL	5.421
		95% H UCL	14.63

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.423	**Data appear Lognormal at 5% Significance Level**	

Theta Star	9.93
nu star	87.12
A-D Test Statistic	2.151
5% A-D Critical Value	0.836
K-S Test Statistic	0.836
5% K-S Critical Value	0.0947

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	58.8
Mean	3.794
Median	0.65
SD	8.13
k star	0.257
Theta star	14.77
Nu star	58.58
AppChi2	41.98
95% Gamma Approximate UCL	5.294
95% Adjusted Gamma UCL	5.317

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	3.797
SD	8.093
SE of Mean	0.762
95% KM (t) UCL	5.06
95% KM (z) UCL	5.05
95% KM (jackknife) UCL	5.06
95% KM (bootstrap t) UCL	5.511
95% KM (BCA) UCL	5.08
95% KM (Percentile Bootstrap) UCL	5.161
95% KM (Chebyshev) UCL	7.117
97.5% KM (Chebyshev) UCL	8.554
99% KM (Chebyshev) UCL	11.38

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	8.554

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Plate 1