# ATTACHMENT 1

# LABORATORY QUALITY CONTROL CRITERIA AND CALIBRATION SPECIFICATIONS

**Table E1-1. Practical Quantitation Limits for Radionuclides**

| Analytical Method[a] | Analyte | Soil PQL (pCi/g) |
|---|---|---|
| EPA 901.1 | Actinum-228 | 0.39 |
| | Bismuth-212 | 0.8 |
| | Bismuth-214 | 0.22 |
| | Cesium-137 | 0.13 |
| | Cobalt-60 | 0.16 |
| | Lead-212 | 0.22 |
| | Lead-214 | 0.24 |
| | Potassium-40 | 1.5 |
| | Radium-224 | 2.6 |
| | Radium-226 | See note b |
| | Thallium-208 | 0.12 |
| | Thorium-228 | 0.22 via Pb-212 |
| | Thorium-234 | 1.4 |
| | Uranium-235 | 0.69 |
| NAS/DOE 3050/RP | Uranium-233/234 | 0.8 |
| | Uranium-235/236 | 0.8 |
| | Uranium-238 | 0.8 |
| NAS/DOE 3004/RP | Thorium-230 | 0.4 |
| | Thorium-232 | 0.3 |
| | Thorium-228 | 0.4 |

Notes:
[a]*Prescribed Procedures for Measurement of Radioactivity in Drinking Water.* Environmental Monitoring and Support Laboratory, Cincinnati, OH. EPA-600/4-80-032, August, 1980.

*DOE Methods for Evaluating Environmental and Waste Management Samples*, National Academy of Sciences/ U.S. Department of Energy, October 1994.

[b]Radium-266 requires a 21 day in-growth and is reported through its daughter product Bismuth-214

**Table E1-2. Quality Control for Laboratory Data Evaluation: Radiological Parameters**

| Analytical Method[a] | Spiking Compounds | Accuracy Percent Recovery (%) | Precision (RER)[b] |
|---|---|---|---|
| Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate | | | |
| EPA 901.1 | Actinum-228 | NA | ≤1.0 |
| | Bismuth-212 | NA | ≤1.0 |
| | Bismuth-214 | NA | ≤1.0 |
| | Cesium-137 | NA | ≤1.0 |
| | Cobalt-60 | NA | ≤1.0 |
| | Lead-212 | NA | ≤1.0 |
| | Lead-214 | NA | ≤1.0 |
| | Potassium-40 | NA | ≤1.0 |
| | Radium-224 | NA | ≤1.0 |
| | Radium-226 | NA | ≤1.0 |
| | Thallium-208 | NA | ≤1.0 |
| | Thorium-228 | NA | ≤1.0 |
| | Thorium-234 | NA | ≤1.0 |
| | Uranium-235 | NA | ≤1.0 |
| NAS/DOE 3050/RP | Uranium-234 | NA | ≤1.00 |
| | Uranium-235/236 | NA | ≤1.00 |
| | Uranium-238 | NA | ≤1.00 |
| | Tracer: | | |
| | Uranium-232 | 40-120% | NA |
| NAS/DOE 3004/RP | Thorium-230 | NA | ≤1.00 |
| | Thorium-232 | NA | ≤1.00 |
| | Tracer: | | |
| | Thorium-229 | 40-120% | NA |

Notes:
NA = not applicable
[a]U.S. Environmental Protection Agency
Prescribed Procedures for Measurement of Radioactivity in Drinking Water.
Environmental Monitoring and Support Laboratory, Cincinnati, OH. EPA-600/4-80-032, August, 1980.

DOE Methods for Evaluating Environmental and Waste Management Samples, National Academy of Sciences/U.S. Department of Energy October 1994.

RER = replicate error ratio (calculated between parent sample and matrix duplicate).

## Table E1-3. Isotopic Uranium: Calibration Specification and Corrective Action Summary

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| NAS/DOE 3050/RP Alpha spectrometry | Uranium–234,- 235,-238 | Pulser check | Daily | Control chart ± 3 sigma | Recount once, if not in control limits, place detector on hold for maintenance as necessary |
| | | Method blank | 1 per preparation batch (≤20 samples) | Result ≤ Reporting limit | Recount/reanalyze preparation blank and all associated samples or NCM and note in narrative, as appropriate |
| | | Matrix spike | See chemical recovery below | 60-140 percent (guidance limits) | If not in guidance limits, flag and note in narrative |
| | | Matrix Duplicate | 1 per preparation batch (≤20 samples) | RPD ≤ 40 percent<br>RER ≤ 1.0<br>(for values >MDA) | Recount/reanalyze sample and duplicate, if not in control limits, reanalyze batch or flag and note in narrative, as appropriate |
| | | LCS | 1 per preparation batch (≤20 samples) | 63-128 percent | Recount LCS, and if fails second time, reanalyze LCS and all associated samples or NCM and note in narrative, as appropriate |
| | | Chemical Recovery | Every sample (uranium-232 tracer) | 20-120 percent | Recount/reanalyze sample, if not in control limits, flag and note in narrative |

Notes:
LCS = laboratory control sample
MDA = minimum detectable activity
RER = relative error ratio
RPD = relative percent difference

## Table E1-4. Isotopic Thorium: Calibration Specification and Corrective Action Summary

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| NAS/DOE 3004/RP Alpha spectrometry | Thorium – 228, 230, 232 | Pulser check | Daily | Control chart ± 3 sigma | Recount once, if not in control limits, place detector on hold for maintenance, as necessary |
| | | Method blank | 1 per preparation batch (≤20 samples) | Result ≤ Reporting limit | Recount/reanalyze preparation blank and all associated samples or NCM and note in narrative, as appropriate |
| | | Matrix spike | See chemical recovery below | 60-140 percent (guidance limits) | If not in guidance limits, flag and note in narrative |
| | | Matrix Duplicate | 1 per preparation batch (≤20 samples) | RPD ≤ 40 percent<br>RER ≤ 1.0<br>(for values >MDA) | Recount/reanalyze sample and duplicate, if not in control limits, reanalyze batch or flag and note in narrative, as appropriate |
| | | LCS | 1 per preparation batch (≤20 samples) | 64-145 percent | Recount LCS, and if fails second time, reanalyze LCS and all associated samples or NCM and note in narrative, as appropriate |
| | | Chemical Recovery | Every sample (thorium-229 tracer) | 20-120 percent | Recount/reanalyze sample, if not in control limits, flag and note in narrative |

Notes;
LCS = laboratory control sample
MDA = minimum detectable activity
RER = relative error ratio
RPD = relative percent difference

## Table E1-5. Gamma Spectrometry: Calibration Specification and Corrective Action Summary

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| EPA 901.1 Gamma spectrometry | Actinum-228 | Instrument Calibration Check | Daily | Control chart ± 3 sigma | Recount once, if not in control limits place detector on hold for maintenance, as necessary |
| | Bismuth-212 | Instrument Background Check | Daily | Control chart ± 3 sigma | Recount twice, if not in control limits place detector on hold for maintenance, as necessary |
| | Bismuth-214 | Instrument blank | 1 per preparation batch (≤20 samples) | Result ≤ Reporting limit | Reanalyze blank and all associated samples analyzed on that detector |
| | Cesium-137 | Matrix Duplicate | 1 per preparation batch (≤20 samples) | RPD ≤ 40 percent RER ≤ 1.0 (for values >MDA) | Recount duplicate and/or sample, if not in control limits, flag and note in narrative |
| | Cobalt-60 | LCS | 1 per preparation batch (≤20 samples) | 85-115 percent plus counting error | Reanalyze LCS and all associated samples analyzed on that detector |
| | Lead-212 | | | | To be determined: |
| | Lead-214 | | | | To be determined: |
| | Potassium-40 | | | | To be determined: |
| | Radium-224 | | | | To be determined: |
| | Radium-226 | | | | To be determined: |
| | Thallium-208 | | | | To be determined: |
| | Thorium-228 | | | | To be determined: |
| | Thorium-234 | | | | To be determined: |
| | Uranium-235 | | | | To be determined: |

Notes:
LCS = laboratory control sample
MDA = minimum detectable activity
RER = relative error ratio
RPD = relative percent difference

**Table E1-6. Inductively Coupled Plasma Metals Analysis: Quality Control Criteria for Laboratory Data Evaluation**

| | | Accuracy[a] Recovery (%) | Precision[b] (RPD %) |
|---|---|---|---|
| **Analytical Method[(a)]** | **Spiking Compounds** | **TCLP Extract** | **Water** |
| **Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate[b]** | | | |
| Metals—SW-846 6010B | Arsenic | 74-126 | 21 |
| | Barium | 74-126 | 21 |
| | Cadmium | 74-126 | 21 |
| | Chromium | 74-126 | 21 |
| | Lead | 74-126 | 21 |
| | Mercury | 74-126 | 21 |
| | Selenium | 74-126 | 21 |
| | Silver | 74-126 | 21 |
| **Laboratory Control Sample** | | | |
| Metals—SW-846 6010B | Arsenic | 84-116 | NA |
| | Barium | 84-116 | NA |
| | Cadmium | 84-116 | NA |
| | Chromium | 84-116 | NA |
| | Lead | 84-116 | NA |
| | Mercury | 84-116 | NA |
| | Selenium | 84-116 | NA |
| | Silver | 84-116 | NA |

Notes:
NA = not applicable
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996
[b]RPD calculated between parent sample and matrix duplicate.

**Table E1-7. Inductively Coupled Plasma Metals Analysis: Calibration Specification and Corrective Action Procedures**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 6010B (Trace) Inductively Coupled Plasma | Metals | Initial calibration (1 point + blank minimum) | Daily prior to analysis | Correlation coefficient (r) >0.995 | • Recalibrate |
| | | Interference check standard (ICS) | Beginning and end of each analytical run | Results ± 20% of true value | • Terminate analysis<br>• Recalibrate instrument<br>• Reanalyze all samples back to last acceptable ICS |
| | | Initial calibration verification (ICV); Independent source | After calibration, prior to sample analysis | Results <10% from true value with <5% RSD from replicate (minimum of two) integrations | • Reanalyze ICV<br>• Recalibrate, if ICV still out |
| | | Continuing calibration verification; independent source | Every 10 samples and end of analytical sequence | Results < 10% from expected concentration | • Reanalyze affected samples back to the last acceptable CCV |
| | | Calibration blank - Initial calibration blank , Continuing calibration blank | After initial calibration verification, each subsequent calibration verification, and at the end of the run | <3x the Method detection limit | • Reanalyze blank<br>• Clean system<br>• Reanalyze all samples back to last acceptable blank |
| | | Internal Standards) | Every standard, blank and sample | Within ± 30% of internal standards in ICB | • Dilute sample and reanalyze<br>• Raise the concentration of the internal standards<br>• Use a different internal standard |
| | | Method blank | 1 per preparation batch (≤20 samples) | < Practical quantitation limit (PQL) | • Reanalyze method blank.<br>• If fails, analyze a calibration blank<br>• Reprep/reanalyze analytical batch as appropriate |
| | | Matrix spike (MS) | 1 per preparation batch (≤20 samples) | % Recovery within project acceptance criteria | • LCS recoveries must be within control limits<br>• Reprep/reanalyze once if problem cannot be attributed to matrix interference<br>• Narrate all outliers |
| | | Matrix spike duplicate | 1 per preparation batch (≤20 samples) | % Recovery and/or RPD within project acceptance criteria | • Same as MS |
| | | Dilution Test | 1per new or unusual matrix | If the analyte concentration is at least a factor of 10 above the IDL after dilution, an analysis of a 1:5 dilution should agree within 10% of the original determination | • If dilution concentration is outside criteria, a chemical or physical interference should be suspected |
| | | Laboratory Control Sample (LCS) | 1 per preparation batch (≤20 samples) | % Recovery within project acceptance criteria | • Reanalyze LCS<br>• Reprep/reanalyze LCS and affected samples<br>• Narrate all outliers |

Table nots:
RPD = relative percent difference
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

Table E1-8. Inductively Coupled Plasma Metals Analysis: Practical Quantitation Limits

| Analysis | Analytical Method[a] | Analyte | PQL[b] (mg/L) | MCL (mg/L) |
|---|---|---|---|---|
| Metals | 6010B | Arsenic | 0.5 | 5.0 |
| | | Barium | 0.1 | 100.0 |
| | | Cadmium | 0.03 | 1.0 |
| | | Chromium | 0.05 | 5.0 |
| | | Lead | 0.3 | 5.0 |
| | | Mercury | 0.002 | 0.2 |
| | | Selenium | 0.5 | 1.0 |
| | | Silver | 0.05 | 5.0 |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
[b]PQLs established by contract laboratories based on the results of annual method detection limit studies. PQL's are base on analyses being performed on TCLP extract (SW846-1311)
MCL = maximum contaminant level
mg/l = milligrams per liter
PQL = practical quantitation limit

**Table E1-9. Mercury Analysis Calibration and Corrective Action Summary**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 7470A/7471A | Mercury | Initial multipoint calibration (3 point + blank minimum) | Daily, prior to analysis | Correlation coefficient (r) ≤0.995 | • Recalibrate |
| | | Initial calibration verification (ICV); mid-level standard | After calibration, prior to sample analysis | ± 20% of true value | • Reanalyze ICV<br>• Rerun initial calibration |
| | | Continuing calibration verification (CCV); mid-level standard | Every 10 samples and at end of analytical sequence | ± 20% of true value | • Reanalyze affected samples back to last acceptable CCV |
| | | Calibration blank (ICB/CCB) | After calibration, and after each subsequent calibration verification | < Method detection limit (MDL) | • Reanalyze blank<br>• Clean system if still out<br>• Reanalyze affected samples back to last acceptable CCB |
| | | Method blank | 1 per preparation batch (≤20 samples) | < Practical quantitation limit (PQL) | • Reanalyze method blank.<br>• If fails, analyze a calibration blank<br>• Reprep/reanalyze analytical batch as appropriate |
| | | Matrix spike (MS) | 1 per preparation batch (≤20 samples) | % Recovery within project acceptance criteria | • If LCS recoveries are within acceptance criteria, matrix interference may be suspected<br>• Reprep/reanalyze once if problem cannot be attributed to matrix<br>• Narrate all outliers |
| | | Matrix spike duplicate (MSD) | 1 per preparation batch (≤20 samples) | % Recovery and/or RPD within project acceptance criteria | • Same as MS |
| | | Laboratory control samples (LCS) | 1 per preparation batch (≤20 samples) | % Recovery within project acceptance criteria | • Reanalyze LCS<br>• Reprep/reanalyze LCS and affected samples<br>• Narrate all outliers |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

MDL = method detection limit
RPD = relative percent difference

**Table E1-10. Organochlorine Pesticides by Gas Chromatography Quality Control Criteria for Laboratory Data Evaluation**

| | | Accuracy[b] (% Recovery) | Precision[c] (RPD %) |
|---|---|---|---|
| Method[a] | Spiking Compounds | TCLP extract | Water |
| **Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate[(c)]** | | | |
| Pesticides | **Spike Compounds** | | |
| SW-846 8081A | gamma-BHC (Lindane) | 7-140 | 21 |
| | Heptachlor | 0.5-136 | 21 |
| | Aldrin | 0.5-133 | 21 |
| | Dieldrin | 39-117 | 21 |
| | Endrin | 15-119 | 21 |
| | 4,4'-DDT | 51-132 | 21 |
| | **Surrogate Spike** | | |
| | DCB | 59-162 | NA |
| | TCMX | 28-110 | NA |
| **Laboratory Control Sample** | | | |
| Pesticides | **Spike Compounds** | | |
| SW-846 8081A | gamma-BHC (Lindane) | 42-129 | NA |
| | Heptachlor | 2-162 | NA |
| | Aldrin | 0.5-150 | NA |
| | Dieldrin | 54-115 | NA |
| | Endrin | 18-121 | NA |
| | 4,4'-DDT | 55-133 | NA |
| | **Surrogate Spike** | | |
| | DCB | 59-162 | NA |
| | TCMX | 28-110 | NA |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III December 1996).
[b]U.S. Army Corps of Engineers Requirements for Contract Laboratory Validation (EM-200-1-1, July 1994).
[c]RPD calculated between parent sample and matrix duplicate.
NA = Not applicable

**Table E1-11. Organochlorine Pesticides by Gas Chromatography Calibration Specification and Corrective Action Summary**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 8081A Organochlorine Pesticides by Gas Chromatography | Organochlorine Pesticides | Column Evaluation Mix | Prior to analysis, both initial and daily | • Degradation of DDT and Endrin < 15% | • Evaluate the system<br>• Repeat standard |
| | | Initial calibration (5 point minimum)<br>Lowest at or below PQL<br>Mid level multi-component standards for pattern recognition and retention times | Prior to analysis and as required | • RSD < 20%, average CF may be used; linear calibration required | • Average RSD <20% across all analytes may be used if any analyte fails<br>• Evaluate the system<br>• Repeat initial calibration |
| | | Initial calibration verification (ICV)<br>Mid level standard<br>Expected multi-component compounds | Prior to each 12 hour shift | • % Difference ≤15% of expected concentration compared to response from ICAL | • Average % difference ≤15% across all analytes may be used if any analyte fails<br>• Evaluate system/standard<br>• Reanalyze ICV standard<br>• Repeat initial calibration |
| | | Continuing calibration verification (CCV)<br>Mid level standard<br>Expected multi-component compounds | After every 20 samples and at the end of the analytical sequence | • % Difference ≤15% of expected concentration compared to response from ICAL for each bracketing standard | • Average % difference ≤15% across all analytes may be used if any analyte fails<br>• Evaluate system/standard<br>• Reanalyze CCV and affected samples<br>• For CCV with response > initial calibration response and % difference >15%, samples need not be reanalyzed if no target compounds are detected |
| | | Retention time windows | Established with each new column installation<br>Updated with each daily initial calibration standard | • Retention times must be within retention time window established by the daily initial calibration standard<br>• Every CCV and every sample | • Evaluate system/standard; pattern recognition may be sufficient for multi-component compounds only<br>• Reanalyze CCV/affected samples |

**Table E1-11. Organochlorine Pesticides by Gas Chromatography Calibration Specification and Corrective Action Summary (concluded)**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 8081 Organochlorine Pesticides by Gas Chromatography (con't) | Organochlorine Pesticides | Method Blank | 1 per preparation batch (≤ 20 samples) | • <Practical Quantitation Limit (PQL) | • Reanalyze blank<br>• Re-prep/reanalyze blank and associated samples |
| | | Surrogate spike DCB and TCMX | Every sample, method blank, LCS and MS/MSD | • % Recovery within QC acceptance criteria (refer to Table E1-9)<br>• one surrogate must fall within established control limits | • Re-extract/reanalyze once<br>• If still out, report both sets of data<br>• Narrate all outliers |
| | | Matrix spike (MS) | 1 per preparation batch (≤20 samples) | • % Recovery within QC acceptance criteria (refer to Table E1-9) | • Assess data (4 x rule)<br>• If LCS and surrogate recoveries are within acceptance criteria, matrix interference maybe suspected<br>• Re-extract/reanalyze once if matrix is not a factor<br>• Narrate all outliers |
| | | Matrix spike duplicate(MSD) or Matrix Duplicate (MD) | 1 per preparation batch (≤20 samples) | • % Recovery and/or RPD within QC acceptance criteria (refer to Table E1-9) | • Same as MS |
| | | Laboratory control sample (LCS) | 1 per preparation batch (≤ 20 samples) | • % Recovery within QC acceptance criteria (refer to Table E1-9) | • Reanalyze LCS<br>• Re-prep/reanalyze LCS and all associated samples<br>• Narrate all outliers |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
%RSD = Relative standard deviation
CF= =Calibration factor
QC = Quality control
RPD = relative percent difference

Table E1-12. Organochlorine Pesticides by Gas Chromatography: Practical Quantitation Limits

| | | Practical Quantitation Limits[a] | MCL |
|---|---|---|---|
| Analysis | Analyte[b] | Water[c] (µg/L) | mg/l |
| Organochlorine Pesticides | | | |
| | Gamma-BHC (Lindane) | 0.2 | 0.4 |
| | Chlordane (technical) | 0.7 | 0.03 |
| | Endrin | 0.3 | 0.02 |
| | Heptachlor | 0.15 | 0.008 |
| | Heptachlor epoxide | NA | 0.008 |
| | Methoxychlor | 9 | 10.0 |
| | Toxaphene | 12 | 0.5 |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
[b]Additional analytes may be determined by this method; define in project-specific work plan.
[c]PQL's are base on analyses being performed on TCLP extract (SW846-1311)

Table E1-13. Organochlorine Herbicides and Pentachlorophenol by Gas Chromatography Quality Control Criteria for Laboratory Data Evaluation

| | | Accuracy[b] (% Recovery) | Precision[b] RPD %) |
|---|---|---|---|
| Analytical Method[a] | Spiking Compounds | TCLP Leachate | TCLP Leachate |
| **Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate[c]** | | | |
| Herbicides | **Spike Compounds** | | |
| SW-846 8151A | 2,4-D | 63-159 | 21 |
| | 2,4,5-TP | 33-155 | 21 |
| | **Surrogate Spike** | | |
| | DCAA | 46-161 | NA |
| **Laboratory Control Sample** | | | |
| Herbicides | **Spike Compounds** | | |
| SW-846 8151A | 2,4-D | 68-140 | NA |
| | 2,4,5-TP | 48-146 | NA |
| | Surrogate Spike | | |
| | DCAA | 46-161 | NA |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
[b]U.S. Army Corps of Engineers (USACE) Requirements from Contract Laboratory Validation (EM-200-1-1, July 1994).
[c]RPD calculated between parent sample and matrix spike.
NA = Not applicable

**Table E1-14. Organochlorine Herbicides and Pentachlorophenol by Gas Chromatography Calibration Specifications and Corrective Action Summary**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 8151A Organochlorine Herbicides and Pentachlorophenol by Gas Chromatography | Organochlorine Herbicides and Pentachlorophenol | Initial calibration (5 point minimum) Lowest point at or below PQL | Prior to analysis and as required | • %RSD <20%, average CF may be used; linear calibration required | • Average RSD <20% across all analytes may be used if any analytes fail<br>• Evaluate the system<br>• Repeat initial calibration |
| | | Initial calibration verification (ICV) second source Mid level standard | Prior to each daily analytical sequence | • % Difference ≤15% of expected concentration compared to response from ICAL | • Average %D ≤15% across all analytes may be used if any analytes fail<br>• Evaluate system/standard<br>• Reanalyze ICV standard<br>• Repeat initial calibration |
| | | Continuing calibration verification (CCV) Mid level standard | After every 20 samples and at the end of the analytical sequence | • % Difference ≤15% of expected concentration compared to response from ICAL for each bracketing standard | • Evaluate system/standard<br>• Reanalyze CCV and all samples back to last acceptable CCV |
| | | Retention time windows | Established with each new column installation Updated with each daily initial calibration standard | • Retention times must be within retention time window established by the daily initial calibration standard<br>• Every CCV and every sample | • Evaluate system/standard;<br>• Reanalyze CCV and affected samples |
| | | Method blank | 1 per preparation batch (≤20 samples) | • <Practical Quantitation Limit (PQL) | • Reanalyze blank<br>• Re-prep/reanalyze blank and all associated samples |

**Table E1-14. Organochlorine Herbicides and Pentachlorophenol by Gas Chromatography Calibration Specifications and Corrective Action Summary (concluded)**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 8151A Organochlorine Herbicides and Pentachlorophenol by Gas Chromatography (cont) | Organochlorine Herbicides and Pentachlorophenol | Surrogate spike DCAA | Every sample, method blank, LCS and MS/MSD | • % Recovery within project QC acceptance criteria (Refer to Table E1-12) | • Re-extract/reanalyze once<br>• If still out, report both sets of data<br>• Narrate all outliers |
| | | Matrix spike (MS) | 1 per preparation batch (≤20 samples) | • % Recovery within QC acceptance criteria (Refer to Table E1-12) | • Assess data (4x rule)<br>• If LCS and surrogate recoveries are within acceptance criteria, matrix interference maybe suspected<br>• Re-exact/reanalyze once if matrix is not a factor<br>• Narrate all outliers |
| | | Matrix spike duplicate (MSD) or Matrix duplicate (MD) | 1 per preparation batch (≤20 samples) | • % Recovery and/or RPD within QC acceptance criteria (Refer to Table E1-12) | • Same as MS |
| | | Laboratory control sample (LCS) | 1 per preparation batch (≤20 samples) | • % Recovery within QC acceptance criteria (Refer to Table E1-12) | • Reanalyze LCS<br>• Re-prep/reanalyze LCS and all associated samples<br>• Narrate all outliers |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
%RSD = relative standard deviation
CF = calibration factor
QC = quality control

**Table E1-15. Organochlorine Herbicides and Pentachlorophenol by Gas Chromatography Practical Quantitation Limits**

| Analysis | Analytical Method[a] | Analyte | PQL (µg/l) | MCL mg/l |
|---|---|---|---|---|
| Chlorinated Herbicides | SW-846 8151A | 2,4-D | 6 | 10.0 |
| | | 2,4,5-TP (Silvex) | .85 | 1.0 |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

**Table E1-16. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry Calibration Specifications and Corrective Action Summary**

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846, 8260B Volatile Organic Compounds By Gas Chromatography/Mass Spectrometry (GC/MS) | Halogenated and Aromatic Volatile Organic Compounds | Tune instrument with a 4-bromofluorobenzene standard (BFB) | Every 12 hours | Must meet key ions and ion abundance criteria established by method (refer to Table E1-18) | • Retune instrument<br>• Repeat standard analysis |
| | | Initial multi-point calibration; 5 point minimum. Lowest point at or below PQL. Includes calibration check compounds (CCC) and system performance check compounds (SPCC), and Internal Standards Compounds (IS). | Prior to analysis, and as required | RSD< 30 % for CCC; Average RF ≥ 0.1 for SPCC (≥0.3 for chlorobenzene, 1,1,2,2-Tetrachloroethane) If % RSD < 15% average RF may be used; linear calibration required | • Evaluate system<br>• Repeat calibration |
| | | Continuing calibration verification (CCV): CCC, SPCC, and IS | Every 12 hours | Percent difference <20% for CCC; RF ≥0.1 for SPCC (≥0.3 for chlorobenzene and 1,1,2,2-Tetrachloroethane). | • Evaluate system/standard<br>• Reanalyze calibration check standard<br>• Repeat initial calibration |
| | | Method blank | 1 per preparation batch (≤20 samples) | < Method detection limit (MDL) | • Reanalyze method blank<br>• Recalibrate |
| | | Internal standards (method recommends fluorobenzene, chlorobenzene-d5, 1,4-dichlorobenzene-d4, dibromofluoromethane) | Every sample, method blank, LCS, and MS/MSD | Retention time for each internal standard must be within 30 seconds of most recent CCV and the EICP area for all internal standards must be within -50% to +100% of the most recent CCV | • Evaluate system/standard<br>• Reanalyze samples<br>• If still out, report both sets of data<br>• Narrate all outliers |

Table E1-16. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry Calibration Specifications and Corrective Action Summary (concluded)

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846, 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) | | Surrogate spike | Every sample, method blank, LCS, MS/MSD | No more than one surrogate outside QC acceptance criteria. No surrogate below 10% recovery. | • Reanalyze sample once<br>• Re-extract and reanalyze if >1 surrogate outside QC acceptance limits<br>• If still out, report both sets of data<br>• Narrate all outliers |
| | Halogenated and Aromatic Volatile Organic Compounds | Matrix spike (MS) | 1 per preparation batch (≤20 samples) using project-specific sample | Percent recovery within QC acceptance criteria (refer to Table E1-16) | • If LCS and surrogate recoveries are within acceptance criteria, matrix interference may be suspected<br>• Reprep/reanalyze once if matrix is not a factor<br>• If still out, report both sets of data<br>• Narrate all outliers |
| | | Matrix spike duplicate (MSD) | 1 per preparation batch (≤20 samples) using project-specific samples | % Recovery and RPD within QC acceptance criteria (refer to Table E1-16) | • Same as MS |
| | | Laboratory control sample (LCS) | 1 per preparation batch (≤20 samples) | % Recovery within QC acceptance criteria (refer to Table E1-16) | • Reanalyze LCS<br>• Reprep/reanalyze LCS and all associated samples<br>• Narrate all outliers |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
EICP = Extracted ion current profile
QC = Quality control
RF = Response factor
RPD = Relative percent difference
RSD = Relative Standard Deviation

Table E1-17. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Quality Control Criteria for Laboratory Data Evaluation

| | | Control Limits | |
|---|---|---|---|
| | | Accuracy Recovery (%) | Precision (RPD %) |
| Analytical Method[a] | Spiking Compounds | TCLP Extract | TCLP Extract |
| **Matrix Spike/Matrix Spike Duplicate Samples** | | | |
| SW-846 8260B | Spiking Compounds | | |
| | 1,1-Dichloroethene | 59-146 | 21 |
| | Trichloroethene | 70-121 | 21 |
| | Chlorobenzene | 74-131 | 21 |
| | Toluene | NA | 21 |
| | Benzene | 75-128 | 21 |
| | Surrogate Spikes | | |
| | 1,2-Dichloroethane-d4 | 84-136 | NA |
| | Toluene-d8 | 83-112 | NA |
| | 4-Bromofluorobenzene | 80-111 | NA |
| Laboratory Control Samples | | | |
| SW-846 8260B | Spiking Compounds | | |
| | 1,1-Dichloroethene | 59-146 | NA |
| | Trichloroethene | 70-121 | NA |
| | Chlorobenzene | 74-131 | NA |
| | Toluene | NA | NA |
| | Benzene | 75-128 | NA |
| | Surrogate Spikes | | |
| | 1,2-Dichloroethane-d4 | 84-136 | NA |
| | Toluene-d8 | 83-112 | NA |
| | Bromofluorobenzene | 80-111 | NA |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

**Table E1-18. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry Practical Quantitation Limits**

| Parameter/ Analytical Method[a] | Analyte | TCLP Extract MDL (µg/l) | TCLP Extract PQL (µg/l) | MCL (mg/l) |
|---|---|---|---|---|
| Volatile Organic Compounds SW-846 8260B | | | | |
| | Benzene | 1.15 | 5 | 0.5 |
| | 2-Butanone | 9.51 | 50 | 200 |
| | Carbon tetrachloride | 0.96 | 5 | 0.5 |
| | Chlorobenzene | 0.72 | 5 | 100 |
| | Chloroform | 0.83 | 5 | 5.0 |
| | 1,4-Dichlorobenzene | 0.55 | 5 | 7.5 |
| | 1,2-Dichloroethane | 0.91 | 5 | 0.5 |
| | 1,1 Dichloroethene | 1.03 | 5 | 0.7 |
| | Hexachlorobutadiene | NA | 5 | 0.5 |
| | Tetrachloroethene | 0.91 | 5 | 0.7 |
| | Trichloroethene | 0.64 | 5 | 0.5 |
| | Vinyl chloride | 1.15 | 10 | 0.2 |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA,August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

**Table E1-19. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry 4-Bromofluorobenzene (BFB) Mass Intensity Criteria**

| Mass | Required Intensity (relative abundance) |
|---|---|
| 50 | 15 to 40% of mass 95 |
| 75 | 30 to 60% of mass 95 |
| 95 | Base peak, 100% relative abundance |
| 96 | 5 to 9% of mass 95 |
| 173 | Less than 2% of mass 174 |
| 174 | Greater than 50% of mass 95 |
| 175 | 5 to 9% of mass 174 |
| 176 | Greater than 95%, but less than 101% of mass 174 |
| 177 | 5 to 9% of mass 176 |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA,August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

Table E1-20. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry Quality Control Criteria for Laboratory Data Evaluation

| | | Control Limits | |
|---|---|---|---|
| | | Accuracy Recovery (%) | Precision (RPD %) |
| Analytical Method[a] | Spiking Compounds | TCLP Extract | TCLP Extract |
| Matrix Spike/Matrix Spike Duplicate Samples | | | |
| SW-846 8270C | Spiking Compounds | | |
| | 1,4-Dichlorobenzene | 9-126 | 21 |
| | 2,4,5-Trichlorophenol | 9-126 | 21 |
| | 2,4,6-Trichlorophenol | 9-126 | 21 |
| | 2,4-Dinitrotoluene | 9-126 | 21 |
| | 2-Methylphenol | 9-126 | 21 |
| | 3 & 4-Methylphenol | 9-126 | 21 |
| | Hexachlorobenzene | 9-126 | 21 |
| | Hexachlorobutadiene | 9-126 | 21 |
| | Hexachloroethane | 9-126 | 21 |
| | Nitrobenzene | 9-126 | 21 |
| | Pentachlorophenol | 9-126 | 21 |
| | Pyridine | 9-126 | 21 |
| | 1,4-Dichlorobenzene-d4 | 50-201 | 21 |
| | Acenaphthene-d10 | 50-201 | 21 |
| | Chrysene-d12 | 50-201 | 21 |
| | Naphthalene-d8 | 50-201 | 21 |
| | Phenanthrene-d10 | 50-201 | 21 |
| | 2,4,6-Tribromophenol | 9-124 | 21 |
| | 2-Fluorobiphenyl | 42-117 | 21 |
| | 2-Fluorophenol | 20-111 | 21 |
| | 4-Terphenyl-d14 | 32-142 | 21 |
| | Nitrobenzene-d5 | 33-115 | 21 |
| | Phenol-d6 | 9-111 | 21 |
| **Laboratory Control Samples** | | | |
| SW-846 8270C | 1,4-Dichlorobenzene | 9-126 | NA |
| | 2,4,5-Trichlorophenol | 9-126 | NA |
| | 2,4,6-Trichlorophenol | 9-126 | NA |
| | 2,4-Dinitrotoluene | 9-126 | NA |
| | 2-Methylphenol | 9-126 | NA |
| | 3 & 4-Methylphenol | 9-126 | NA |
| | Hexachlorobenzene | 9-126 | NA |
| | Hexachlorobutadiene | 9-126 | NA |
| | Hexachloroethane | 9-126 | NA |
| | Nitrobenzene | 9-126 | NA |
| | Pentachlorophenol | 9-126 | NA |
| | Pyridine | 9-126 | NA |
| | 1,4-Dichlorobenzene-d4 | 50-201 | NA |
| | Acenaphthene-d10 | 50-201 | NA |
| | Chrysene-d12 | 50-201 | NA |
| | Naphthalene-d8 | 50-201 | NA |
| | Phenanthrene-d10 | 50-201 | NA |
| | 2,4,6-Tribromophenol | 9-124 | NA |
| | 2-Fluorobiphenyl | 42-117 | NA |
| | 2-Fluorophenol | 20-111 | NA |
| | 4-Terphenyl-d14 | 32-142 | NA |
| | Nitrobenzene-d5 | 33-115 | NA |
| | Phenol-d6 | 9-111 | NA |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA,August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

Table E1-21. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry Calibration Specifications and Corrective Action Summary

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 8270C Semi-Volatiles by GC/MS | Semi-Volatiles | Tune the instrument using a deca-fluorotriphenylphosiné (DFTPP) standard | Every 12 hours | Must meet the ion abundance criteria specified in the method<br>Degradation of DDT < 20%<br>Benzidine and PCP present at normal response without excessive tailing | • Retune instrument<br>• Repeat standard analysis<br>• Perform injection port, column maintenance as necessary |
| | | Initial calibration (5 point minimum); includes Calibration Check Compounds (CCC), System Performance Calibration Check (SPCC), and Internal Standard Compounds (IS) | Prior to analysis and as required | % RSD for CCC <30%<br>average RF >0.05 for SPCC<br>If % RSD <15 % average RF may be used; linear calibration required | • Evaluate the system<br>• Repeat calibration |
| | | Continuing calibration verification (CCV); includes CCC, SPCC, and IS | Every 12 hours | CCV Percent difference for CCC <20%<br>RF >0.05 for SPCC | • Evaluate system/standard<br>• Reanalyze calibration check standard<br>• Repeat the initial calibration as necessary |
| | | Method blank | 1 per preparation batch (≤20 samples) | <Method detection limit (MDL) | • Reanalyze blank<br>• Reprep/reanalyze blank and all associated samples |
| | | Internal Standard (method recommends 1,4-dichlorobenzene-d4, naphthalene-d8, acenaphthene-d10, phenanthrene-d10, chrysene-d12, and perylene-d12) | Every sample, method blank, LCS and MS/MSD | The EICP area for all internal standards must be within -50% and +100% of most recent CCV<br>Retention time for each internal standard must be within 30 seconds of most recent CCV | • Evaluate system/standard<br>• Reanalyze the sample<br>• If still out, report both sets of data |

Table E1-21. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry Calibration Specifications and Corrective Action Summary (concluded)

| Analytical Method[a] | Parameter | QC Element | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|---|---|
| SW-846 8270C Semi-Volatiles by GC/MS (con't) | Semi-Volatiles | Surrogate spike | Every sample, method blank, LCS and MS/MSD | No more than one surrogate per fraction outside of acceptance criteria (Refer to Table E1-19)<br>No surrogate below 10% recovery | • Reanalyze sample once<br>• Re-extract and reanalyze if >1 surrogate per fraction outside acceptance limits<br>• Narrate all outliers |
| | | Matrix spike (MS) | 1 per preparation batch (≤20 samples) using project-specific samples | % Recovery within QC acceptance criteria (Refer to Table E1-19) | • If LCS recoveries and surrogates are within control limits, matrix interference may be suspected<br>• Reprep/reanalyze once if matrix is not a factor<br>• If still out, report both sets of data<br>• Narrate all outliers |
| | | Matrix spike duplicate (MSD) | 1 per preparation batch (≤20 samples) using project-specific samples | % Recovery and RPD within QC acceptance criteria (Refer to Table E1-19) | • Same as MS |
| | | Laboratory control sample | 1 per preparation batch (≤20 samples) | % Recovery within project QC acceptance criteria for all spiked analytes | • Reanalyze LCS<br>• Re-prep/reanalyze LCS and all associated samples<br>• Narrate all outliers |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
EICP = Extracted ion current profile
QC = Quality control
RF = Response factor
RSD = Relative standard deviation

Table E1-22. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry Practical Quantitation Limits

| Parameter/ Analytical Method[a] | Analyte | Water MDL[(d)] (µg/l) | Water PQL (µg/l) | MCL (µg/l) |
|---|---|---|---|---|
| Semivolatile Organic Compounds | | | | |
| SW-846 8270C | o-Cresol | 1.23 | 50 | 200,000 |
| | p+m-Cresol | 1.27 | 50 | 200,000 |
| | p-Cresol | NA | NA | 200,000 |
| | 2,4-Dinitrotoluene | 1.48 | 50 | 130 |
| | Hexachloroethane | 0.78 | 50 | 3,000 |
| | Hexachlorobutadiene | 0.57 | 50 | 500 |
| | Nitrobezene | 1.43 | 50 | 2,000 |
| | Pentachlorophenol | 1.23 | 250 | 100,000 |
| | Pyridine | 0.76 | 50 | 5,000 |
| | 2,4,5-Trichlorophenol | 2.05 | 250 | 400,000 |
| | 2,4,6-Trichlorophenol | 1.85 | 50 | 2,000 |

Notes:
[a]EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, September 1986; Final Update I, July 1992;
Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).

# APPENDIX F
# TITLE 10 *CODE OF FEDERAL REGULATIONS* § 40.42

[Code of Federal Regulations]
[Title 10, Volume 1]
[Revised as of January 1, 2001]
From the U.S. Government Printing Office via GPO Access
[CITE: 10CFR40.42]

[Page 637-640]

TITLE 10--ENERGY

CHAPTER I--NUCLEAR REGULATORY COMMISSION

PART 40--DOMESTIC LICENSING OF SOURCE MATERIAL--Table of Contents

Sec. 40.42 Expiration and termination of licenses and decommissioning of sites and separate buil

(a)(1) Except as provided in paragraph (a)(2) of this section, each specific license expires at the end of the day on the expiration date stated in the license unless the licensee has filed an application for renewal under Sec. 40.43 not less than 30 days before the expiration date stated in the existing license (or, for those licenses subject to paragraph (a)(2) of this section, 30 days before the deemed expiration date in that paragraph). If an application for renewal has been filed at least 30 days before the expiration date stated in the existing license (or, for those licenses subject to paragraph (a)(2) of this section, 30 days before the deemed expiration date in that paragraph), the existing license expires at the end of the day on which the Commission makes a final determination to deny the renewal application or, if the determination states an expiration date, the expiration date stated in the determination.

(2) Each specific license that has an expiration date after July 1, 1995, and is not one of the licenses described in paragraph (a)(3) of this section, shall be deemed to have an expiration date that is five years after the expiration date stated in the current license.

(3) The following specific licenses are not subject to, or otherwise affected by, the provisions of paragraph (a)(2) of this section:

(i) Specific licenses for which, on February 15, 1996, an evaluation or an emergency plan is required in accordance with Sec. 40.31(j);

(ii) Specific licenses whose holders are subject to the financial assurance requirements specified in 10 CFR 40.36, and on February 15, 1996, the holders either:

(A) Have not submitted a decommissioning funding plan nor certification of financial assurance for decommissioning; or

(B) Have not received written notice that the decommissioning funding plan or certification of financial assurance for decommissioning is acceptable;

(iii) Specific licenses whose holders are listed in the SDMP List published in NUREG 1444, Supplement 1 (November 1995);

(iv) Specific licenses whose issuance, amendment, or renewal, as of February 15, 1996, is not a categorical exclusion under 10 CFR 51.22(c)(14) and, therefore, need an environmental assessment or environmental impact statement pursuant to subpart A of part 51 of this chapter;

(v) Specific licenses whose holders have not had at least one NRC inspection of licensed activities before February 15, 1996;

(vi) Specific licenses whose holders, as the result of the most recent NRC inspection of licensed activities conducted before February 15, 1996, have been:

(A) Cited for a Severity Level I, II, or III violation in a Notice of Violation;

(B) Subject to an Order issued by the NRC; or

(C) Subject to a CAL issued by the NRC.

(vii) Specific licenses with expiration dates before July 1, 1995, for which the holders have submitted applications for renewal under 10 CFR 40.43 of this part.

(b) Each specific license revoked by the Commission expires at the end of

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the day on the date of the Commission's final determination to revoke the license, or on the expiration date stated in the determination, or as otherwise provided by Commission Order.

(c) Each specific license continues in effect, beyond the expiration date if necessary, with respect to possession of source material until the Commission notifies the licensee in writing that the license is terminated. During this time, the licensee shall--

(1) Limit actions involving source material to those related to decommissioning; and

(2) Continue to control entry to restricted areas until they are suitable for release in accordance with NRC requirements;

(d) Within 60 days of the occurrence of any of the following, consistent with the administrative directions in Sec. 40.5, each licensee shall provide notification to the NRC in writing and either begin decommissioning its site, or any separate building or outdoor area that contains residual radioactivity, so that the building or outdoor area is suitable for release in accordance with NRC requirements, or submit within 12 months of notification a decommissioning plan, if required by paragraph (g)(1) of this section, and begin decommissioning upon approval of that plan if--

(1) The license has expired pursuant to paragraph (a) or (b) of this section; or

(2) The licensee has decided to permanently cease principal activities, as defined in this part, at the entire site or in any separate building or outdoor area; or

(3) No principal activities under the license have been conducted for a period of 24 months; or

(4) No principal activities have been conducted for a period of 24 months in any separate building or outdoor area that contains residual radioactivity such that the building or outdoor area is unsuitable for release in accordance with NRC requirements.

(e) Coincident with the notification required by paragraph (d) of this section, the licensee shall maintain in effect all decommissioning financial assurances established by the licensee pursuant to Sec. 40.36 in conjunction with a license issuance or renewal or as required by this section. The amount of the financial assurance must be increased, or may be decreased, as appropriate, to cover the detailed cost estimate for decommissioning established pursuant to paragraph (g)(4)(v) of this section.

(1) Any licensee who has not provided financial assurance to cover the detailed cost estimate submitted with the decommissioning plan shall do so when this rule becomes effective November 24, 1995.

(2) Following approval of the decommissioning plan, a licensee may reduce the amount of the financial assurance as decommissioning proceeds and radiological contamination is reduced at the site with the approval of the Commission.

(f) The Commission may grant a request to delay or postpone initiation of the decommissioning process if the Commission determines that such relief is not detrimental to the public health and safety and is otherwise in the public interest. The request must be submitted no

later than 30 days before notification pursuant to paragraph (d) of this section. The schedule for decommissioning set forth in paragraph (d) of this section may not commence until the Commission has made a determination on the request.

(g)(1) A decommissioning plan must be submitted if required by license condition or if the procedures and activities necessary to carry out decommissioning of the site or separate building or outdoor area have not been previously approved by the Commission and these procedures could increase potential health and safety impacts to workers or to the public, such as in any of the following cases:

(i) Procedures would involve techniques not applied routinely during cleanup or maintenance operations;

(ii) Workers would be entering areas not normally occupied where surface contamination and radiation levels are significantly higher than routinely encountered during operation;

(iii) Procedures could result in significantly greater airborne concentrations of radioactive materials than are present during operation; or

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(iv) Procedures could result in significantly greater releases of radioactive material to the environment than those associated with operation.

(2) The Commission may approve an alternate schedule for submittal of a decommissioning plan required pursuant to paragraph (d) of this section if the Commission determines that the alternative schedule is necessary to the effective conduct of decommissioning operations and presents no undue risk from radiation to the public health and safety and is otherwise in the public interest.

(3) The procedures listed in paragraph (g)(1) of this section may not be carried out prior to approval of the decommissioning plan.

(4) The proposed decommissioning plan for the site or separate building or outdoor area must include:

(i) A description of the conditions of the site or separate building or outdoor area sufficient to evaluate the acceptability of the plan;

(ii) A description of planned decommissioning activities;

(iii) A description of methods used to ensure protection of workers and the environment against radiation hazards during decommissioning;

(iv) A description of the planned final radiation survey; and

(v) An updated detailed cost estimate for decommissioning, comparison of that estimate with present funds set aside for decommissioning, and a plan for assuring the availability of adequate funds for completion of decommissioning.

(vi) For decommissioning plans calling for completion of decommissioning later than 24 months after plan approval, a justification for the delay based on the criteria in paragraph (i) of this section.

(5) The proposed decommissioning plan will be approved by the Commission if the information therein demonstrates that the decommissioning will be completed as soon as practicable and that the health and safety of workers and the public will be adequately protected.

(h)(1) Except as provided in paragraph (i) of this section, licensees shall complete decommissioning of the site or separate building or outdoor area as soon as practicable but no later than 24 months following the initiation of decommissioning.

(2) Except as provided in paragraph (i) of this section, when decommissioning involves the entire site, the licensee shall request license termination as soon as practicable but no later than 24 months

following the initiation of decommissioning.

(i) The Commission may approve a request for an alternate schedule for completion of decommissioning of the site or separate building or outdoor area, and license termination if appropriate, if the Commission determines that the alternative is warranted by consideration of the following:

(1) Whether it is technically feasible to complete decommissioning within the allotted 24-month period;

(2) Whether sufficient waste disposal capacity is available to allow completion of decommissioning within the allotted 24-month period;

(3) Whether a significant volume reduction in wastes requiring disposal will be achieved by allowing short-lived radionuclides to decay;

(4) Whether a significant reduction in radiation exposure to workers can be achieved by allowing short-lived radionuclides to decay; and

(5) Other site-specific factors which the Commission may consider appropriate on a case-by-case basis, such as the regulatory requirements of other government agencies, lawsuits, ground-water treatment activities, monitored natural ground-water restoration, actions that could result in more environmental harm than deferred cleanup, and other factors beyond the control of the licensee.

(j) As the final step in decommissioning, the licensee shall--

(1) Certify the disposition of all licensed material, including accumulated wastes, by submitting a completed NRC Form 314 or equivalent information; and

(2) Conduct a radiation survey of the premises where the licensed activities were carried out and submit a report of the results of this survey, unless the licensee demonstrates in some other manner that the premises are suitable for release in accordance with the criteria for decommissioning in 10 CFR

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part 20, subpart E. The licensee shall, as appropriate--

(i) Report levels of gamma radiation in units of millisieverts (microroentgen) per hour at one meter from surfaces, and report levels of radioactivity, including alpha and beta, in units of megabecquerels (disintegrations per minute or microcuries) per 100 square centimeters removable and fixed for surfaces, megabecquerels (microcuries) per milliliter for water, and becquerels (picocuries) per gram for solids such as soils or concrete; and

(ii) Specify the survey instrument(s) used and certify that each instrument is properly calibrated and tested.

(k) Specific licenses, including expired licenses, will be terminated by written notice to the licensee when the Commission determines that:

(1) Source material has been properly disposed;

(2) Reasonable effort has been made to eliminate residual radioactive contamination, if present; and

(3)(i) A radiation survey has been performed which demonstrates that the premises are suitable for release in accordance with the criteria for decommissioning in 10 CFR part 20, subpart E; or

(ii) Other information submitted by the licensee is sufficient to demonstrate that the premises are suitable for release in accordance with the criteria for decommissioning in 10 CFR part 20, subpart E.

(4) Records required by Sec. 40.61 (d) and (f) have been received.

(l) Specific licenses for uranium and thorium milling are exempt from paragraphs (d)(4), (f) and (g) of this section with respect to reclamation of tailings impoundments and/or waste disposal areas.

[59 FR 36035, July 15, 1994, as amended at 60 FR 38239, July 26, 1995; 61 FR 1114, Jan. 16, 1996; 61 FR 24674, May 16, 1996; 61 FR 29637, June 12, 1996; 62 FR 39090, July 21, 1997]

# APPENDIX G
# 2000/2001 STATIC AND SCANNING GAMMA RADIATION MEASUREMENTS

*Scanning Gamma Radiation Counts for Reference Area - Obtained 04/17/01*

| Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 415673.57 | 1458487.07 | 11164 | 415835.41 | 1458408.72 | 11495 | 415677.42 | 1458433.39 | 12854 | 415819.99 | 1458419.65 | 12377 | 415690.12 | 1458457.07 | 11975 | 415804.43 | 1458390.99 | 13039 |
| 415673.80 | 1458486.89 | 11906 | 415836.03 | 1458403.20 | 11406 | 415676.95 | 1458439.05 | 12221 | 415819.85 | 1458414.35 | 11914 | 415689.95 | 1458457.23 | 12172 | 415805.86 | 1458388.60 | 12575 |
| 415675.70 | 1458486.63 | 12138 | 415836.18 | 1458397.52 | 11133 | 415677.12 | 1458447.45 | 12013 | 415819.74 | 1458412.92 | 12015 | 415689.92 | 1458457.28 | 11111 | 415807.44 | 1458385.43 | 12282 |
| 415678.43 | 1458486.69 | 11809 | 415836.56 | 1458392.55 | 11228 | 415676.96 | 1458452.27 | 12307 | 415819.73 | 1458412.60 | 12444 | 415690.12 | 1458457.10 | 12710 | 415808.47 | 1458383.02 | 12786 |
| 415681.26 | 1458486.83 | 11732 | 415836.77 | 1458385.43 | 11415 | 415676.90 | 1458456.50 | 12206 | 415819.78 | 1458409.47 | 11886 | 415693.92 | 1458456.71 | 12905 | 415807.45 | 1458381.98 | 12799 |
| 415681.90 | 1458486.93 | 12379 | 415837.39 | 1458378.98 | 11361 | 415676.26 | 1458463.85 | 12220 | 415820.24 | 1458403.84 | 11993 | 415699.14 | 1458456.26 | 12482 | 415807.55 | 1458382.06 | 12088 |
| 415682.53 | 1458487.02 | 12251 | 415838.00 | 1458372.79 | 11516 | 415676.11 | 1458467.85 | 11947 | 415820.57 | 1458398.40 | 11509 | 415705.35 | 1458455.86 | 11747 | 415805.88 | 1458381.98 | 12577 |
| 415686.36 | 1458486.79 | 11176 | 415838.61 | 1458366.44 | 11843 | 415675.68 | 1458472.89 | 12044 | 415821.37 | 1458391.22 | 11070 | 415710.74 | 1458455.17 | 13354 | 415800.95 | 1458382.37 | 12013 |
| 415690.00 | 1458486.50 | 11378 | 415839.10 | 1458361.25 | 12221 | 415675.81 | 1458477.33 | 11751 | 415821.82 | 1458385.26 | 10983 | 415711.54 | 1458454.99 | 12878 | 415796.04 | 1458382.20 | 12118 |
| 415694.16 | 1458486.96 | 11968 | 415839.15 | 1458355.89 | 12166 | 415675.07 | 1458478.62 | 11733 | 415821.89 | 1458379.93 | 10924 | 415711.52 | 1458455.16 | 12447 | 415790.22 | 1458382.26 | 12811 |
| 415698.92 | 1458487.14 | 12686 | 415837.92 | 1458352.81 | 12918 | 415676.15 | 1458477.52 | 11027 | 415822.36 | 1458373.83 | 11371 | 415715.41 | 1458454.53 | 11406 | 415787.62 | 1458382.54 | 13334 |
| 415703.02 | 1458486.63 | 12931 | 415833.81 | 1458352.58 | 11957 | 415677.65 | 1458477.67 | 11775 | 415823.21 | 1458369.14 | 12991 | 415720.29 | 1458454.23 | 12882 | 415782.61 | 1458382.67 | 13500 |
| 415707.49 | 1458486.92 | 12237 | 415828.60 | 1458352.66 | 12625 | 415681.56 | 1458473.70 | 12396 | 415822.40 | 1458368.12 | 13080 | 415726.19 | 1458453.88 | 12037 | 415777.66 | 1458382.67 | 12935 |
| 415710.89 | 1458486.81 | 12791 | 415823.99 | 1458352.20 | 12874 | 415682.28 | 1458472.44 | 12842 | 415821.54 | 1458368.26 | 13027 | 415730.41 | 1458454.34 | 12931 | 415771.53 | 1458382.21 | 12433 |
| 415714.80 | 1458486.62 | 12116 | 415819.96 | 1458352.40 | 12848 | 415682.17 | 1458471.90 | 13772 | 415820.42 | 1458368.46 | 13156 | 415737.06 | 1458454.42 | 12027 | 415763.77 | 1458382.54 | 12981 |
| 415718.91 | 1458486.44 | 11864 | 415813.16 | 1458352.58 | 12544 | 415682.20 | 1458471.98 | 12720 | 415815.79 | 1458368.52 | 12634 | 415741.35 | 1458454.83 | 11816 | 415758.94 | 1458382.77 | 12293 |
| 415724.21 | 1458486.09 | 11866 | 415808.39 | 1458352.56 | 12134 | 415682.80 | 1458471.83 | 12273 | 415810.52 | 1458368.36 | 13368 | 415747.49 | 1458455.09 | 12295 | 415753.99 | 1458382.48 | 12372 |
| 415728.43 | 1458486.06 | 12862 | 415803.18 | 1458352.43 | 11473 | 415686.55 | 1458471.36 | 12247 | 415804.77 | 1458368.84 | 12998 | 415753.42 | 1458455.14 | 11425 | 415749.37 | 1458382.32 | 12058 |
| 415732.24 | 1458485.77 | 11961 | 415799.10 | 1458352.29 | 12447 | 415691.51 | 1458471.44 | 12945 | 415798.88 | 1458368.75 | 13606 | 415757.81 | 1458455.26 | 12891 | 415745.17 | 1458381.98 | 13627 |
| 415737.03 | 1458485.77 | 11698 | 415793.15 | 1458352.69 | 11911 | 415696.79 | 1458470.99 | 13015 | 415794.43 | 1458369.10 | 13772 | 415764.24 | 1458454.70 | 12760 | 415740.70 | 1458381.28 | 12497 |
| 415742.02 | 1458485.17 | 11697 | 415787.87 | 1458352.97 | 12200 | 415700.97 | 1458470.78 | 11539 | 415788.38 | 1458368.78 | 14166 | 415768.64 | 1458455.14 | 12553 | 415734.06 | 1458381.69 | 12236 |
| 1.00 | 1458484.52 | 12068 | 415784.31 | 1458352.35 | 12462 | 415706.32 | 1458470.83 | 11658 | 415782.32 | 1458369.25 | 13723 | 415774.99 | 1458455.42 | 12800 | 415728.97 | 1458381.12 | 12494 |
| 415751.78 | 1458485.13 | 11904 | 415780.12 | 1458351.81 | 12453 | 415712.60 | 1458470.85 | 12094 | 415775.88 | 1458368.81 | 12431 | 415782.16 | 1458455.08 | 12529 | 415723.00 | 1458380.74 | 11953 |
| 415757.51 | 1458485.17 | 11112 | 415775.42 | 1458351.55 | 12248 | 415717.72 | 1458470.69 | 12033 | 415769.92 | 1458369.21 | 12729 | 415786.88 | 1458455.98 | 12658 | 415717.36 | 1458380.38 | 12936 |
| 415762.48 | 1458484.92 | 12363 | 415768.14 | 1458351.46 | 12244 | 415723.90 | 1458470.90 | 12220 | 415765.35 | 1458369.32 | 13136 | 415791.19 | 1458456.53 | 12386 | 415712.40 | 1458380.02 | 13189 |
| 415768.39 | 1458485.43 | 11960 | 415761.34 | 1458351.94 | 11503 | 415728.67 | 1458470.93 | 11351 | 415757.41 | 1458369.09 | 13096 | 415797.37 | 1458456.91 | 12077 | 415705.30 | 1458378.93 | 12289 |
| 415775.87 | 1458485.16 | 11541 | 415754.99 | 1458351.37 | 12715 | 415732.94 | 1458470.51 | 11781 | 415751.81 | 1458368.87 | 12234 | 415800.75 | 1458457.26 | 11913 | 415705.68 | 1458379.94 | 12346 |
| 415779.80 | 1458485.53 | 11094 | 415749.46 | 1458351.75 | 12887 | 415740.28 | 1458470.78 | 11242 | 415746.83 | 1458369.18 | 12845 | 415800.96 | 1458456.74 | 11670 | 415706.68 | 1458380.84 | 12577 |
| 415784.72 | 1458485.18 | 10902 | 415744.33 | 1458351.78 | 12434 | 415745.74 | 1458471.31 | 11419 | 415741.90 | 1458368.44 | 13294 | 415800.93 | 1458454.65 | 12305 | 415706.94 | 1458381.24 | 11844 |
| 415790.63 | 1458485.45 | 11539 | 415738.47 | 1458351.59 | 12081 | 415751.13 | 1458471.53 | 12261 | 415736.73 | 1458368.52 | 12688 | 415801.30 | 1458454.43 | 12285 | 415707.30 | 1458384.48 | 12535 |
| 415794.44 | 1458485.35 | 11505 | 415733.80 | 1458351.80 | 13308 | 415757.39 | 1458471.37 | 12658 | 415730.95 | 1458368.53 | 12323 | 415800.79 | 1458455.58 | 12547 | 415707.26 | 1458389.56 | 12651 |
| 415801.62 | 1458485.29 | 11202 | 415726.27 | 1458351.71 | 13539 | 415761.82 | 1458471.45 | 12712 | 415726.34 | 1458368.23 | 12457 | 415801.14 | 1458455.31 | 12136 | 415707.46 | 1458396.74 | 12065 |
| 415808.36 | 1458485.16 | 11828 | 415721.47 | 1458351.90 | 12465 | 415768.58 | 1458471.54 | 12052 | 415720.97 | 1458367.95 | 13044 | 415801.80 | 1458454.87 | 11839 | 415706.67 | 1458401.81 | 11324 |
| 415813.62 | 1458485.35 | 11877 | 415716.40 | 1458351.79 | 11910 | 415773.78 | 1458471.25 | 11860 | 415715.16 | 1458367.51 | 12225 | 415801.56 | 1458453.73 | 11844 | 415706.57 | 1458408.57 | 12212 |
| 415817.76 | 1458485.69 | 12157 | 415710.80 | 1458351.41 | 12531 | 415779.46 | 1458471.49 | 11988 | 415707.68 | 1458367.32 | 12788 | 415801.78 | 1458453.83 | 11857 | 415705.86 | 1458414.80 | 12563 |
| 415820.63 | 1458485.85 | 11621 | 415704.82 | 1458350.50 | 12315 | 415784.89 | 1458471.59 | 11430 | 415702.97 | 1458366.84 | 12697 | 415802.15 | 1458453.60 | 11678 | 415705.18 | 1458419.17 | 12748 |
| 415823.23 | 1458486.05 | 10809 | 415699.85 | 1458350.55 | 11854 | 415788.91 | 1458471.92 | 11251 | 415697.81 | 1458366.21 | 12402 | 415801.49 | 1458452.89 | 12142 | 415704.96 | 1458424.50 | 12837 |
| 415827.50 | 1458486.10 | 11115 | 415695.81 | 1458350.50 | 12204 | 415797.48 | 1458471.93 | 11713 | 415693.54 | 1458365.51 | 12451 | 415800.59 | 1458448.59 | 12935 | 415704.28 | 1458431.17 | 12162 |
| 415831.93 | 1458485.93 | 11144 | 415689.52 | 1458350.31 | 13311 | 415802.44 | 1458472.09 | 12255 | 415693.57 | 1458365.97 | 13293 | 415800.39 | 1458445.92 | 11813 | 415704.09 | 1458436.29 | 12426 |
| 415833.48 | 1458484.63 | 11524 | 415685.21 | 1458350.04 | 12579 | 415806.85 | 1458472.52 | 11793 | 415693.61 | 1458368.84 | 13214 | 415801.16 | 1458441.67 | 11279 | 415704.95 | 1458439.24 | 12083 |
| 415833.55 | 1458484.33 | 11074 | 415680.11 | 1458351.02 | 12524 | 415810.64 | 1458472.35 | 11748 | 415693.72 | 1458375.49 | 12735 | 415801.02 | 1458441.61 | 12996 | 415705.20 | 1458438.88 | 12076 |
| 415833.59 | 1458482.15 | 12324 | 415679.64 | 1458353.09 | 13213 | 415815.64 | 1458473.52 | 11217 | 415693.40 | 1458381.69 | 11965 | 415803.71 | 1458444.71 | 12436 | 415712.84 | 1458441.88 | 11932 |
| 415833.96 | 1458477.20 | 11432 | 415679.22 | 1458356.12 | 12325 | 415818.90 | 1458473.38 | 11622 | 415693.64 | 1458387.04 | 11813 | 415804.85 | 1458445.49 | 12737 | 415715.88 | 1458438.41 | 11542 |
| 415834.13 | 1458472.38 | 11577 | 415678.61 | 1458358.39 | 13291 | 415818.05 | 1458471.98 | 11810 | 415693.23 | 1458392.69 | 11975 | 415805.52 | 1458442.36 | 12399 | 415720.31 | 1458438.28 | 12150 |
| 415834.07 | 1458468.69 | 11646 | 415678.29 | 1458365.68 | 12251 | 415817.80 | 1458471.73 | 12140 | 415692.62 | 1458398.52 | 12388 | 415806.09 | 1458435.64 | 12032 | 415724.50 | 1458438.68 | 12025 |
| 415834.59 | 1458464.03 | 11233 | 415677.96 | 1458370.83 | 12921 | 415817.48 | 1458468.76 | 12333 | 415692.13 | 1458405.11 | 12368 | 415806.22 | 1458429.61 | 12333 | 415730.84 | 1458438.41 | 12105 |
| 415834.82 | 1458460.13 | 11634 | 415677.61 | 1458377.15 | 12746 | 415818.19 | 1458465.31 | 12098 | 415692.11 | 1458410.75 | 13758 | 415806.70 | 1458424.79 | 12522 | 415736.97 | 1458438.10 | 12310 |
| 415834.82 | 1458453.60 | 12478 | 415677.89 | 1458383.57 | 12520 | 415818.50 | 1458461.19 | 12256 | 415691.91 | 1458418.18 | 13679 | 415806.69 | 1458418.95 | 11251 | 415740.90 | 1458438.01 | 11660 |
| 415834.49 | 1458449.50 | 12285 | 415677.40 | 1458389.88 | 13548 | 415818.59 | 1458456.73 | 11539 | 415691.31 | 1458423.50 | 12902 | 415806.47 | 1458412.84 | 11539 | 415744.77 | 1458437.90 | 11006 |
| 415834.88 | 1458443.13 | 12041 | 415677.33 | 1458395.81 | 13167 | 415819.03 | 1458452.30 | 12467 | 415691.13 | 1458427.76 | 12705 | 415806.19 | 1458411.41 | 11927 | 415746.71 | 1458438.61 | 12112 |
| 415834.93 | 1458438.13 | 12425 | 415677.02 | 1458402.24 | 11993 | 415818.86 | 1458447.15 | 13148 | 415690.69 | 1458433.80 | 12820 | 415806.19 | 1458410.83 | 11959 | 415751.37 | 1458438.95 | 11851 |
| 415835.47 | 1458432.04 | 12436 | 415677.40 | 1458408.64 | 12970 | 415818.88 | 1458439.77 | 11940 | 415690.67 | 1458441.00 | 12462 | 415806.47 | 1458406.68 | 11731 | 415758.01 | 1458439.65 | 12431 |
| 415835.38 | 1458426.09 | 12268 | 415677.57 | 1458417.44 | 12626 | 415819.13 | 1458434.76 | 11611 | 415690.45 | 1458445.60 | 12799 | 415806.20 | 1458400.98 | 12971 | 415763.40 | 1458439.87 | 13251 |
| 415835.55 | 1458420.20 | 11529 | 415677.65 | 1458421.60 | 12368 | 415819.55 | 1458429.83 | 12243 | 415690.54 | 1458451.49 | 12953 | 415805.24 | 1458396.90 | 13255 | 415769.07 | 1458440.25 | 12814 |
| 415835.63 | 1458415.45 | 12056 | 415677.63 | 1458427.41 | 12787 | 415819.65 | 1458423.96 | 11987 | 415690.38 | 1458456.05 | 12514 | 415804.58 | 1458393.92 | 12364 | 415774.35 | 1458440.53 | 11203 |

Note: Coordinates are in U.S. State Plane 1927 New Mexico Central (3002)

Readings collected using bare 2-inch by 2-inch sodium iodide detector held at 18 inches above ground.

*Scanning Gamma Radiation Counts for Reference Area - Obtained 04/17/01*

| Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 415779.54 | 1458439.87 | 12168 | 415739.45 | 1458424.44 | 12038 | 415814.30 | 1458380.44 | 12457 | 415785.33 | 1458479.54 | 12063 | 415739.08 | 1458357.93 | 13590 | 415747.41 | 1458463.86 | 12073 |
| 415784.49 | 1458440.50 | 11950 | 415745.48 | 1458423.96 | 12078 | 415815.85 | 1458381.48 | 11690 | 415789.39 | 1458478.95 | 11771 | 415734.28 | 1458357.25 | 14311 | 415753.24 | 1458463.97 | 12747 |
| 415786.73 | 1458440.45 | 11824 | 415754.34 | 1458424.00 | 12416 | 415812.87 | 1458391.09 | 11971 | 415794.97 | 1458478.77 | 12480 | 415729.25 | 1458355.62 | 12842 | 415758.45 | 1458464.26 | 11859 |
| 415789.57 | 1458440.96 | 12926 | 415759.20 | 1458423.94 | 12091 | 415814.02 | 1458394.91 | 12248 | 415800.82 | 1458478.95 | 13582 | 415722.22 | 1458358.51 | 13402 | 415763.88 | 1458463.96 | 12343 |
| 415794.97 | 1458441.76 | 12115 | 415765.76 | 1458425.61 | 12293 | 415816.58 | 1458402.73 | 12052 | 415807.08 | 1458477.88 | 10989 | 415717.02 | 1458358.58 | 12432 | 415769.46 | 1458464.58 | 11129 |
| 415795.19 | 1458440.86 | 12539 | 415771.46 | 1458426.13 | 13098 | 415817.68 | 1458410.43 | 12236 | 415812.13 | 1458477.66 | 12146 | 415712.01 | 1458358.53 | 13234 | 415776.41 | 1458464.27 | 12740 |
| 415792.35 | 1458438.93 | 12902 | 415778.82 | 1458428.35 | 11265 | 415818.46 | 1458415.37 | 12386 | 415815.50 | 1458477.91 | 12174 | 415706.86 | 1458357.95 | 12264 | 415781.91 | 1458464.86 | 12481 |
| 415791.50 | 1458434.00 | 11847 | 415780.17 | 1458425.38 | 11075 | 415818.20 | 1458422.70 | 12408 | 415818.26 | 1458478.77 | 11741 | 415702.25 | 1458356.58 | 13749 | 415786.93 | 1458465.19 | 13905 |
| 415791.24 | 1458429.69 | 12786 | 415780.75 | 1458422.72 | 11362 | 415820.37 | 1458423.57 | 11647 | 415822.84 | 1458479.34 | 13416 | 415696.92 | 1458356.86 | 13661 | 415793.60 | 1458464.74 | 12171 |
| 415791.42 | 1458423.23 | 12754 | 415781.36 | 1458417.58 | 11494 | 415816.22 | 1458434.03 | 11430 | 415826.06 | 1458479.95 | 11293 | 415691.84 | 1458355.89 | 12711 | 415799.22 | 1458464.24 | 12565 |
| 415791.42 | 1458417.81 | 13038 | 415779.96 | 1458412.13 | 13091 | 415815.91 | 1458441.68 | 11694 | 415827.60 | 1458479.54 | 11978 | 415687.20 | 1458355.54 | 14212 | 415803.80 | 1458464.59 | 11997 |
| 415790.59 | 1458417.89 | 12512 | 415778.69 | 1458407.60 | 11869 | 415813.61 | 1458446.49 | 12281 | 415827.49 | 1458481.44 | 13746 | 415683.42 | 1458354.33 | 12843 | 415808.48 | 1458465.18 | 13155 |
| 415791.66 | 1458415.34 | 12828 | 415776.72 | 1458406.35 | 11889 | 415807.36 | 1458452.06 | 12012 | 415827.28 | 1458482.32 | 13249 | 415684.78 | 1458352.62 | 12562 | 415812.42 | 1458466.61 | 11464 |
| 415791.36 | 1458411.48 | 12128 | 415773.41 | 1458406.37 | 12065 | 415804.21 | 1458454.83 | 11717 | 415827.54 | 1458480.47 | 11613 | 415684.42 | 1458352.75 | 13340 | 415813.89 | 1458466.06 | 13084 |
| 415790.47 | 1458408.39 | 11907 | 415768.55 | 1458405.92 | 12072 | 415797.47 | 1458458.11 | 12096 | 415827.50 | 1458475.81 | 11998 | 415684.11 | 1458356.11 | 13591 | 415813.73 | 1458469.01 | 11160 |
| 415790.81 | 1458403.39 | 12225 | 415763.21 | 1458406.08 | 11967 | 415791.07 | 1458461.35 | 11983 | 415827.43 | 1458471.39 | 13155 | 415683.92 | 1458359.45 | 13412 | 415813.39 | 1458472.25 | 11640 |
| 415790.70 | 1458399.94 | 12025 | 415757.79 | 1458406.40 | 11964 | 415785.13 | 1458462.56 | 11729 | 415826.04 | 1458467.63 | 12537 | 415682.72 | 1458364.59 | 11173 | 415811.39 | 1458472.32 | 12435 |
| 415791.08 | 1458397.86 | 11792 | 415752.23 | 1458405.21 | 13219 | 415778.99 | 1458465.24 | 11832 | 415825.64 | 1458462.62 | 10788 | 415682.58 | 1458370.33 | 13755 | 415811.01 | 1458469.54 | 13002 |
| 415788.82 | 1458400.41 | 12802 | 415745.54 | 1458405.19 | 12733 | 415773.45 | 1458467.34 | 12976 | 415826.02 | 1458457.09 | 12539 | 415682.58 | 1458377.87 | 12837 | 415810.98 | 1458464.75 | 11425 |
| 415791.15 | 1458394.28 | 11772 | 415738.73 | 1458404.56 | 12144 | 415767.35 | 1458470.42 | 11780 | 415825.17 | 1458451.56 | 12423 | 415682.88 | 1458383.84 | 13342 | 415811.26 | 1458460.31 | 12511 |
| 415790.05 | 1458391.05 | 12615 | 415731.68 | 1458405.59 | 11791 | 415758.53 | 1458473.99 | 12522 | 415825.59 | 1458446.65 | 12581 | 415683.02 | 1458390.94 | 13082 | 415811.29 | 1458458.13 | 12969 |
| 415790.65 | 1458390.53 | 12373 | 415726.83 | 1458405.67 | 12120 | 415752.58 | 1458475.24 | 12600 | 415822.90 | 1458439.46 | 11586 | 415682.41 | 1458397.44 | 12603 | 415811.29 | 1458449.40 | 11985 |
| 415790.55 | 1458392.19 | 12083 | 415720.74 | 1458404.12 | 12520 | 415747.58 | 1458476.35 | 12230 | 415824.10 | 1458434.34 | 12851 | 415682.80 | 1458403.53 | 11977 | 415810.76 | 1458447.55 | 12689 |
| 415789.76 | 1458393.84 | 12015 | 415711.58 | 1458404.77 | 13085 | 415740.39 | 1458479.40 | 12793 | 415825.12 | 1458428.88 | 12375 | 415683.12 | 1458410.11 | 12073 | 415810.78 | 1458437.94 | 12260 |
| 415787.66 | 1458394.34 | 12427 | 415705.24 | 1458407.00 | 12801 | 415735.69 | 1458482.22 | 11618 | 415825.35 | 1458423.20 | 12593 | 415683.45 | 1458414.43 | 12657 | 415810.80 | 1458432.77 | 11806 |
| 415782.87 | 1458395.08 | 12974 | 415697.44 | 1458408.00 | 12917 | 415729.40 | 1458486.48 | 11884 | 415825.44 | 1458417.69 | 12914 | 415683.89 | 1458420.92 | 13046 | 415810.91 | 1458426.83 | 11785 |
| 415779.22 | 1458395.81 | 12243 | 415690.48 | 1458406.45 | 12790 | 415722.67 | 1458490.28 | 12085 | 415825.65 | 1458411.23 | 13527 | 415683.57 | 1458427.39 | 12530 | 415811.47 | 1458424.02 | 12736 |
| 415773.24 | 1458396.59 | 12865 | 415691.32 | 1458400.11 | 12272 | 415717.22 | 1458494.17 | 12085 | 415825.44 | 1458404.90 | 11803 | 415683.96 | 1458433.89 | 12126 | 415812.11 | 1458418.37 | 12001 |
| 415768.57 | 1458396.88 | 12656 | 415690.12 | 1458394.78 | 12596 | 415672.95 | 1458478.76 | 12661 | 415825.91 | 1458400.17 | 12535 | 415683.23 | 1458441.13 | 13275 | 415811.93 | 1458413.66 | 12772 |
| 415763.21 | 1458396.35 | 12334 | 415689.70 | 1458386.52 | 12192 | 415674.57 | 1458478.65 | 12888 | 415826.13 | 1458393.61 | 12213 | 415683.59 | 1458446.16 | 13182 | 415813.22 | 1458412.60 | 11118 |
| 415758.67 | 1458395.37 | 12890 | 415689.23 | 1458377.96 | 12448 | 415676.37 | 1458478.19 | 12303 | 415826.46 | 1458387.87 | 12935 | 415682.45 | 1458452.06 | 12006 | 415812.47 | 1458412.02 | 12754 |
| 415754.48 | 1458395.92 | 12754 | 415689.39 | 1458372.66 | 13641 | 415677.85 | 1458477.98 | 12851 | 415826.69 | 1458382.00 | 12561 | 415683.39 | 1458455.88 | 13792 | 415812.62 | 1458409.74 | 13007 |
| 415746.34 | 1458395.72 | 12589 | 415689.78 | 1458366.29 | 14133 | 415679.78 | 1458478.23 | 11250 | 415826.68 | 1458375.62 | 12117 | 415682.47 | 1458459.33 | 12839 | 415813.21 | 1458400.78 | 13345 |
| 415742.38 | 1458395.81 | 12293 | 415693.67 | 1458364.14 | 12617 | 415681.06 | 1458478.22 | 12530 | 415827.47 | 1458369.64 | 13372 | 415682.11 | 1458465.45 | 13005 | 415812.90 | 1458394.43 | 13524 |
| 415734.70 | 1458394.61 | 12453 | 415701.68 | 1458364.84 | 13351 | 415684.30 | 1458478.82 | 14328 | 415827.83 | 1458363.80 | 12288 | 415680.11 | 1458470.51 | 11762 | 415811.94 | 1458388.42 | 14860 |
| 415732.29 | 1458393.48 | 12392 | 415707.94 | 1458365.47 | 12906 | 415689.17 | 1458479.53 | 12543 | 415829.17 | 1458359.77 | 12685 | 415680.36 | 1458474.15 | 12225 | 415812.29 | 1458380.43 | 12633 |
| 415732.95 | 1458393.97 | 12108 | 415716.26 | 1458366.29 | 12538 | 415695.55 | 1458478.41 | 13031 | 415832.00 | 1458358.52 | 12740 | 415679.44 | 1458474.91 | 12914 | 415812.83 | 1458375.99 | 11957 |
| 415733.47 | 1458394.15 | 12633 | 415722.97 | 1458365.18 | 12267 | 415699.78 | 1458479.45 | 12349 | 415831.16 | 1458358.64 | 12751 | 415679.18 | 1458473.09 | 13669 | 415813.21 | 1458371.10 | 13804 |
| 415732.37 | 1458393.91 | 12726 | 415727.34 | 1458364.96 | 12635 | 415703.99 | 1458479.00 | 12487 | 415827.60 | 1458357.92 | 11529 | 415679.02 | 1458469.47 | 12532 | 415814.01 | 1458369.66 | 12067 |
| 415731.87 | 1458393.89 | 12780 | 415733.02 | 1458364.62 | 12788 | 415708.78 | 1458479.04 | 12165 | 415823.81 | 1458357.05 | 12705 | 415680.38 | 1458465.20 | 11823 | 415817.96 | 1458372.50 | 12356 |
| 415729.03 | 1458393.68 | 12550 | 415740.57 | 1458362.35 | 12847 | 415712.11 | 1458478.13 | 12132 | 415819.53 | 1458357.35 | 12449 | 415679.85 | 1458461.33 | 11366 | 415820.36 | 1458374.68 | 12607 |
| 415723.58 | 1458393.43 | 12817 | 415749.46 | 1458363.52 | 12319 | 415716.47 | 1458476.36 | 10890 | 415814.72 | 1458357.60 | 12838 | 415679.88 | 1458462.07 | 11278 | 415820.62 | 1458373.90 | 13042 |
| 415720.42 | 1458393.61 | 12593 | 415755.95 | 1458364.52 | 12708 | 415720.86 | 1458477.06 | 11128 | 415809.62 | 1458357.31 | 11662 | 415680.12 | 1458462.25 | 14084 | 415814.74 | 1458374.51 | 13422 |
| 415720.35 | 1458393.60 | 12541 | 415762.88 | 1458365.05 | 12538 | 415724.76 | 1458477.30 | 12163 | 415804.49 | 1458358.14 | 13126 | 415680.91 | 1458461.71 | 13130 | 415812.52 | 1458374.13 | 11624 |
| 415720.19 | 1458397.14 | 12180 | 415770.70 | 1458365.63 | 13328 | 415728.31 | 1458477.69 | 11900 | 415798.95 | 1458357.75 | 13083 | 415685.18 | 1458462.95 | 11868 | 415804.01 | 1458374.19 | 12831 |
| 415720.30 | 1458401.21 | 11891 | 415777.56 | 1458366.08 | 12360 | 415732.88 | 1458477.95 | 12896 | 415794.20 | 1458357.60 | 12255 | 415690.82 | 1458462.28 | 12921 | 415797.81 | 1458373.84 | 13282 |
| 415719.98 | 1458407.26 | 12346 | 415785.56 | 1458367.54 | 12216 | 415736.95 | 1458477.59 | 12446 | 415788.66 | 1458357.46 | 11326 | 415698.42 | 1458461.98 | 12672 | 415794.64 | 1458374.55 | 11577 |
| 415719.83 | 1458413.13 | 12810 | 415791.39 | 1458368.32 | 12101 | 415742.16 | 1458476.81 | 13167 | 415785.24 | 1458357.49 | 11620 | 415701.97 | 1458461.69 | 12837 | 415785.21 | 1458374.12 | 13327 |
| 415719.73 | 1458419.72 | 12733 | 415794.51 | 1458368.90 | 11915 | 415746.72 | 1458476.82 | 13468 | 415779.47 | 1458357.81 | 12711 | 415708.77 | 1458462.22 | 12015 | 415782.04 | 1458374.43 | 12521 |
| 415719.60 | 1458422.73 | 11985 | 415804.04 | 1458368.15 | 12889 | 415752.85 | 1458477.81 | 13816 | 415775.15 | 1458357.15 | 12757 | 415712.72 | 1458462.58 | 12795 | 415773.67 | 1458375.86 | 11695 |
| 415719.68 | 1458424.66 | 11913 | 415810.58 | 1458367.70 | 12913 | 415760.83 | 1458476.72 | 12271 | 415769.44 | 1458356.70 | 11514 | 415718.37 | 1458461.92 | 12229 | 415767.18 | 1458376.37 | 13871 |
| 415722.23 | 1458424.45 | 11771 | 415815.68 | 1458366.22 | 12743 | 415764.75 | 1458476.95 | 12774 | 415761.28 | 1458356.48 | 13327 | 415724.48 | 1458462.87 | 11894 | 415764.13 | 1458375.74 | 12806 |
| 415725.99 | 1458424.68 | 12029 | 415821.58 | 1458365.41 | 12344 | 415770.03 | 1458478.51 | 11906 | 415756.51 | 1458357.66 | 12022 | 415729.27 | 1458462.57 | 12563 | 415755.41 | 1458375.34 | 13490 |
| 415730.05 | 1458424.13 | 11824 | 415820.15 | 1458366.87 | 12465 | 415774.84 | 1458478.58 | 12984 | 415750.16 | 1458358.69 | 12946 | 415734.55 | 1458462.63 | 11990 | 415752.28 | 1458376.01 | 13113 |
| 415734.85 | 1458424.40 | 13031 | 415817.19 | 1458372.01 | 12247 | 415780.50 | 1458479.02 | 11581 | 415744.95 | 1458358.14 | 12359 | 415740.20 | 1458463.44 | 11969 | 415743.49 | 1458375.29 | 12947 |

Note: Coordinates are in U.S. State Plane 1927 New Mexico Central (3002)

Readings collected using bare 2-inch by 2-inch sodium iodide detector held at 18 inches above ground.

*Scanning Gamma Radiation Counts for Reference Area - Obtained 04/17/01*

| Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate | Easting | Northing | Count Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 415738.44 | 1458375.35 | 12104 | 415798.80 | 1458450.02 | 11814 | 415712.59 | 1458381.39 | 12620 | 415768.37 | 1458405.99 | 12977 | 415684.70 | 1458425.59 | 12615 |
| 415733.33 | 1458375.19 | 13094 | 415798.59 | 1458450.27 | 12033 | 415713.59 | 1458383.48 | 13651 | 415762.81 | 1458406.01 | 12676 | 415679.85 | 1458432.11 | 12721 |
| 415728.47 | 1458373.77 | 12368 | 415797.09 | 1458453.23 | 12799 | 415713.57 | 1458389.37 | 14435 | 415758.24 | 1458406.04 | 11599 | 415677.10 | 1458435.88 | 13395 |
| 415722.89 | 1458374.51 | 12533 | 415796.09 | 1458455.51 | 12711 | 415713.34 | 1458396.41 | 12129 | 415753.76 | 1458404.74 | 12207 | 415676.89 | 1458441.75 | 12672 |
| 415717.11 | 1458374.00 | 12491 | 415795.90 | 1458456.52 | 12314 | 415713.21 | 1458403.19 | 11940 | 415748.30 | 1458404.56 | 11428 | 415679.41 | 1458446.83 | 11337 |
| 415712.13 | 1458373.52 | 10590 | 415795.93 | 1458456.86 | 13963 | 415712.15 | 1458411.40 | 13286 | 415743.68 | 1458403.61 | 13666 | 415679.81 | 1458452.27 | 12678 |
| 415706.28 | 1458372.57 | 12257 | 415795.86 | 1458456.72 | 12385 | 415711.78 | 1458415.94 | 12523 | 415736.98 | 1458403.30 | 12201 | 415680.09 | 1458457.68 | 13459 |
| 415701.35 | 1458373.00 | 13321 | 415795.51 | 1458454.23 | 12586 | 415711.19 | 1458418.87 | 12647 | 415732.47 | 1458403.02 | 12162 | 415680.86 | 1458462.77 | 12991 |
| 415695.93 | 1458372.20 | 12555 | 415795.14 | 1458453.00 | 12794 | 415711.02 | 1458423.47 | 13128 | 415731.77 | 1458403.00 | 12512 | 415682.01 | 1458467.40 | 11717 |
| 415697.48 | 1458369.08 | 13467 | 415793.13 | 1458448.86 | 12642 | 415710.90 | 1458430.90 | 12115 | 415735.76 | 1458402.05 | 13599 | 415682.48 | 1458473.50 | 11397 |
| 415699.75 | 1458365.88 | 12991 | 415794.44 | 1458445.03 | 12002 | 415706.23 | 1458433.39 | 12539 | 415737.46 | 1458401.17 | 12685 | 415683.33 | 1458478.79 | 12225 |
| 415699.96 | 1458368.81 | 11987 | 415795.63 | 1458441.17 | 13410 | 415704.46 | 1458432.03 | 12041 | 415735.17 | 1458401.23 | 13115 | 415683.62 | 1458482.15 | 14256 |
| 415699.96 | 1458374.81 | 12734 | 415796.76 | 1458440.57 | 12050 | 415706.22 | 1458432.06 | 12715 | 415730.05 | 1458401.99 | 13824 | | | |
| 415700.06 | 1458380.79 | 11363 | 415798.52 | 1458443.12 | 12768 | 415709.71 | 1458432.32 | 12914 | 415725.66 | 1458401.35 | 12069 | | | |
| 415701.07 | 1458387.34 | 12935 | 415798.91 | 1458443.75 | 11515 | 415714.16 | 1458431.86 | 12567 | 415726.36 | 1458397.93 | 12589 | | | |
| 415700.29 | 1458393.40 | 12696 | 415800.09 | 1458439.64 | 11339 | 415718.60 | 1458431.31 | 12883 | 415727.97 | 1458395.95 | 12179 | | | |
| 415699.86 | 1458399.98 | 12568 | 415800.09 | 1458434.38 | 10503 | 415723.81 | 1458431.41 | 13472 | 415727.24 | 1458398.88 | 12903 | | | |
| 415698.35 | 1458406.02 | 13445 | 415800.38 | 1458428.64 | 12311 | 415729.02 | 1458432.01 | 12647 | 415726.90 | 1458404.14 | 12386 | | | |
| 415698.55 | 1458411.85 | 13005 | 415795.82 | 1458422.04 | 12012 | 415734.17 | 1458432.26 | 13135 | 415726.56 | 1458410.24 | 12918 | | | |
| 415697.09 | 1458417.62 | 13310 | 415795.29 | 1458415.01 | 14175 | 415740.30 | 1458431.63 | 11666 | 415726.32 | 1458413.90 | 11155 | | | |
| 415699.81 | 1458423.14 | 12108 | 415797.41 | 1458412.69 | 12346 | 415743.43 | 1458431.78 | 13884 | 415725.33 | 1458419.09 | 12037 | | | |
| 415698.47 | 1458429.50 | 13176 | 415799.26 | 1458413.04 | 12336 | 415746.49 | 1458432.78 | 10490 | 415724.90 | 1458420.77 | 12459 | | | |
| 415697.84 | 1458435.67 | 12891 | 415799.14 | 1458409.84 | 12726 | 415752.10 | 1458433.30 | 12783 | 415725.05 | 1458419.79 | 11631 | | | |
| 415696.86 | 1458441.43 | 12993 | 415799.14 | 1458405.39 | 12457 | 415758.51 | 1458433.65 | 11726 | 415723.64 | 1458417.99 | 12712 | | | |
| 415695.93 | 1458446.51 | 12212 | 415799.37 | 1458399.97 | 11646 | 415763.78 | 1458433.73 | 15155 | 415723.97 | 1458417.00 | 12397 | | | |
| 415696.37 | 1458451.66 | 14908 | 415798.84 | 1458395.89 | 11917 | 415767.20 | 1458433.39 | 12489 | 415728.50 | 1458417.60 | 11432 | | | |
| 415692.87 | 1458452.94 | 12391 | 415797.98 | 1458392.23 | 11275 | 415771.61 | 1458432.80 | 12420 | 415735.48 | 1458417.54 | 11964 | | | |
| 415690.64 | 1458451.95 | 12782 | 415797.89 | 1458390.90 | 12517 | 415777.85 | 1458433.59 | 11718 | 415741.48 | 1458417.73 | 11720 | | | |
| 415689.86 | 1458451.36 | 12978 | 415799.91 | 1458388.11 | 13712 | 415782.19 | 1458434.73 | 11015 | 415748.00 | 1458418.87 | 12320 | | | |
| 415689.98 | 1458449.27 | 12091 | 415800.86 | 1458384.42 | 12362 | 415782.93 | 1458435.45 | 13918 | 415753.55 | 1458419.11 | 12250 | | | |
| 415690.04 | 1458449.30 | 12043 | 415802.54 | 1458382.70 | 12457 | 415787.71 | 1458435.11 | 12180 | 415760.27 | 1458418.67 | 11276 | | | |
| 415692.63 | 1458448.80 | 10427 | 415803.66 | 1458386.40 | 12582 | 415789.65 | 1458438.51 | 13533 | 415767.13 | 1458419.77 | 12360 | | | |
| 415698.59 | 1458447.33 | 12749 | 415806.08 | 1458387.77 | 13267 | 415788.29 | 1458440.44 | 13310 | 415773.68 | 1458420.12 | 11340 | | | |
| 415704.53 | 1458446.80 | 11244 | 415806.51 | 1458387.90 | 11831 | 415786.22 | 1458438.61 | 11662 | 415776.60 | 1458420.85 | 13391 | | | |
| 415708.24 | 1458447.07 | 12192 | 415800.50 | 1458388.44 | 11232 | 415784.42 | 1458435.34 | 13216 | 415775.62 | 1458420.36 | 13841 | | | |
| 415709.21 | 1458447.03 | 12139 | 415795.05 | 1458388.99 | 12949 | 415784.30 | 1458429.16 | 12863 | 415776.11 | 1458417.77 | 13360 | | | |
| 415710.80 | 1458447.29 | 11236 | 415789.55 | 1458389.25 | 12277 | 415783.30 | 1458423.46 | 13884 | 415775.81 | 1458415.44 | 12212 | | | |
| 415715.39 | 1458447.02 | 12057 | 415786.32 | 1458389.14 | 12062 | 415782.70 | 1458419.49 | 12792 | 415775.56 | 1458414.52 | 12403 | | | |
| 415721.21 | 1458446.45 | 11831 | 415780.98 | 1458389.73 | 13256 | 415785.44 | 1458420.99 | 11952 | 415772.88 | 1458414.09 | 11552 | | | |
| 415725.48 | 1458446.61 | 12236 | 415774.94 | 1458389.67 | 13458 | 415785.41 | 1458419.53 | 11892 | 415772.59 | 1458413.12 | 11754 | | | |
| 415730.95 | 1458447.89 | 13462 | 415768.92 | 1458389.53 | 13081 | 415782.89 | 1458413.26 | 13800 | 415768.99 | 1458413.17 | 12074 | | | |
| 415737.36 | 1458447.93 | 11851 | 415762.67 | 1458389.38 | 11835 | 415781.70 | 1458407.64 | 12502 | 415763.70 | 1458413.38 | 12066 | | | |
| 415741.38 | 1458446.28 | 12830 | 415757.92 | 1458389.75 | 13572 | 415781.63 | 1458404.47 | 12114 | 415757.80 | 1458414.77 | 15379 | | | |
| 415750.16 | 1458449.57 | 11182 | 415752.48 | 1458388.87 | 12038 | 415783.01 | 1458403.82 | 13792 | 415753.02 | 1458414.20 | 12338 | | | |
| 415754.66 | 1458449.04 | 12143 | 415747.17 | 1458389.08 | 11845 | 415783.23 | 1458402.21 | 13987 | 415747.00 | 1458413.91 | 11488 | | | |
| 415760.11 | 1458448.23 | 13929 | 415741.99 | 1458387.81 | 13505 | 415784.18 | 1458398.45 | 11591 | 415741.01 | 1458413.25 | 11233 | | | |
| 415765.57 | 1458448.52 | 12570 | 415737.21 | 1458387.79 | 12499 | 415784.39 | 1458394.26 | 12477 | 415735.02 | 1458413.13 | 12724 | | | |
| 415770.92 | 1458448.28 | 12598 | 415732.69 | 1458387.22 | 13208 | 415784.70 | 1458393.64 | 12555 | 415729.26 | 1458413.40 | 13357 | | | |
| 415777.10 | 1458448.05 | 11662 | 415727.50 | 1458387.27 | 11910 | 415786.45 | 1458395.83 | 13842 | 415723.27 | 1458413.58 | 12917 | | | |
| 415782.59 | 1458448.37 | 12008 | 415722.01 | 1458386.98 | 13194 | 415788.24 | 1458398.48 | 12370 | 415717.51 | 1458413.95 | 11352 | | | |
| 415788.68 | 1458448.52 | 13133 | 415716.37 | 1458386.09 | 12089 | 415791.04 | 1458401.02 | 12120 | 415711.47 | 1458414.50 | 13752 | | | |
| 415793.30 | 1458448.98 | 11328 | 415712.00 | 1458385.43 | 11593 | 415789.15 | 1458402.02 | 12592 | 415705.84 | 1458415.25 | 13474 | | | |
| 415797.69 | 1458450.77 | 12700 | 415710.26 | 1458384.00 | 13714 | 415784.17 | 1458402.67 | 13154 | 415700.01 | 1458416.69 | 13187 | | | |
| 415797.38 | 1458450.72 | 11773 | 415708.18 | 1458384.29 | 12602 | 415779.41 | 1458403.92 | 12222 | 415693.86 | 1458418.21 | 12531 | | | |
| 415797.50 | 1458451.17 | 13230 | 415708.70 | 1458382.42 | 12300 | 415774.68 | 1458404.68 | 12404 | 415687.53 | 1458423.39 | 12010 | | | |

Note: Coordinates are in U.S. State Plane 1927 New Mexico Central (3002)

Readings collected using bare 2-inch by 2-inch sodium iodide detector held at 18 inches above ground.

# 2000/2001 Investigation Static Gamma Measurement/Soil Sample Locations



Training Sites 5 and 6

| Sample Location | Easting | Northing |
|---|---|---|
| TS5-01 | 413,269 | 1,459,852 |
| TS5-02 | 413,307 | 1,459,807 |
| TS5-03 | 413,299 | 1,459,737 |
| TS5-04 | 412,910 | 1,459,378 |
| TS5-05 | 412,730 | 1,459,488 |
| TS5-06 | 412,654 | 1,459,517 |
| TS5-07 | 412,714 | 1,459,556 |
| TS5-08 | 412,640 | 1,459,635 |
| TS5-09 | 412,615 | 1,459,744 |
| TS5-10 | 412,709 | 1,459,774 |
| TS5-11 | 412,779 | 1,459,686 |
| TS5-12 | 412,796 | 1,459,620 |
| TS5-13 | 412,830 | 1,459,599 |
| TS5-14 | 412,897 | 1,459,538 |
| TS5-15 | 412,980 | 1,459,562 |
| TS5-16 | 412,912 | 1,459,647 |
| TS5-17 | 413,015 | 1,459,682 |
| TS5-18 | 412,918 | 1,459,848 |
| TS5-19 | 413,087 | 1,459,763 |
| TS5-20 | 413,030 | 1,459,609 |
| TS6-01 | 414,492 | 1,459,674 |
| TS6-02 | 414,607 | 1,459,665 |
| TS6-03 | 414,546 | 1,459,666 |
| TS6-04 | 414,443 | 1,459,840 |
| TS6-05 | 414,467 | 1,459,851 |
| TS6-06 | 414,481 | 1,459,895 |
| TS6-07 | 414,452 | 1,460,032 |
| TS6-08 | 414,412 | 1,459,685 |
| TS6-09 | 414,242 | 1,460,109 |
| TS6-10 | 414,210 | 1,460,063 |
| TS6-11 | 414,209 | 1,460,004 |
| TS6-12 | 414,283 | 1,459,976 |
| TS6-13 | 414,445 | 1,460,113 |
| TS6-14 | 414,714 | 1,459,722 |
| TS6-15 | 414,653 | 1,459,447 |
| TS6-16 | 414,420 | 1,460,219 |
| TS6-17 | 414,332 | 1,460,028 |
| TS6-18 | 414,467 | 1,459,551 |
| TS6-19 | 414,254 | 1,459,918 |
| TS6-20 | 414,603 | 1,459,801 |

Training Sites 7 and 8

| Sample Location | Easting | Northing |
|---|---|---|
| TS7-01 | 415,745 | 1,458,129 |
| TS7-02 | 415,745 | 1,458,002 |
| TS7-03 | 415,884 | 1,457,920 |
| TS7-04 | 415,619 | 1,458,229 |
| TS7-05 | 415,424 | 1,458,229 |
| TS7-06 | 415,550 | 1,458,143 |
| TS7-07 | 415,407 | 1,457,946 |
| TS7-08 | 415,472 | 1,458,095 |
| TS7-09 | 415,364 | 1,458,088 |
| TS7-10 | 415,365 | 1,458,046 |
| TS7-11 | 415,597 | 1,458,106 |
| TS7-12 | 415,563 | 1,458,116 |
| TS7-13 | 415,865 | 1,458,149 |
| TS7-14 | 415,405 | 1,458,120 |
| TS7-15 | 415,396 | 1,458,093 |
| TS7-16 | 415,400 | 1,458,066 |
| TS7-17 | 415,866 | 1,458,094 |
| TS7-18 | 415,502 | 1,458,083 |
| TS7-19 | 415,339 | 1,458,132 |
| TS7-20 | 415,533 | 1,458,093 |
| TS8-01 | 412,080 | 1,463,290 |
| TS8-02 | 412,005 | 1,463,300 |
| TS8-03 | 411,969 | 1,463,399 |
| TS8-04 | 411,878 | 1,463,617 |
| TS8-05 | 411,881 | 1,463,566 |
| TS8-06 | 411,881 | 1,463,507 |
| TS8-07 | 411,861 | 1,463,439 |
| TS8-08 | 411,819 | 1,463,393 |
| TS8-09 | 411,824 | 1,463,583 |
| TS8-10 | 411,845 | 1,463,536 |
| TS8-11 | 411,750 | 1,463,434 |
| TS8-12 | 411,719 | 1,463,493 |
| TS8-13 | 411,753 | 1,463,519 |
| TS8-14 | 411,840 | 1,463,455 |
| TS8-15 | 411,835 | 1,463,493 |
| TS8-16 | 411,796 | 1,463,427 |
| TS8-17 | 411,781 | 1,463,503 |
| TS8-18 | 411,824 | 1,463,447 |
| TS8-19 | 411,764 | 1,463,441 |
| TS8-20 | 411,783 | 1,463,485 |

Reference Area

| Sample Location | Easting | Northing |
|---|---|---|
| RA-01 | 415,694 | 1,458,463 |
| RA-02 | 415,737 | 1,458,461 |
| RA-03 | 415,764 | 1,458,467 |
| RA-04 | 415,799 | 1,458,463 |
| RA-05 | 415,837 | 1,458,458 |
| RA-06 | 415,697 | 1,458,432 |
| RA-07 | 415,739 | 1,458,428 |
| RA-08 | 415,763 | 1,458,435 |
| RA-09 | 415,797 | 1,458,431 |
| RA-10 | 415,828 | 1,458,426 |
| RA-11 | 415,699 | 1,458,398 |
| RA-12 | 415,736 | 1,458,393 |
| RA-13 | 415,764 | 1,458,401 |
| RA-14 | 415,792 | 1,458,396 |
| RA-15 | 415,830 | 1,458,397 |
| RA-16 | 415,700 | 1,458,362 |
| RA-17 | 415,731 | 1,458,368 |
| RA-18 | 415,769 | 1,458,367 |
| RA-19 | 415,800 | 1,458,371 |
| RA-20 | 415,830 | 1,458,366 |

Notes:

Coordinates are in U.S. State Plane 1927 New Mexico Central (3002).

ERG Form 2.09B

Ratemeter/Scaler Model 2221 Dector Model 44-10
Serial Number 117336 Serial No. PR150851

Count Time (if applicable) ONE Reading units cpm
Technician KB

| Shielded Location I.D. | Reading |
|---|---|
| TS8-01 | 12915 |
| TS8-02 | 12972 |
| TS8-03 | 11690 |
| TS8-04 | 16555 |
| TS8-05 | 15854 |
| TS8-06 | 17230 |
| TS8-07 | 16956 |
| TS8-08 | 5303 |
| TS8-09 | 26341 |
| TS8-10 | 7601 |
| TS8-11 | 9370 |
| TS8-12 | 32628 |
| TS8-13 | 34818 |
| TS8-14 | 31563 |
| TS8-15 | 27926 |
| TS8-16 | 11,111 |
| TS8-17 | 55,111 |
| TS8-18 | 60618 |
| TS8-19 | 20335 |
| TS8-20 | 242261 |
| | |
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| Unshielded Location I.D. | Reading |
|---|---|
| TS8-01 | 4006 |
| TS8-02 | 4186 |
| TS8-03 | 3334 |
| TS8-04 | 5193 |
| TS8-05 | 4821 |
| TS8-06 | 4962 |
| TS8-07 | 5117 |
| TS8-08 | 18124 |
| TS8-09 | 8725 |
| TS8-10 | 24155 |
| TS8-11 | 31424 |
| TS8-12 | 11119 |
| TS8-13 | 11680 |
| TS8-14 | 10746 |
| TS8-15 | 8831 |
| TS8-16 | 37555 |
| TS8-17 | 18038 |
| TS8-18 | 21047 |
| TS8-19 | 59960 |
| TS8-20 | 89246 |
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ERG Form 2.09B

Ratemeter/Scaler Model 2221
Serial Number 117736

Dector Model 44-10
Serial No. PK 150851

Count Time (if applicable) ONE

Reading units CPM
Technician KB

UNSHIELDED

| Location I.D. | Reading |
|---|---|
| TS7-5 | 21383 |
| TS7-4 | 18355 |
| TS7-13 | 17884 |
| TS7-17 | 17621 |
| TS7-1 | 14195 |
| TS7-3 | 12510 |
| TS7-2 | 12261 |
| TS7-7 | 15895 |
| TS7-19 | 31280 |
| TS7-9 | 30225 |
| TS7-10 | 27709 |
| TS7-16 | 55638 |
| TS7-15 | 54404 |
| TS7-14 | 38642 |
| TS7-8 | 14374 |
| TS7-18 | 34195 |
| TS7-20 | 95371 |
| TS7-12 | 39703 |
| TS7-6 | 16096 |
| TS7-11 | 29535 |
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SHIELDED

| Location I.D. | Reading |
|---|---|
| TS7-5 | 7274 |
| TS7-4 | 5752 |
| TS7-13 | 5983 |
| TS7-17 | 5747 |
| TS7-1 | 4545 |
| TS7-3 | 3778 |
| TS7-2 | 3817 |
| TS7-7 | 4618 |
| TS7-19 | 11497 |
| TS7-9 | 9944 |
| TS7-10 | 8559 |
| TS7-16 | 22064 |
| TS7-15 | 19458 |
| TS7-14 | 14189 |
| TS7-8 | 3904 |
| TS7-18 | 11087 |
| TS7-20 | 36068 |
| TS7-12 | 17305 |
| TS7-6 | ~~47~~ 4575 |
| TS7-11 | 9460 |
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ERG Form 2.09B

Ratemeter/Scaler Model 2221
Serial Number 117336

Dector Model 44-10
Serial No. PR150851

Count Time (if applicable) ONE

Reading units CPM
Technician KS

Shielded

| Location I.D. | Reading |
|---|---|
| TS-601 | 16303 |
| TS6-02 | 5428 |
| TS6-03 | 6769 |
| TS6-04 | 18533 |
| TS6-05 | 44692 |
| TS6-06 | 10321 |
| TS6-07 | 5830 |
| TS6-08 | 17922 |
| TS6-09 | 5637 |
| TS6-10 | 8059 |
| TS6-11 | 14063 |
| TS6-12 | 26616 |
| TS6-13 | 5596 |
| TS6-14 | 4115 |
| TS6-15 | 4030 |
| TS6-16 | ~~[illegible]~~ 5316 |
| TS6-17 | 8861 |
| TS6-18 | 14270 |
| TS6-19 | 7505 |
| TS6-20 | ~~1708~~ 4742 |
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Unshielded

| Location I.D. | Reading |
|---|---|
| | 49411 |
| | 70359 |
| | 26337 |
| | 57324 |
| | 13354 |
| | 32284 |
| | 20018 |
| | 68228 |
| | 21727 |
| | 27968 |
| | 44047 |
| | 72644 |
| | 19503 |
| | 14156 |
| | 14089 |
| | ~~[illegible]~~ 18610 |
| | 29552 |
| | 40769 |
| | 28432 |
| | 17087 |
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DATA VOID — TAKEN WITH SOME POINTS WITH SCA WINDOW IN.

TS-5
4/10/01

ERG Form 2.09B

Ratemeter/Scaler Model 2221 Dector Model 44-10
Serial Number 117336 Serial No. PR 150851

Count Time (if applicable) ONE Reading units COUNTS
Technician KB

Recheched

unshielded

| Location I.D. | Reading |
|---|---|
| TS5-04 | 17750 |
| TS5-05 | 61312 |
| TS5-06 | 19202 |
| TS5-07 | 45807 |
| TS5-08 | 32624 |
| TS5-09 | 17823 |
| TS5-10 | 30196 |
| TS5-11 | 89348 |
| TS5-12 | 57500 |
| TS5-13 | 46577 |
| TS5-14 | 50906 |
| TS5-15 | 41829 |
| TS5-17 | 29734 |
| ✓ TS5-19 | ~~13621~~ 16366 |
| ✓ TS5-18 | ~~15506~~ 18876 |
| ✓ TS5-16 | 26032 |
| TS5-20 | 26948 |

shielded

| Location I.D. | Reading |
|---|---|
| TS5-04 | 5060 |
| TS5-05 | 21566 |
| TS5-06 | 5394 |
| TS5-07 | 14371 |
| TS5-08 | 9685 |
| TS5-09 | 4661 |
| TS5-10 | 8648 |
| TS5-11 | 25777 |
| TS5-12 | 16643 |
| TS5-13 | 14596 |
| TS5-14 | 14728 |
| TS5-15 | 13252 |
| TS5-17 | 9027 |
| TS5-19 | ~~3159~~ 4678 |
| TS5-18 | ~~3641~~ 5287 |
| TS5-16 | ~~4358~~ 6245 |
| TS5-20 | 8224 |

collected after TS5-15

Found Window Out near end of work - used to recheck.

ERG Form 2.09B

Ratemeter/Scaler Model 2221

Serial Number 117336

Dector Model 44-10

Serial No. PR 150857

Count Time (if applicable) ONE MIN

Reading units Counts

Technician KS

Unshielded

| Location I.D. | Reading |
|---|---|
| TS5-Ø4 | 18,202 |
| TS5-Ø5 | 61,462 |
| TS5-Ø6 | 19,429 |
| TS5-Ø8 | 33,875 |
| TS5-Ø9 | 17,923 |
| TS5-1Ø | 30,2Ø2 |
| TS5-11 | 91,110 |
| TS5-15 | 56,829 |
| TS5-13 | 47,215 |
| TS5-16 | 26,7Ø4 |
| TS5-18 | 19,865 |
| TS5-19 | 16,798 |
| TS5-17 | 30,442 |
| TS5-2Ø | 28,048 |
| TS5-14 | 49,700 |
| TS5-Ø7 | 46,545 |
| TS5-12 | 56,783 |
| TS5-01 | 13,895 |
| TS5-02 | 14,112 |
| TS5-03 | 14554 |
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Shielded

| Location I.D. | Reading |
|---|---|
| TS5-Ø4 | 5Ø36 |
| TS5-Ø5 | ~~6121Ø32~~ 21,032 |
| TS5-Ø6 | 5379 — 5,379 |
| TS5-Ø8 | 9961 |
| TS5-Ø9 | 4,758 |
| TS5-1Ø | 8,923 |
| TS5-11 | 26,147 |
| TS5-15 | 16,127 |
| TS5-13 | 14,397 |
| TS5-16 | 6,71Ø |
| TS5-18 | 5,442 |
| TS5-19 | 4,91Ø |
| TS5-17 | 9,246 |
| TS5-2Ø | 8,Ø3Ø |
| TS5-14 | 14,658 |
| TS5-Ø7 | 14,711 |
| TS5-12 | 15,715 |
| TS5-01 | 4087 |
| TS5-02 | 4252 |
| TS5-03 | 4317 |
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ERG Form 2.09B

Ratemeter/Scaler Model LMI 2221
Serial Number 117376

Dector Model LMI 44-10
Serial No. PR150857

Count Time (if applicable) 1.4 min

Reading units counts
Technician KB

shielded

| Location I.D. | Reading |
|---|---|
| RA1 | 3901 |
| RA2 | 3842 |
| RA3 | 3938 |
| RA4 | 3841 |
| RA5 | 3865 |
| RA6 | 3957 |
| RA7 | 3902 |
| RA8 | 3878 |
| RA9 | 3952 |
| RA10 | 3932 |
| RA11 | 3951 |
| RA12 | 3956 |
| RA13 | 3964 |
| RA14 | 3907 |
| RA15 | 3936 |
| RA16 | 4016 |
| RA17 | 3818 |
| RA18 | 4193 |
| RA19 | 3958 |
| RA20 | 4027 |
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unshielded

| Location I.D. | Reading |
|---|---|
| 12305 | |
| 12692 | |
| 12508 | |
| 12296 | |
| 12239 | |
| 12243 | |
| 12448 | |
| 12533 | |
| 12621 | |
| 12102 | |
| 12924 | |
| 13045 | |
| 12357 | |
| 12491 | |
| 12277 | |
| 12978 | |
| 12398 | |
| 12975 | |
| 12621 | |
| 12911 | |
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Kenneth K Baker
4/17/01