The highest exposure rates found on the Site were observed in a small area in the southern section, visible in Figure 11. Strata staff noted during our survey that this area exhibits unusual characteristics, perhaps including natural materials that may have concentrated uranium-bearing materials.

Other areas of note in Figure11 are discussed below:

1. The low density of scanning performed in an area in the SE corner of the site was the result of interactions with the property owner. This area was cut for hay during our site work; windrows were in place for drying, and access was discouraged by the owner. Data that were collected in that portion of the site indicate a likelihood of low exposure rates throughout the segment.

2. Collection of scan data in the area west of the reservoir was restricted by steep slopes, marshland and a stream. Similarly, access to the area east of the reservoir was restricted by marshland and streambed.

3. A section of land just south of the widest portion of the reservoir (the east end) is of interest, showing, upon careful inspection, low gamma exposure rates relative to adjacent sections immediately east and west. The lower-exposure-rate section is Bureau of Land Management (BLM) land, fenced and presumably untouched in terms of ranching operations for perhaps a century or more. Several other adjacent areas on site show notable differences in exposure rate, but without such apparent differences in their history or use characteristics.

4. The segment of the main roads on site, forming the base of the “Y” that includes CR 193, shows a significantly lower exposure rate than CR 193. Material used to construct that portion of the road must have origins different from material used to construct the upper two segments.

5. The narrow, elongated area of higher exposure rates seen slightly to the west of south-center of Figure 11 may be associated with pre-ISR test project activities performed at this site by previous lease holders. The area adjacent to that location and to the east, said to have contained a pond associated with the historical activities at this site, does not show similar higher exposure rates.

3.2 Soil Radium-226 Concentrations: Correlation With Gamma Radiation Results

As discussed previously, soil samples were composited at 10 locations selected to cover the range of exposure rates found on site. Correlation locations are shown in Figures 12 and 13, and Table 1 summarizes the contract laboratory’s soil analysis results, included in Appendix C. At most other pre-licensing uranium ISR sites where we have performed similar correlation work, the range of soil radium concentrations and related gamma radiation exposure rates was significantly larger than found at this site. Other sites also allowed the collection of soil samples at locations spread reasonably uniformly over the range of measured exposure rates. The Ross site offered few sample locations at higher exposure rates.

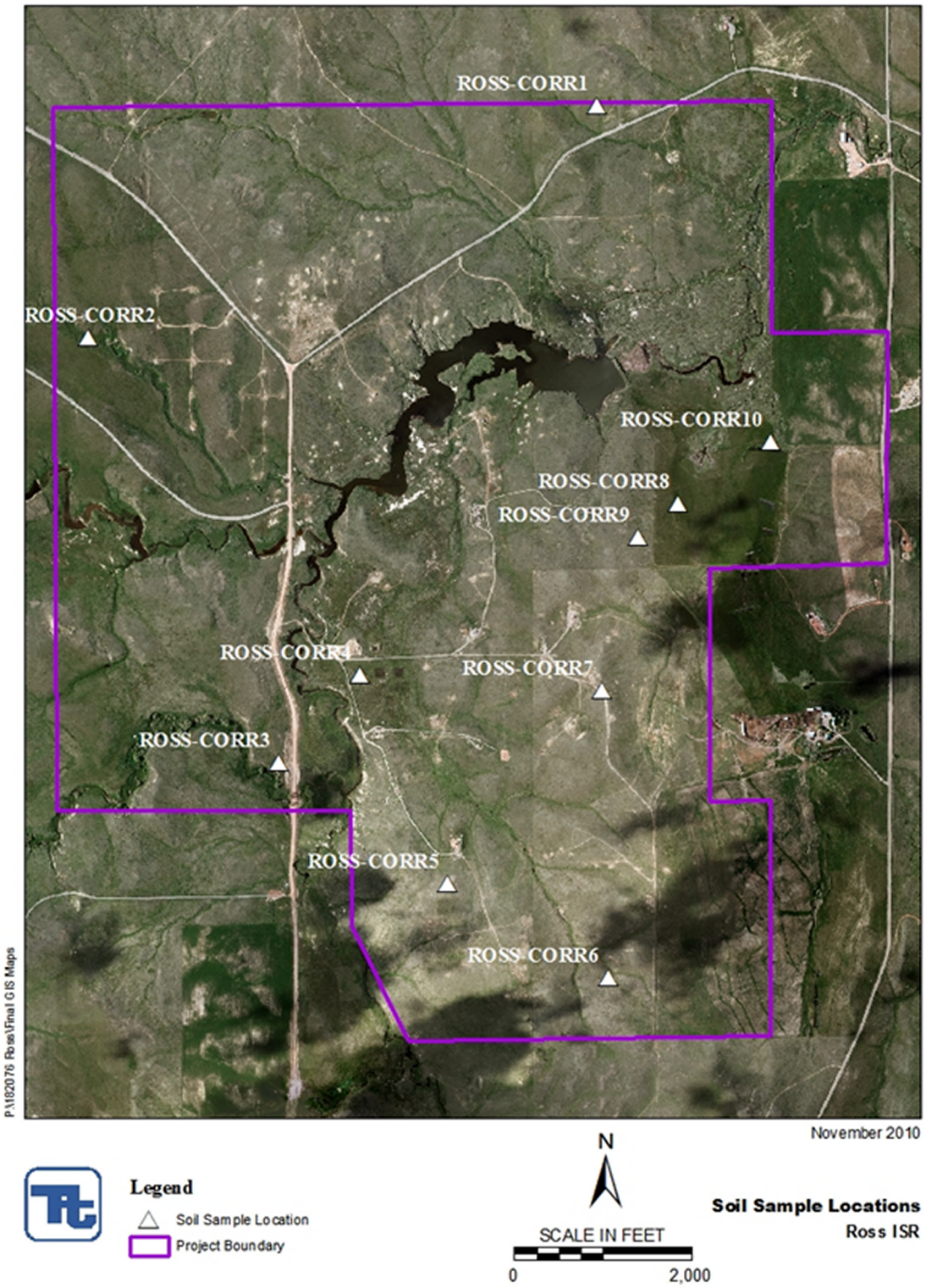

Figure 12. Correlation plot locations

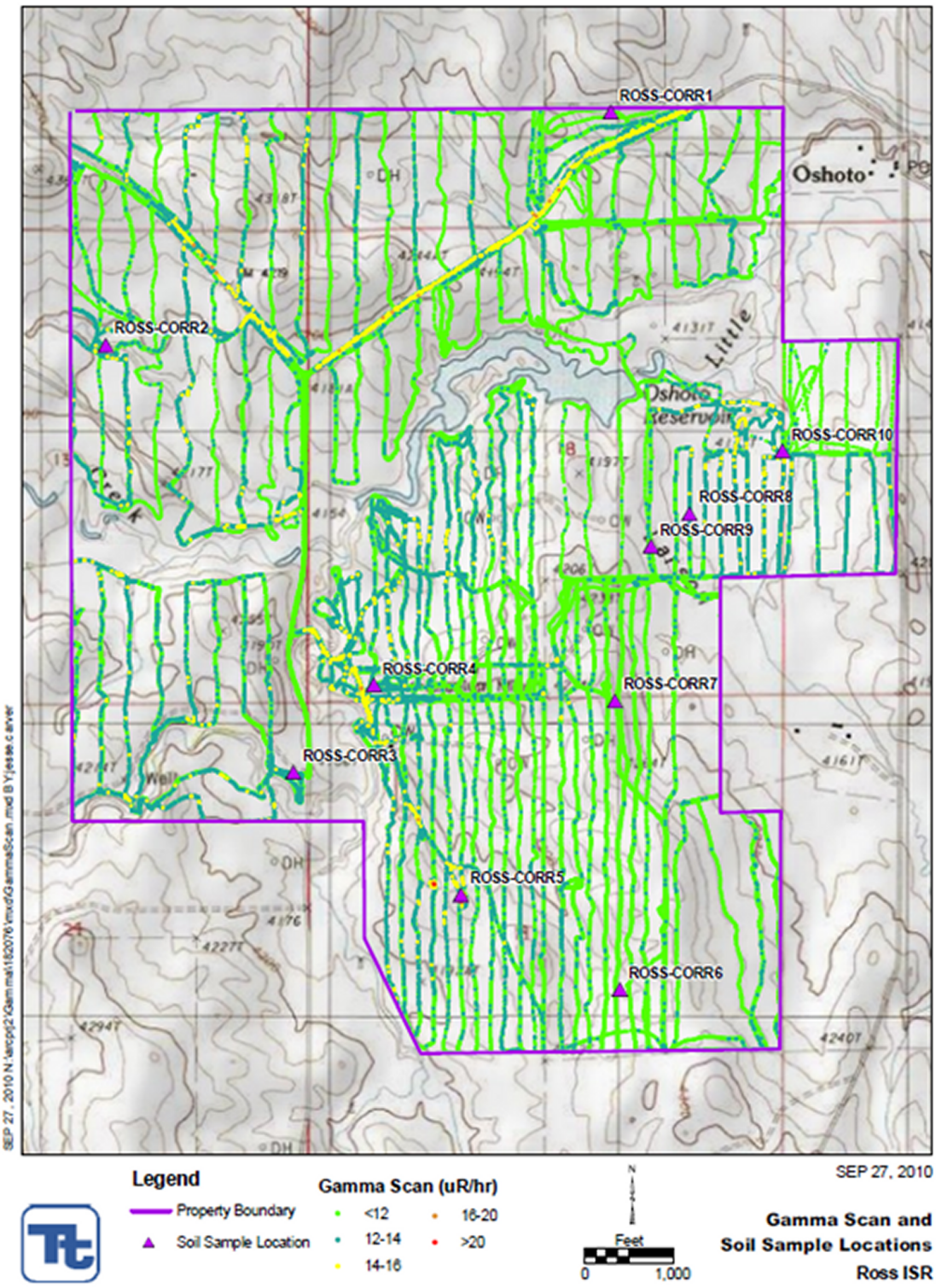

Figure 13. Correlation site locations overlaid on a gamma exposure rate plot

Table 1. Radium-226 soil correlation plot data

Soil Correlation ID	Ra-226 Soil Concentration (pCi/g)	Ra-226 Results Standard Deviation (+/-)	Gamma Radiation Exposure Rate (µR/hr)
ROSS-CORR1	1.15	0.37	10
ROSS-CORR2	1.96	0.48	10.7
ROSS-CORR3	1.97	0.36	10.2
ROSS-CORR4	1.81	0.43	11.9
ROSS-CORR5	14.3	1.9	19.1
ROSS-CORR6	1.18	0.32	9
ROSS-CORR7	0.93	0.25	9.8
ROSS-CORR8	1.60	0.40	12.5
ROSS-CORR9	1.44	0.41	10.7
ROSS-CORR10	1.53	0.42	12.6

A regression analysis performed on the 10 Ross site data pairs results in a power function relationship with an R^2 (coefficient of determination) of 0.80 (Figure 14). Figure 14 indicates that the relationship is significantly influenced by the single, high data point (ROSS-CORR5).

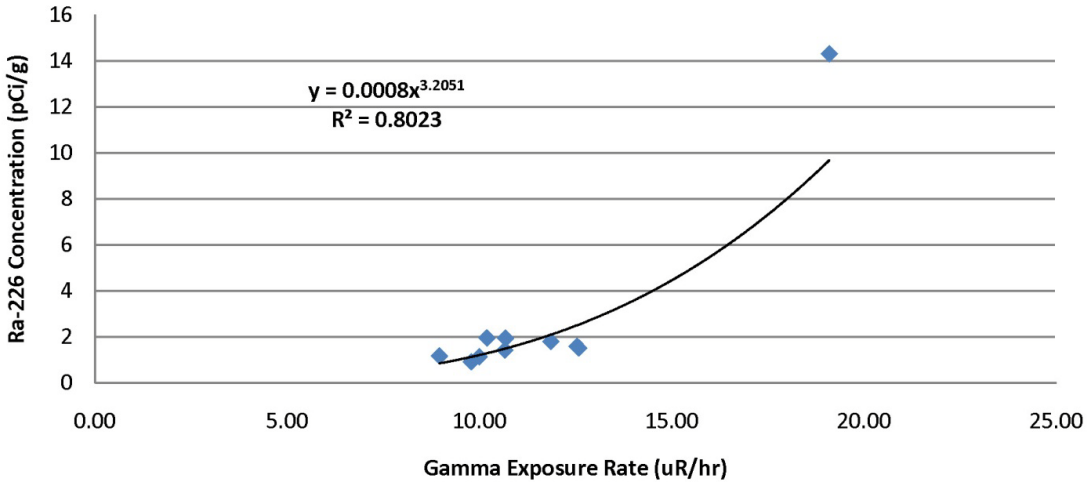

Figure 14. Radium-226 concentrations vs. gamma radiation exposure rates

Soil sample analysis results from ALS Laboratory identified no quality control flags or analytical problems.

Except for correlation sample ROSS-CORR5, the Ross site radium-226 soil concentration values are at or near typical natural background levels (~1 pCi/g). At these concentrations, gamma radiation exposure rates are driven by a combination of influences including radium-226 decay products, but are strongly influenced by thorium-232 and potassium-40 soil concentrations as well. In our experience scanning similar sites, a strong correlation of gamma exposure rate with radium-226 soil concentrations is unlikely until soil values approach 3 to 5 pCi/g radium-226,

where radium decay products begin to drive the exposure rate. (Note: neither the Ludlum 44-10 NaI detector nor the Bicron® micro-rem detector is sensitive to cosmic ray particulate radiation, although both will detect photon radiation associated with cosmic ray spallation events.) Although the Ross site correlation data do not provide a strong relationship between exposure rate and soil radium concentrations, the relationship is useable. For the purposes of this report, we have developed a radium-226 soil concentration estimate map (Figure 15), using the Figure 14 correlation equation.

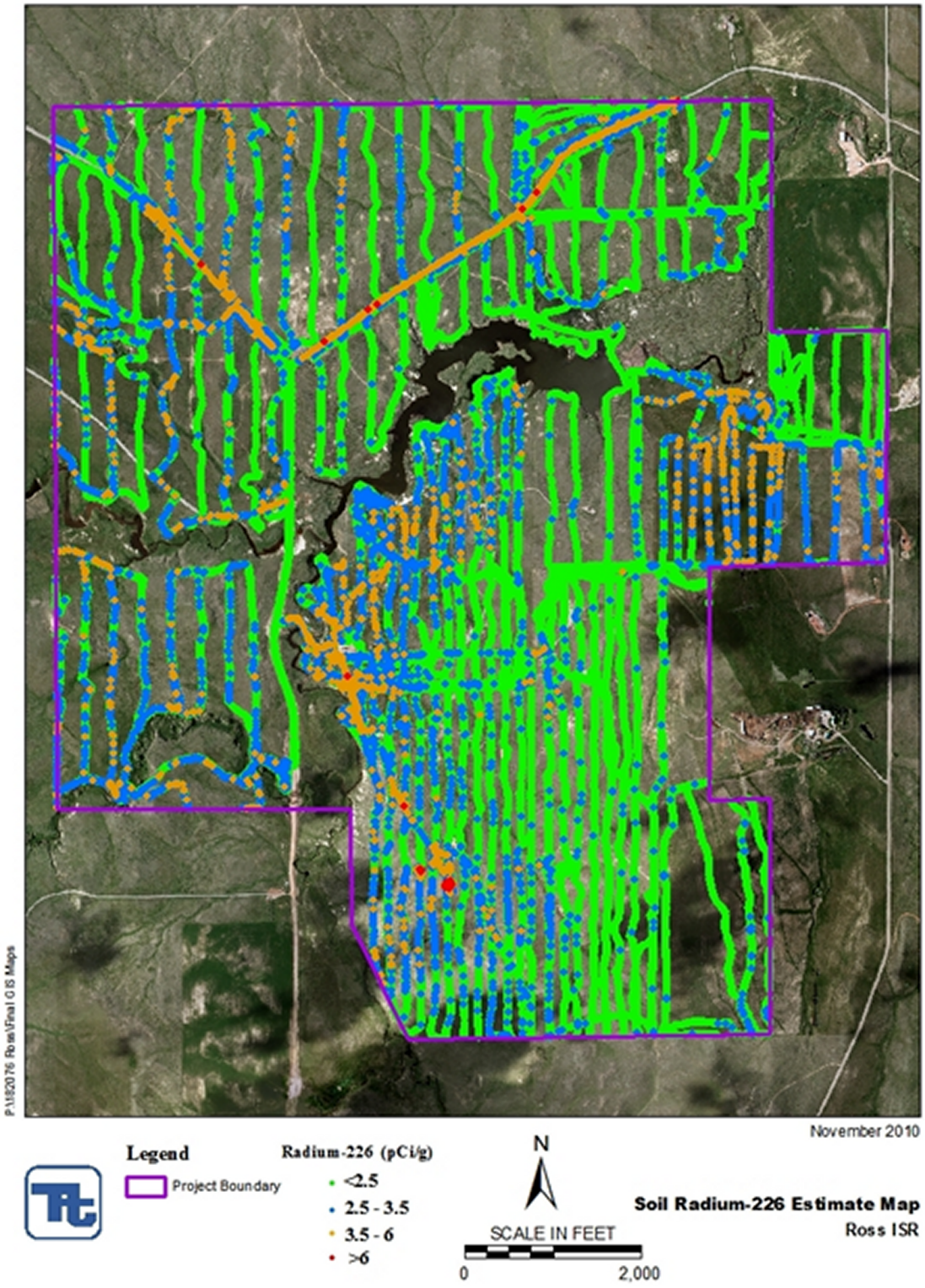

Figure 15. Ross site estimated radium-226 concentrations, based on the Figure 14 correlation equation

3.3 Gamma Radiation Exposure Rate vs. Dose Rate: Correlation Results

As discussed earlier, at the same 10 by 10 m plots from which soil radium-226 vs. NaI gamma radiation exposure rate correlations were developed, a Bicron® micro-rem meter was used to record dose rates averaged over each plot. Results of the gamma radiation exposure and dose rate correlation analysis are presented in Figure 16 and Table 2.

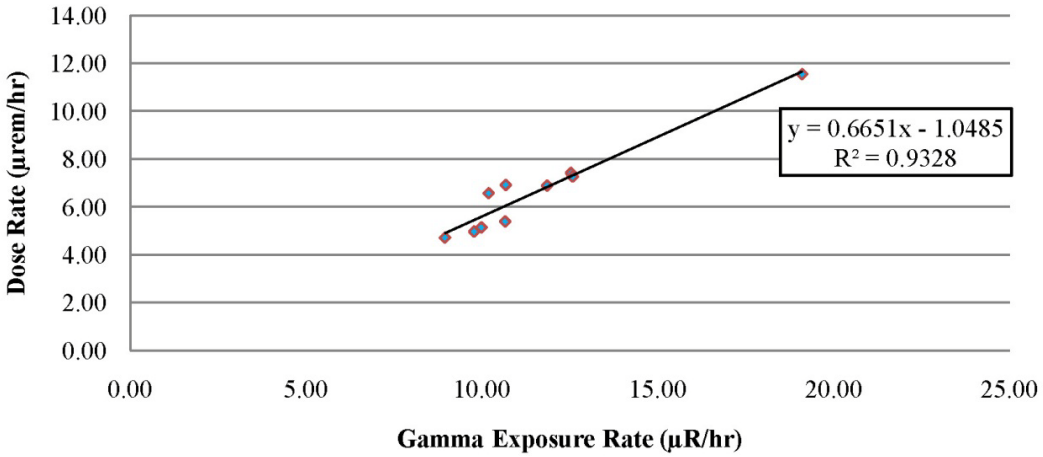

Figure 16. Bicron dose rates vs. Ludlum exposure rates

An R^2 value of 0.93 was calculated for the dose rate to gamma radiation exposure rate correlation. The equation developed in Figure 16 can be used to estimate dose rate values throughout the Site.

Table 2. Dose rate vs. exposure rate at correlation plot locations

Soil Correlation ID	Bicron MicroRem Detector (dose rate)	NaI Detector 44-10/2350 (exp. rate)	Dose Rate (µrem/hr)	Exposure Rate (µR/hr)	Latitude	Longitude
ROSS-CORR1	SN#B9904	Rhino Left-MFG-2	5.2	10.0	44.58903	-104.95049
ROSS-CORR2	SN#B9904	Rhino Left-MFG-2	6.9	10.7	44.58188	-104.97256
ROSS-CORR3	SN#B9904	Rhino Left-MFG-2	6.6	10.2	44.56873	-104.96436
ROSS-CORR4	SN#B9904	Rhino Right-MFG-3	6.9	11.9	44.57143	-104.96085
ROSS-CORR5	SN#B9904	Rhino Right-MFG-3	12	19.1	44.56497	-104.95704
ROSS-CORR6	SN#B9904	Rhino Left-MFG-2	4.7	8.96	44.56205	-104.95012
ROSS-CORR7	SN#B9904	Rhino Right-MFG-3	5.0	9.78	44.57092	-104.95032
ROSS-CORR8	SN#B9904	Jeep Left - MFG-16	7.4	12.5	44.57669	-104.94704
ROSS-CORR9	SN#B9904	Jeep Left - MFG-16	5.4	10.7	44.57568	-104.94874
ROSS-CORR10	SN#B9904	Jeep Left - MFG-16	7.3	12.6	44.57862	-104.94298

(Note: NaI detector ID numbers and soil plot latitude/longitude locations also apply to Table 1.)

Using the regression equation shown in Figure 16, gamma radiation exposure rate data were converted to produce a plot of site gamma radiation dose rate (Figure 17).

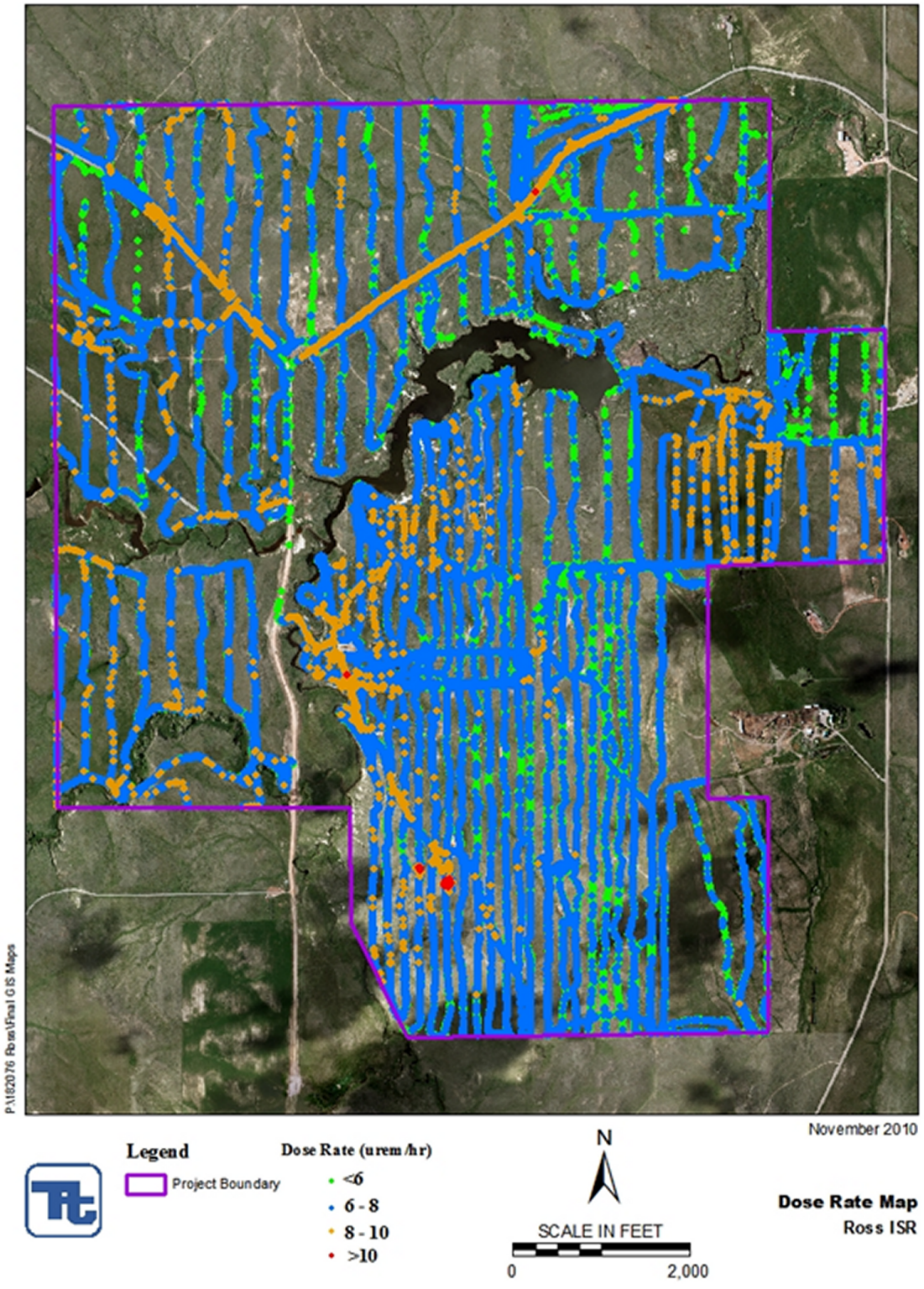

Figure 17. Ross site dose rate estimates (micro-rem/hr)

4.0 SUMMARY

Tetra Tech field engineers performed a survey of baseline gamma radiation exposure rates on the proposed Ross ISR Site. The survey developed GPS-located gamma radiation exposure rate data. Ludlum NaI detector vs. laboratory-analyzed soil radium correlation data allow estimation of soil radium concentrations over much of the Site. Ludlum sodium-iodide detector vs. Bicron® micro-rem detector cross-calibrations were also developed and used to map dose rate over the Site.

Tetra Tech's survey results highlight the following information:

1. Based on the higher exposure rates observed on the CR 193 road segments passing through the northern portion of the site, we conclude that the base material used to develop CR 193 was probably imported from elsewhere. This is not true for the public road segment passing south from CR 193 and exiting the site at the south boundary. Eventual closure and license termination of the Ross ISR site will include evaluations to determine whether site roads were contaminated during uranium transportation activities. This report's record of pre-existing anomalous gamma radiation levels on CR 193 will therefore be important during site closure.

2. This report's measured radiation exposure rates are likely to be overestimates, given the response characteristics of sodium iodide detectors in the mixed-energy radiation field associated with the Ross site's predominantly low soil concentrations of gamma-emitting terrestrial radionuclides. The Bicron micro-rem meter vs. Ludlum NaI detector onsite correlation data provide data to correct for this effect.

3. While oil and gas extraction activities occurring on the Ross site can result in the concentration of naturally-occurring radioactive materials in, for example, pipe scale, no evidence of this effect was noted during evaluation of the field survey results.

4. Based on the data presented here, it is reasonable to conclude that the great majority of the Ross site exhibits relatively low near-surface radium-226 soil concentrations. The data provide a useful record of current site conditions in the context of eventual required evaluations.

These results are provided to meet the intent of specific pre-licensing regulatory guidance related to site radioactive material concentrations. The information should facilitate the eventual assessment of any onsite contamination resulting from ISR activities.

5.0 REFERENCES AND BIBLIOGRAPHY

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APPENDIX A
INSTRUMENTATION: FACTORY CALIBRATION SHEETS

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

MFG-2

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER TETRA TECH MFG INC ORDER NO. 20152128/349181

Mfg. Ludlum Measurements, Inc. Model 2350-1 Serial No. 134748

Cal. Date 22-Apr-10 Cal Due Date 22-Apr-11 Cal. Interval 1 Year Meterface N/A

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 52 % Alt 694.8 mm Hg

☐ New Instrument Instrument Received ☐ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☑ Requiring Repair ☐ Other-See comments

☑ Mechanical check
☑ F/S Resp. check ☑ Reset check ☑ Window Operation ☑ Input Sens. Linearity
☑ Audio check ☑ Alarm Setting check ☑ Battery check (Min. Volt) 4.4 VDC
☑ Ratemeter Linearity check ☑ Integrated Dose check ☑ Recycle Mode check
☑ Data Log check ☑ Overload check ☑ Scaler Readout check Threshold Dial Ratio 100 = 10 mV

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

☑ HV Readout (2 points) Ref./Inst. 500 / 500 V Ref./Inst. 2000 / 2001 V

COMMENTS: *Firmware: 37122N20*
IO Firmware:37123N04
Cs137 Resolution:12.08%
Cal. Braced w. T4 39" e Cable.
Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
Detector #	LMI44-10	PR139487	1000	100	7 / 1	0.000000E+00	1.000000E+00	
Detector #	LMI44-10	PR139487	1000	100	4 / 2	1.800144E-05	5.747030E+10	—
Detector #	PEAK	CS137	749	642	7 / 1	0.000000E+00	1.000000E+00	
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								

Units: 0 -- rad, 1 -- Gray, 2 -- rem, 3 -- Sv, 4 -- R, 5 -- C/Kg, 6 -- Disintegrations, 7 -- Counts, 8 -- Ci/cm sq., 9 -- Bq/cm sq.
Time Base: 0 -- Seconds, 1 -- Minutes, 2 -- Hours

* See attached detector documentation, if app

Digital Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400kcpm	n/a	39869 (9)	400cpm	n/a	40 (9)
	40kcpm		3992	40cpm		4
	4kcpm		399			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 Gamma S/N ☐ 73410 ☐ 1131 ☐ 781 ☐ 059 ☐ 280 ☐ 60646
☐ 1162 ☐ G112 ☑ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ 70897 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N ☐ Beta S/N ☑ Other Am241:0.83uci

☑ m 500 S/N 94940 ☑ Multimeter S/N 78401031

Calibrated By: [signature] Date 22-APR-10

Reviewed By: [signature] Date 26 Apr 10

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

MFG - 3

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER TETRA TECH, INC. ORDER NO. 20140461/342081

Mfg. Ludlum Measurements, Inc. Model 2350-1 Serial No. 98631

Cal. Date 22-Sep-09 Cal Due Date 22-Sep-10 Cal. Interval 1 Year Meterface N/A

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 30 % Alt 705.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical check
☑ F/S Resp. check
☑ Audio check
☑ Ratemeter Linearity check
☑ Data Log check
☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89.

☑ Reset check
☑ Alarm Setting check
☑ Integrated Dose check
☑ Overload check

☑ Window Operation
☑ Battery check (Min. Volt) 4.4 VDC
☑ Recycle Mode check
☑ Scaler Readout check
☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

☑ Input Sens. Linearity
Threshold Dial Ratio 100 = 10 mV

☑ HV Readout (2 points) Ref./Inst. 500 / 499 V Ref./Inst. 2000 / 1999 V

COMMENTS: *Firmware: 37122N26*

I/O Firmware: 37123N05

Calibrated using 39" cable.

(44-10) Resolution for Cs137 ≈ 9.06%

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
Detector # 1	LMI44-10	PR011772	900	100	4 / 2	1.204162E-05	5.751392E+10	✓
Detector # 2	LMI44-10	PR011772	900	100	7 / 1	1.204162E-05	1.000000E+00	
Detector # 3	CS137/PK	662KEV	601	642	7 / 1	0.000000E+00	1.000000E+00	
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								

Units: 0 -- rad, 1 -- Gray, 2 -- rem, 3 -- Sv, 4 -- R, 5 -- C/Kg, 6 -- Disintegrations, 7 -- Counts, 8 -- Ci/cm sq, 9 -- Bq/cm sq.
Time Base: 0 -- Seconds, 1 -- Minutes, 2 -- Hours

* See attached detector documentation, if app

Digital Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400kcpm	40055(0)	40055(0)	400cpm	40(0)	40(0)
	40kcpm	4006	4006	40cpm	4 ↓	4 ↓
	4kcpm	400 ↓	400 ↓			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.
The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 Gamma S/N ☐ S-394/1122 ☐ 1131 ☐ 781 ☐ 059 ☐ 280 ☐ 60646
☐ 1162 ☐ G112 ☑ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304
☐ Alpha S/N ☐ Beta S/N ☑ Other Am241≈ 0.83 µCi
☑ m 500 S/N 114520 ☑ Multimeter S/N 78401030

Calibrated By: Sebastian Castaneda Date 22-Sep-09
Reviewed By: David Jackson Date 23Sep09

FORM C44C 10/15/2008

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

MFG-16

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER TETRA TECH, INC. ORDER NO. 20140461/342081

Mfg. Ludlum Measurements, Inc. Model 2350-1 Serial No. 129405

Cal. Date 22-Sep-09 Cal Due Date 22-Sep-10 Cal. Interval 1 Year Meterface N/A

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 30 % Alt 705.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical check
☑ F/S Resp. check
☑ Audio check
☑ Ratemeter Linearity check
☑ Data Log check
☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89.

☑ Reset check
☑ Alarm Setting check
☑ Integrated Dose check
☑ Overload check

☑ Window Operation
☑ Battery check (Min. Volt) 4.4 VDC
☑ Recycle Mode check
☑ Scaler Readout check
☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

☑ Input Sens. Linearity
Threshold Dial Ratio 100 = 10 mV

☑ HV Readout (2 points) Ref./Inst. 500 / 500 V Ref./Inst. 2000 / 1997 V

COMMENTS: *Firmware: 37122N21*

I/O Firmware: 37123N05

Calibrated using 39" cable.

(44-10) Resolution for Cs137 ≈ 9.67%

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
Detector # 1	LMI44-10	PR137085	850	100	4 / 2	1.537896E-05	5.740377E+10	✓
Detector # 2	LMI44-10	PR137085	850	100	7 / 1	1.537895E-05	1.000000E+00	
Detector # 3	CS137/PK	662KEV	578	642	7 / 1	0.000000E+00	1.000000E+00	
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								

Units: 0 -- rad, 1 -- Gray, 2 -- rem, 3 -- Sv, 4 -- R, 5 -- C/Kg, 6 -- Disintegrations, 7 -- Counts, 8 -- Ci/cm sq, 9 -- Bq/cm sq.
Time Base: 0 -- Seconds, 1 -- Minutes, 2 -- Hours

* See attached detector documentation, if app

Digital Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400kcpm	400870	400870	400cpm	400	400
	40kcpm	4004	4004	40cpm	4 ↓	4 ↓
	4kcpm	400 ↓	400 ↓			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.
The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 Gamma S/N ☐ S-394/1122 ☐ 1131 ☐ 781 ☐ 059 ☐ 280 ☐ 60646
☐ 1162 ☐ G112 ☑ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304
☐ Alpha S/N ☐ Beta S/N ☑ Other Am241 ≈ 0.83 µCi
☑ m 500 S/N 114520 ☑ Multimeter S/N 78401030

Calibrated By: Sebast Caballero Date 22-Sep-09
Reviewed By: Quality Inspector Date 23-Sep-09

FORM C44C 10/15/2008

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

MFG-17

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER TETRA TECH MFG, INC. ORDER NO. 20150942/348450

Mfg. Ludlum Measurements, Inc. Model 2350-1 Serial No. 120630

Cal. Date 13-Apr-10 Cal Due Date 13-Apr-11 Cal. Interval 1 Year Meterface

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 20 % Alt 698.8 mm Hg

☐ New Instrument Instrument Received ☐ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical check
☑ F/S Resp. check
☑ Audio check
☑ Ratemeter Linearity check
☑ Data Log check
☑ Reset check
☑ Alarm Setting check
☑ Integrated Dose check
☑ Overload check
☑ Window Operation
☑ Battery check (Min. Volt) 4.4 VDC
☑ Recycle Mode check
☑ Scaler Readout check
☑ Input Sens. Linearity
Threshold Dial Ratio 100 = 10 mV

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89.
☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

☑ HV Readout (2 points) Ref./Inst. 500 / 498 V Ref./Inst. 2000 / 1997 V

COMMENTS: *Firmware: 37122N21*
I/O Firmware# 37123n04 Resolution for Cs-137 = 12%
Calibrated with a 39" cable.
Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
Detector # 1	LMI44-10	PR135847	1000	100	4 / 2	1.603268E-05	5.430998E+10	✓
Detector # 2	LMI44-10	PR135847	1000	100	7 / 1	1.603268E-05	1.000000E+00	
Detector # 3	CS137PK	662KEV	676	642	7 / 1	0.000000E+00	1.000000E+00	
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								

Units: 0 -- rad, 1 -- Gray, 2 -- rem, 3 -- Sv, 4 -- R, 5 -- C/Kg, 6 -- Disintegrations, 7 -- Counts, 8 -- Ci/cm sq., 9 -- Bq/cm sq.
Time Base: 0 -- Seconds, 1 -- Minutes, 2 -- Hours

* See attached detector documentation, if applicable.

Digital Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400K cpm	39933 (0)	39933 (0)	400 cpm	40 (0)	40 (0)
	40K 5	3990 5	3990 5	40	4 5	4 5
	4K 5	398 5	398 5			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.
The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 Gamma S/N ☐ 73410 ☐ 1131 ☐ 781 ☐ 059 ☐ 280 ☐ 60646
☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ 70897 ☐ Neutron Am-241 Be S/N T-304
☐ Alpha S/N ☐ Beta S/N ☑ Other Am 241 ≈ 0.1μC
☑ m 500 S/N 50800 ☑ Multimeter S/N 83990502

Calibrated By: Charles Dick Date 13 Apr 10
Reviewed By: Rhonda Hain Date 15 Apr 10

FORM C44A 03/11/2010 Page 1 of 3

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER TETRA TECH MFG, INC. ORDER NO. 20141568/342736

Mfg. ~~Ludlum Measurements, Inc.~~ BICRON Model MICRO REM Serial No. B 990 Y

Mfg. _____ Model _____ Serial No. _____

Cal. Date 30-Sep-09 Cal Due Date 30-Sep-10 Cal. Interval 1 Year Meterface 0-200µrem

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 53 % Alt 697.8 mm Hg

☐ New Instrument Instrument Received ☐ Within Toler. +-10% ☑ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☐ F/S Resp. ck ☐ Reset ck. ☐ Window Operation ☐ Geotropism
☐ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) _____VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set _____ V Input Sens. _____ mV Det. Oper. _____ V at _____ mV Threshold Dial Ratio _____ = _____ mV

☐ HV Readout (2 points) Ref./Inst. _____ / _____ V Ref./Inst. _____ / _____ V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1000	150 mR/hr	150	150
x1000	50 mR/hr	45	45
x100	15 mR/hr	145	150
x100	5 mR/hr	45	50
x10	1500 µR/hr	130	150
x10	500 µR/hr	40	50
x1	150 µR/hr	150	150
x1	100 µR/hr	100	100
x0.1	15 µR/hr	150	150
x0.1			

*Uncertainty within ± 10% C.F. within ± 20%

Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: ☐ S-394/1122 ☑ 1131 ☑ 781 ☐ 059 ☐ 280 ☐ 60646

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N _____ ☐ Beta S/N _____ ☑ Other 20/uci # 356/282A-35

☐ m 500 S/N _____ ☐ Oscilloscope S/N _____ ☐ Multimeter S/N _____

Calibrated By: Wendell Williams Date 30-Sep-09

Reviewed By: Richard Haines Date 30 Sep 09

FORM C22A 10/15/2008

AC Inst. Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed: _____

APPENDIX B
LABORATORY ANALYSIS RESULTS

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division
Fort Collins, Colorado

Gamma Spectroscopy

Case Narrative

Tetra Tech MM, Inc.

Work Order Number: 1007308

1. The following report consists of analytical results for 10 soil samples received by ALS on 07/27/10.

2. These samples were prepared according to procedure SOP739R9. The samples were sealed in steel cans on 07/31/10 and stored for at least 21 days to allow ^{222}Rn to approach secular equilibrium with its parent, ^{226}Ra. The degree of in-growth achieved prior to analysis on 08/21/10 is at least 97.8%. Conservatively assuming a radon emanation efficiency of approximately 50%, the effective radon progeny in-growth for these samples would be greater than 98.9%.

3. The samples were analyzed for the presence of gamma emitting radionuclides according to procedure SOP713R11. The analyses were completed on 08/21/10.

4. The results for these samples are reported on a “Dry Weight” basis in units of pCi/gram.

5. ALS has observed a reproducible low bias in ^{226}Ra results (about -30% for the geometry in question) when using a mixed gamma source for the calibration of HPGe detectors for solid samples. This bias is eliminated by calibration using a NIST traceable ^{226}Ra source in the same geometry and configuration as the samples.

6. The library used for calibration and analysis employs multiple peaks for the ^{226}Ra progeny, ^{214}Pb (352 and 295 keV) and ^{214}Bi (609 and 1120 keV). Using these peaks avoids the use of the problematic ^{226}Ra photo-peak at 186 keV, which suffers from poorly resolvable interference from ^{235}U at the same energy. Final activity results for ^{226}Ra are calculated, using the uncertainty-weighted mean of the activities for the four photo-peaks, by the Seeker gamma spectroscopy software assuming secular equilibrium.

7. There are cases where the sample density is less than the associated calibration standard density. Cases that exceed the limit of +/- 15% of the density of the calibration standard are flagged with a ‘G’, denoting a significant density difference between the sample and calibration standard. Consequently, the results may be biased high for the flagged results in this work order. If requested, ALS can perform a transmission spike in order to estimate a magnitude of this bias. The results are reported without further qualification.

8. No further problems were encountered with either the client samples or the associated quality control samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Linda Arend
Radiochemistry Primary Data Reviewer

08/27/10
Date

Radiochemistry Final Data Reviewer

08/27/10
Date

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 1007308
Client Name: Tetra Tech MM, Inc.
Client Project Name:
Client Project Number:
Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Ross Corr 1	1007308-1		SOIL	22-Jul-10	
Ross Corr 2	1007308-2		SOIL	22-Jul-10	
Ross Corr 3	1007308-3		SOIL	22-Jul-10	
Ross Corr 4	1007308-4		SOIL	22-Jul-10	
Ross Corr 5	1007308-5		SOIL	22-Jul-10	
Ross Corr 6	1007308-6		SOIL	22-Jul-10	
Ross Corr 7	1007308-7		SOIL	22-Jul-10	
Ross Corr 8	1007308-8		SOIL	22-Jul-10	
Ross Corr 9	1007308-9		SOIL	22-Jul-10	
Ross Corr 10	1007308-10		SOIL	22-Jul-10	

1007308

ALS Laboratory Group

CHAIN OF CUSTODY

Failure to complete all sections of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the terms and conditions as specified on the back of Chain of Custody

COC number (for client tracking) _____

Page ____ of _____

SHIPMENT INFORMATION

CONTACT INFORMATION

customer.support@alsglobal.com
www.alsglobal.eu

CODE OR NAME OF ANALYSIS (See Instruction 9)

Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Ra-226 Concentration, Avg	Soil, after drying	Homogenizing each sample, then									

CLIENT CONTACT AND REPORTING INFORMATION (See Instruction 1)

Company Name: Tetra Tech FT. Collins
Contact Name: Robert Meyer
Change of contacts *: No ✓ Yes — If yes, we will contact you
Contact Phone: 970 223 9600
Address: 3801 Automation Way, Suite 100, FT Collins, CO 80525
Email 1: rmeyer7@mindspring.com
Email 2: robert.meyer@tetratech.com

PROJECT INFORMATION (See Instructions 3-7)

Project name:
Quote number:
Purchase Order (PO):
Sampler ID, sample location:
Special archiving conditions:
Express handling? No — Standard delivery (7-10 working days)
Yes — Express Due date: (Express fees will apply, see terms and conditions)

INVOICE ADDRESS - If other than reporting adress (See Instruction 2)

Company Name:
Contact Name:
Change of contacts *: No Yes — If yes, we will contact you
Address:
Email:

ALS ID #	SAMPLE IDENTIFICATION (See Instruction 8)	CROSS THE REQUESTED ANALYSES (See Instruction 10)	MATRIX (a)	SAMPLING AND CONTAINER INFO Date	Time	Tot bottles	(b)	REMARKS (See Instruction 11-15)
1	Ross Corr 1 22 July 2010	✓	Soil					
2	" 2 "	✓						
3	" 3 "	✓						
4	" 4 "	✓						
5	" 5 "	✓						
6	" 6 "	✓						
7	" 7 "	✓						
8	" 8 "	✓						
9	" 9 "	✓						
10	" 10 "	✓						

CLIENT SIGNATURES (See Instruction 16)

Client's signature: R. Meyer
Client's date and time of completion: 22 July 2010

Chain of Custody: Sealed / Broken / ✓ Not available
Received by (Lab): Shawna Schmitt — Date and time: 7/27/10 0945
Shipment condition:
Logged by — Date
Committed by — Date
Arriving Temperatue
Optional information: Hours over 8°C

a) DW (Drinking water), SW (Surface water), GW (Ground water), WW (Waste water), IW (Industrial water), SO (Soil), SL (Sludge) WA (Waste), SE (Sediment) OS (Other solid material), EM (Emission) IM (Immission, Ambient air)
b) F (Flammable), P (Poisonous) I (Infectious) CR (Corrosive) E (Explosive) CN (Contaminated)

ALS Laboratory Group - Fort Collins

CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA Workorder No: 1007308

Project Manager: ARW Initials: LAS Date: 7/27/10

1. Does this project require any **special handling** in addition to standard Paragon procedures?		YES	(NO)
2. Are custody **seals** on **shipping containers** intact?	(NONE)	YES	NO
3. Are Custody seals on **sample containers** intact?	(NONE)	YES	NO
4. Is there a **COC (Chain-of-Custody) present** or other representative documents?		(YES)	NO
5. Are the **COC and bottle labels complete and legible?**		(YES)	NO
6. Is the **COC in agreement** with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		(YES)	NO
7. Were **airbills / shipping documents** present and/or removable?	(DROP OFF)	YES	NO
8. Are all aqueous **samples requiring preservation preserved correctly?** (excluding volatiles)	(N/A)	YES	NO
9. Are all aqueous **non-preserved samples pH 4-9?**	(N/A)	YES	NO
10. Is there **sufficient sample** for the requested analyses?		(YES)	NO
11. Were all samples placed in the **proper containers** for the requested analyses?		(YES)	NO
12. Are all samples within **holding times** for the requested analyses?		(YES)	NO
13. Were all sample containers received **intact?** (not broken or leaking, etc.)		(YES)	NO
14. Are all samples requiring **no headspace** (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? **Size of bubble:** ____ < green pea ____ > green pea	(N/A)	YES	NO
15. Do perchlorate LCMS-MS **samples have headspace?** (at least 1/3 of container required)	(N/A)	YES	NO
16. Were samples checked for and free from the presence of **residual chlorine?** (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	(N/A)	YES	NO
17. Were the samples **shipped on ice?**		YES	(NO)
18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	(RAD ONLY)	YES	(NO)

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	Ø							
DOT Survey/ Acceptance Information — External µR/hr reading:	N/A							
DOT Survey/ Acceptance Information — Background µR/hr reading:	11							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 7/28/10

*IR Gun #2: Oakton, SN 29922500201-0066 *IR Gun #4: Oakton, SN 2372220101-0002

Form 201r22.xls (6/1/09)

Gamma Spectroscopy Results

PAI 713 Rev 11

Method Blank Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Lab ID: GS100801-1MB
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 31-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes

Final Aliquot: 134 g
Result Units: pCi/g
File Name: 101395d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	0.05 +/- 0.25	0.43	1	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Laboratory Control Sample(s)

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Lab ID: GS100801-1LCS

Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 31-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 101465d04

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	458 +/- 54	3	470	97.5	85 - 115	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Duplicate Sample Results (DER)

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 10
Lab ID: 1007308-10DUP
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 138 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101212d08

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13982-63-3	Ra-226	1.53 +/- 0.42	0.74	G	1.71 +/- 0.40	0.63	G	0.303	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 1
Lab ID: 1007308-1
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 138 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101616d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.15 +/- 0.37	0.70	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 2
Lab ID: 1007308-2
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 109 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101210d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.96 +/- 0.48	0.69	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 3
Lab ID: 1007308-3
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 130 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101393d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.97 +/- 0.36	0.53	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 4
Lab ID: 1007308-4
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 132 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101463d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.81 +/- 0.43	0.67	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 5
Lab ID: 1007308-5
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 136 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101617d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	14.3 +/- 1.9	1.0	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 6
Lab ID: 1007308-6
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 142 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101211d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.18 +/- 0.32	0.54	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 7
Lab ID: 1007308-7
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 140 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101394d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	0.93 +/- 0.25	0.47	1	LT,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 8
Lab ID: 1007308-8
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 135 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101464d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.60 +/- 0.40	0.62	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 9
Lab ID: 1007308-9
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 141 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101079d10

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.44 +/- 0.41	0.72	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 10
Lab ID: 1007308-10
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 136 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101618d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.53 +/- 0.42	0.74	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*

Gamma Spectroscopy Results

PAI 713 Rev 11

Sample Duplicate Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1007308
Client Name: Tetra Tech MM, Inc.
ClientProject ID:

Field ID: Ross Corr 10
Lab ID: 1007308-10DUP
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 10
Date Collected: 22-Jul-10
Date Prepared: 31-Jul-10
Date Analyzed: 21-Aug-10

Prep Batch: GS100801-1
QCBatchID: GS100801-1-1
Run ID: GS100801-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 138 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 101212d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	Lab Qualifier
13982-63-3	Ra-226	1.71 +/- 0.40	0.63	1	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1007308-1*