

STATE OF COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

# **ORIGINAL FILE COPY**

# GEORGE E. DAVIS MILL REMEDIATION PROJECT HMWMD-RAD-01

# GATEWAY, MESA COUNTY, COLORADO

# **PROJECT COMPLETION REPORT**

**PREPARED BY:** 

MFG, INC. 3801 AUTOMATION WAY FORT COLLINS, COLORADO 80525-5734

# AND

FRONTIER ENVIRONMENTAL SERVICES, INC. 5171 WARD ROAD, UNIT 1 WHEAT RIDGE, COLORADO 80033-1940

**SEPTEMBER 2006** 

# **Original File Copy**

#### October 16, 2006

Mr. Robert W. Terry

State of Colorado Department of Public Health and Environment (CDPHE) HMWMD-RP-B2 4600 Cherry Creek Drive South Denver, Colorado 80246-1530

Reference: CDPHE RFP Number HMWMD-RCP-01 Gateway, Colorado – Davis Mill Site Remediation

Subject: Transmittal of Final George E. Davis Mill Site Completion Report

Dear Mr. Terry:

Pursuant to the Terms and Conditions of the above reference project contract documents; please find enclosed twenty-five (25) copies of the Final George E. Davis Mill Site Remediation Completion Report.

Contained within each report is a Compact Disc (CD) copy of relevant project documents:

- Project Completion Report Text File
- Project Daily Field Reports
- Project Safety Meeting
- Project Photographs
- Project "Bills-Of-Lading"

Contained in Attachment I of the Final Completion Report are the RESRAD Files.

Should you have any questions, you may contact us 303-234-9350.

Sincerely,

Frontier Environmental Services, Inc.

And for MFG, Inc. – Fort Collins, CO

Daniel S. Hinds, CEM, RHSP President

Cc: Robert Meyer, et. al; MFG, Inc. with Final Completion Report

Page 1 of 1 October 16, 2006



FRONTIER ENVIRONMENTAL SERVICES. INC.

5171 Ward Road, Unit 1 Wheat Ridge, Colorado 80033 Telephone: (303) 234-9350 Facsimile: (303) 234-9371

# COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Hazardous Materials and Waste Management Division NRC Grant No. NRC-06-05-303 Formerly Licensed Sites

#### SA-1000 SITE CLEANUP REPORT

1

Licensee:	Sinbad Uranium Company / George E. Davis 1017 Lakeside Court Grand Junction, Colorado 81502	Current owner:	Katherine B. Willis 43201 State Hwy 141 Gateway, Colorado 81522
License Number: Docket Number:	R-00215 (previously R-00170) lic 40-1987	ense active 16-Dec-5	55 – 31-Jul-59
Purpose of report:	NRC Grant No. NRC-06-05-303 NRC Grant No. NRC-06-04-301 NRC Grant No. NRC-06-01-301	site cleanup as follow site characterization a scoping survey	vup to and

#### I: Radionuclides used at site:

- A. Determined from files
  - Uranium ore (including carnotite)

B. Determined from interviews with current or past employees and from site surveys
 Interviews with John R. Willis, owner of adjacent property, son of current owner, and son and former
 employee of Robert Willis, previous owner and uranium miner/operator/broker
 Uranium ore (including carnotite), Uranium, Thorium, Radium, related U and Th decay series
 radionuclides

II: Affected and unaffected areas (described in detail in the attached consultant's site characterization report)

- A. Affected areas (28,300 square meters, or about 6.98 acres, approximately 25% of property) Hill where mill is located; hillsides; area around hill including adjacent pond Equipment yard and outbuildings, areas where ore was piled for storage while awaiting sale Areas used as rental property
- B. Unaffected areas (all remaining areas on site; site area is 111,026 square meters, or about 27.435 acres) Hay field

Treed area at back of property, between hay field and river beaches Sandy beaches along Dolores River and West Creek Colo. Dept. of Transportation yard (portion of originally licensed site)

This Department has reviewed all of the measurement data and concurs with the contractor's findings regarding final (post-cleanup) status of the property.

III: Field measurements and dose evaluation

The contractor (Frontier Environmental and subcontractor MFG, Inc.) and their subcontractors performed extensive field and laboratory measurements before, during and after excavation. MFG analyzed the field data using the U.S. DOE RESRAD v6.22 mathematical model dosimetry program. Several estimates were made, based on combinations of likely assumptions. Details of data collection and analysis, and of MFG's findings, are provided in the attached consultant's project completion report.

MFG has estimated that, based on the current property use conditions and analysis by RESRAD, the radiation dose rate to the present on-site population probably does not exceed 25 mrem/yr *above background*. This Department has reviewed all of the survey data, and the input data and site use assumptions that were used in the models, and concurs with the consultant's findings.

However, because not all contaminated material could be removed within the limitations of the project budget, the State of Colorado will not be able to release the property for unrestricted use in its present condition.

As required by RH 4.61.3 of the State of Colorado *Rules and Regulations Pertaining to Radiation Control*, the Colorado Department of Public Health and Environment, working with the Colorado Department of Law (Office of the Attorney General), will request that the present property owner establish durable, legally enforceable institutional controls which provide reasonable assurance that the Total Effective Dose Equivalent (TEDE) from residual radioactivity that is distinguishable from background will not exceed 0.25 mSv per year (25 mrem/y) to an average member of the critical group (the present residential population).

The durable, legally enforceable institutional controls will take the form of restrictive covenants on the property, signed and agreed to by the property owner, that will be filed with the Mesa County (Colorado) Clerk and will be linked to all future titles and deeds to the property. Those restrictive covenants are presently being drafted. If the property owner fails to agree to the restrictive covenants, then this Department will issue a Radioactive Materials License to the property owner.

IV: Burial or storage locations

There is no radioactive material that has been buried or stored on the site. All remaining radioactive material consists of contamination in the fabric of the mill buildings that the property owner did not wish to have destroyed, contaminated surface soil underneath the mill buildings, and contaminated soil that remains below the water table near the Dolores River. Contamination in the fabric of the mill buildings and of the soil underneath the mill buildings is minimal; however, contamination in the soil that remains below the water table near the Dolores River provides the greatest hazard, in the event that the ground in the contaminated area is used to cultivate crops for direct human consumption or that groundwater from wells in the contaminated area is used for consumption by humans or livestock, or for irrigation.

V: Photographs

VI: Survey results

- A. Area surveys
- B. 1. Contaminated areas
  - 2. Unaffected areas
- C. Surface contamination sampling points
- D. Soil/sediment sampling points
- E. Maps and diagrams
- F. Radionuclides detected and not detected <sup>Nat</sup>U <sup>230</sup>Th <sup>226</sup>Ra, <sup>Nat</sup>Th(<sup>232</sup>Th)
- G. Concentrations measured

VII: Site cleanup results

- A. Resident and worker populations within the remaining contaminated area
- B. Accessibility of contaminated area to the public
- C. Average gamma surface dose rate in the contaminated area
- D. Estimate of contaminated area
- E. Estimate of the total volume of waste
- F. Percentage of contaminated area where the level of removable contamination exceeds permissible regulatory limits

PROVIDED WITH CONTRACTOR'S FINAL REPORT

PROVIDED WITH CONTRACTOR'S FINAL REPORT PROVIDED WITH CONTRACTOR'S FINAL REPORT PROVIDED WITH CONTRACTOR'S FINAL REPORT PROVIDED WITH CONTRACTOR'S FINAL REPORT PROVIDED WITH CONTRACTOR'S FINAL REPORT PROVIDED WITH CONTRACTOR'S FINAL REPORT PROVIDED WITH CONTRACTOR'S FINAL REPORT

#### PROVIDED WITH CONTRACTOR'S FINAL REPORT

None

Residents, workers and visitors have unrestricted access to the property Less than 25 mrem/yr *above background* 

Reduced to Survey Units 3, 4 and 5 in the area described in the attached letter from Frontier Environmental Services, Inc., dated December 2, 2006, subject: Transmittal of Final Site Survey Drawing – Showing Legal Description of Post Remediation Zone/Unit Locations No longer applicable

None (subject to covenants restricting use)

VIII: Discussion and evaluation of results A. Additional information Site was surveyed; map of survey results was made Samples collected; sample analysis results were tabulated Survey and analysis results provide specific information about the extent and degree of remaining Ra, U and Th contamination on site Dose assessment was performed using RESRAD v6.22 B. Discussion and evaluation Failure to properly terminate radioactive materials license R-00215 (previously R-00170), license active 16-Dec-55 – 31-Jul-59, following its expiration resulted in site use that is was not consistent with the radiation hazards that were present on the property prior to site cleanup Site cleanup has made the condition of the site consistent with current site use RECOMMENDATION: Terminate AEC/NRC license: State of Colorado will enforce restrictions on use of the property until future site cleanup and/or site characterization justify reduction or elimination of institutional controls att: Supplemental CDPHE laboratory reports MFG, Inc., and Frontier Environmental Services, Inc., George E. Davis Mill Remediation Project Completion Report, Project no. HMWMD-RAD-01, September 2006 Frontier Environmental Services, Inc., Transmittal of Final Site Survey Drawing - Showing Legal Description of Post Remediation Zone/Unit Locations, December 2, 2006 INDICATIONS FOR TERMINATION OF AEC/NRC LICENSE R-00215 (previously R-00170) Identity and location of current site owner Katherine B. Willis 43201 State Hwy 141 Gateway, Colorado 81522 Identity and location of original licensee **UNKNOWN/NOT TRACEABLE** Cleanup criterion Endpoint not to exceed 25 mrem/yr History of review of eligibility for CERCLA funding assistance EPA ID COD980666358 Following a site inspection on 01-Sep-81 the Hazardous Ranking System package was made final on 01-Dec-1982 Site was not placed on the National Priorities List Site is not a Federal Facility Site is a Mines/Tailings site No (zero) operable units have been assigned to the site, other than sitewide OU 00 used as reference in discovery/preliminary assessment, site inspection and preparation of the HRS package

att: Printout CERCLIS Hazardous Waste Sites Gateway Vanadium Mill Site Information Printout CERCLIS Hazardous Waste Sites Gateway Vanadium Mill Actions Printout CERCLIS Hazardous Waste Sites Gateway Vanadium Mill Aliases Printout CERCLIS Hazardous Waste Sites Gateway Vanadium Mill Operable Units

	led States Ironnental Protection ncy			Su	perfund
	CERCLIS AIRGANAAD STRES	RODS OI	D	RDER PRO	DUGTS
D. R	CERCLIS Ha	zardou	s Wa	ste Si	tes
Contact Üs	GATEW	AY VANAD	IUM M	1IEL	
Cibe Tata		Actions			
Home	Site Info   Aliases   Op Units   Financial   RODs				
Superfund Home	OU Action Name	Qualifier	<u>Lead</u>	<u>Actual</u> Start	<u>Actual</u> Completion
EPA Home	00 DISCOVERY		F		02/01/1980
	00 PRELIMINARY ASSESSMENT	н	F		07/01/1981
Disclaimer	00 SITE INSPECTION	Ν	F .		09/01/1981
	00 HRS PACKAGE		F		12/01/1982
	· .	[Back to TOP	]		

EPA Home | OSWER Home | Superfund Home Search EPA | Contact Us URL: http://www.epa.gov/superfund/sites/cursites/c3co/a0800232.htm This page was last updated on: March 19, 2002 Site maintained by: Office of Emergency and Remedial Response brown.margret@epa.gov

http://www.epa.gov/superfund/sites/cursites/c3co/a0800232.htm



<u>Non-NPL Status</u>:NFRAP <u>Federal Facility Flag</u>:Not a Federal Facility <u>Incident Category</u>:Mines/Tailings

NPL Status:Not on the NPL

#### [Back to TOP]

EPA Home | OSWER Home | Superfund Home Search EPA | Contact Us URL: http://www.epa.gov/superfund/sites/cursites/c3co/s0800232.htm This page was last updated on: March 19, 2002 Site maintained by: Office of Emergency and Remedial Response brown.margret@epa.gov

http://www.epa.gov/superfund/sites/cursites/c3co/s0800232.htm

CERCLIS SHE AHAS INORMADOA



EPA Home | OSWER Home | Superfund Home Search EPA | Contact Us URL: http://www.epa.gov/superfund/sites/cursites/c3co/l0800232.htm This page was last updated on: March 19, 2002 Site maintained by: Office of Emergency and Remedial Response brown.margret@epa.gov

http://www.epa.gov/superfund/sites/cursites/c3co/10800232.htm

3/28/02



# Superfund



EPA Home | OSWER Home | Superfund Home Search EPA | Contact Us URL: http://www.epa.gov/superfund/sites/cursites/c3co/o0800232.htm This page was last updated on: March 19, 2002 Site maintained by: Office of Emergency and Remedial Response brown.margret@epa.gov

http://www.epa.gov/superfund/sites/cursites/c3co/o0800232.htm



STATE OF COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

# **ORIGINAL FILE COPY**

# GEORGE E. DAVIS MILL REMEDIATION PROJECT HMWMD-RAD-01

# GATEWAY, MESA COUNTY, COLORADO

# **PROJECT COMPLETION REPORT**

**PREPARED BY:** 

MFG, INC. 3801 AUTOMATION WAY FORT COLLINS, COLORADO 80525-5734

AND

FRONTIER ENVIRONMENTAL SERVICES, INC. 5171 WARD ROAD, UNIT 1 WHEAT RIDGE, COLORADO 80033-1940

**SEPTEMBER 2006** 

# TABLE OF CONTENTS Colorado Department Of Public Health and Environment

# George E. Davis Mill Remediation Project Gateway, Mesa County, Colorado Work Plan

Sectio	n	Section	Page
<u>Numb</u>	er:	<u>Title:</u>	Number:
		-	
I.	PROJI	ECT DESCRIPTION	1
	A.	Site History and Background	1
	B.	Scope of Work	2
	С.	Design-Build Concept	3
II	LOCA	TION	4
III.	PROJI	ECT OBJECTIVES	4
IV.	DESC	RIPTION OF CONTAMINATED SITE MATERIAL	
V.	SCHE	DULE	5
VI.	DAVI	S MILL REMEDIATION WORK PLAN	7
	A	Design and Project Planning	7
۰.	B.	Site Remediation	8
·	C.	Sequencing of Davis Mill Site Remediation	10
VII.	FINAI	L PROJECT REMEDIATION COMPLETION REPORT	10
	A.	Introduction - Final Project Completion Report	10
	A.1	Radiological Support Services for Remedial Activities	11
-	A.2	Radiological Cleanup Criteria	11
	A.3	Radiological Measurements	12
	A.3.1	Excavation Support: Gamma Surveys	12
	A.3.2	Verification: Gamma Mapping Surveys	13
•	Á.3.3	Soil Sampling and Analysis	14
-	A.3.3.	1 Soil Sample Collection and Preparation	15
	A.3.3.	2Soil Sample analysis: NaI-Based Gamma Spectroscopy	16
	A.3.4	Water Sampling and Analysis	17
	A.3.4.	1 Groundwater Sampling	17
	A.3.4.	2Surface Water Sampling	18
	A.3.5	Application of the ALARA Principle	18
	A.4	Implementation of Radiological and Other Health and Safety Proto	cols18
	B.	Cleanup and Final Status Survey Results	19
	<b>B</b> .1	Cleanup Boundaries	19
	B.2	Gamma Mapping Survey Results	21
	B.3	Soil Sampling Results	23
	B.3.1	Data Quality	23
	B.3.2	Surface Soils: Ra-226 Concentration Results	24

September 2006 Page i of iii

B.3.4 Sub-Surface Soils: Ra-226 Concentration Results	31 32
	32
B.4 Water Sampling Results	
B.5 Mill Building Decontamination	33
C. Post Remediation Dose Assessment	33
C.1 RESRAD Computer Code	33
C.2 Derivation of the Ra-226 Cleanup Criteria	34
C.3 Post-Remediation Dose Assessment	35
C.3.1 Survey Unit 3	35
C.3.2 Survey Units 4 and 5	37
C.3.2.1 New Pond in survey Unit 4	39
C.3.3 Combined Doses from All Sources	41
C.3.4 Indoor Radon Dose	42
C.3.5 Dose from Crops Grown on Site	43
C.3.5.1 Radionuclides in Soil	14
C.3.5.2 Radionuclides in Groundwater	14
C.3.6 Dose from Animals Grazing on Site	45
C.3.6.1 Radionuclides in Soil	45
C.3.6.2 Radionuclides in Groundwater4	16
C.3.7 Direct Ingestion of Groundwater	47
C.3.8 Playground Scenario	48
D. Conclusion	18
E. References	19

#### FIGURES:

### FIGURE 1: GEORGE E. DAVIS MILL SITE LOCATION MAP FIGURE 2: PROJECT ORGANIZATIONAL CHART

# COMPACT DISC – ARCHIVE FILES:

GEORGE E. DAVIS MILL SITE RESRAD FILES PROJECT SITE PHOTOGRAPHS DAILY "BILL-OF-LADING" – LOAD TICKETS DAILY PROJECT FIELD REPORTS DAILY PROJECT SIGN-IN SHEETS DAILY SAFETY MEETING SUMMARY & SIGN-IN

# ATTACHMENTS:

ATTACHMENT A:	SITE OWNER ACCESS AGREEMENT
ATTACHMENT B:	SUMMARY OF GEORGE E. DAVIS SITE PROJECT
	SPECIFIC BILL-OF-LADING ISSUED
ATTACHMENT C:	PRE-REMEDIATION GEORGE E. DAVIS MILL SITE
х	TOPOGRAPHICAL SURVEY DRAWING

ATTACHMENT D:	POST-REMEDIATION GEORGE E. DAVIS MILL SITE
	TOPOGRAPHICAL SURVEY DRAWING
ATTACHMENT E:	FINAL STATUS SURVEY SOIL AND
	WATER SAMPLING RESULTS
ATTACHMENT F:	FINAL STATUS SURVEY: MAPS OF SURFACE SOIL
	SAMPLING LOCATION AND RESULTS
ATTACHMENT G:	COMPASS OUTPUT RESULTS FOR
	MARSSIM ANALYSES
ATTACHMENT H:	PHOTOGRAPH DIAGRAMS: MARSSIM
	HOT SPOT DELINEATIONS
ATTACHMENT I:	RESRAD OUTPUT RESULTS FOR
	POST-REMEDIATION DOSE ASSESSMENT
ATTACHMENT J:	INSTRUMENTATION QUALITY
	CONTROL RECORDS
ATTACHMENT K:	RADIATION SAFETY PLAN
	IMPLEMENTATION RECORDS
ATTACHMENT L:	FIELD ACTIVITY LOG BOOK NOTES
ATTACHMENT M:	SELECT PHOTOGRAPHS BY SURVEY UNIT (SU)
	OF THE GEORGE E. DAVIS MILL
	SITE REMEDIATION

.

۴

## Colorado Department of Public Health and Environment George E. Davis Mill Remediation Project Gateway, Mesa County, Colorado

#### **Final Project Completion Report**

#### I. **PROJECT DESCRIPTION**

The original scope of work; and ensuing work plan, for the George E. Davis Mill Remediation Project (Project) provided for the design, radiological remediation oversight, and on-site construction for the complete remediation of the George E. Davis Mill Site; located at 43201 Highway 141 (Mile Post 111), Gateway, Mesa County, Colorado. The remediation work plan included and consisted of necessary site improvements for the excavation and transportation of radiological material contaminated soils to the UMETCO Minerals Corporation Uravan Site for disposal. The UMETCO Uravan facility is accessed off of Colorado Highway 141 approximately 38-miles south of Gateway; and is located in Montrose County Colorado. A separate contract was completed between the Colorado Department of Public Health and Environment (CDPHE) and UMETCO for the on-site management and disposal of project excavated and transported materials by UMETCO. Frontier Environmental Services, Inc. (FESI) of Wheat Ridge, Colorado was the selected design build contractor which performed the onsite remediation activities at the George E. Davis Mill Site. On-site remediation activities at the Davis Mill Site included partial building decontamination and/or demolition, regrading, site reclamation, residence area remediation, and other work as may be required to meet the objectives of the Project's work plan scope.

#### **A.** Site History and Background:

As part of an on-going regulatory administrative process; the U.S. Nuclear Regulatory Commission (NRC) is closing old radioactive materials license files that have not been properly terminated by the licensees. The George E. Davis Mill Site ("Site") in Gateway, Colorado, is one such site. The NRC has been mandated by the United States Congress to facilitate a file closure program for about 150 radioactive materials licenses, most of which were issued by the Atomic Energy Commission in the 1950s and 1960s. The program, which is titled "Funding Assistance for Formerly Licensed Sites in Agreement States" provides grants to Agreement States for the purpose of reviewing files, conducting surveys, characterizing and remediating sites formerly licensed by the Nuclear Regulatory Commission. As part of Phase I of the NRC program, the CDPHE reviewed files for 12 sites in Colorado, and directed the NRC to close 11 of the files without further action. In fulfillment of Phase I of the program, the CDPHE conducted a scoping survey of the George E. Davis Mill Site. Based on the results of the scoping survey, on April 30, 2004 CDPHE submitted a proposal to the NRC to conduct characterization of the Site. On September 16, 2004, the NRC awarded a grant to the CDPHE for the "Site Characterization of the George E. Davis (Gateway, Colorado) Mill Site." The initial scoping survey and the site characterization were Phases I and II of a

three phase project. The site remediation was partially completed by the full implementation of the Project's Work Plan. Implementation of the Project's Work Plan was Phase III of a three-phase CDPHE project that was administrated by the U.S. Nuclear Regulatory Commission Funding Assistance for Formerly Licensed Sites in Agreement States SA-1000.

Phase I of the project was completed under U.S. NRC Grant no. NRC-06-01-301 for File Reviews and Initial Surveys of Eleven NRC Formerly Licensed Sites. The Site Characterization, Phase II, was completed under U.S. NRC Grant no. NRC-06- 04-301 for Site Characterization of the George E. Davis (Gateway, Colorado) Mill Site. Phase III was awarded and contracted to FESI by CDPHE and was funded by U.S. NRC Grant Number NRC-06-05-303 for Site Remediation of the George E. Davis (Gateway, Colorado) Mill Site. Phase III was partially completed in July 2006. Areas not fully remediated are those radiological contaminated soils found beneath the Davis Mill Site mill building and two mill support buildings; non-excavatable radiological soils found in direct contact with localized site ground water; and radiological affected soils found deep (in excess of 6-feet) beneath specific site residence mobile home foot-prints.

#### **B.** Scope of Work:

In order to achieve a timely and cost effective remediation of the Gateway - Davis Mill Site Remediation site, CDPHE had a portion of the contaminated soils located at the Gateway - Davis Mill Site removed and disposed of off-site at the UMETCO Uravan Facility. FESI provided the environmental professionals necessary to execute the environmental remediation plan describing this Project's site remediation. In April 2006 FESI initiated the implementation of the work plan with the excavation and disposal of approximately 17,200 cubic yards of contaminated soils as the bulk of the cleanup. The original project volume estimate of radiological contaminated soils at the Davis Mill Site was 14,000 cubic yards. The project's scope of work included all ancillary or peripheral tasks necessary to implement the scope of work; and as such the temporary relocation of selected residences and decontamination, to the extent practicable, of selected site radiological contaminated buildings. The project included post cleanup verification surveys and calculation and presentation of any post cleanup site risk that might still remain. The results of post site remediation verification radiological surveys are found in Attachment A of this Completion Report. All deliverables for this project will be submitted to the Nuclear Regulatory Commission (NRC) by the State of Colorado -CDPHE. Final acceptance by the CDPHE will be subject to approval and acceptance of this Project Completion Report by the NRC and the State of Colorado. A design-build method of construction was selected in an attempt to maximize project budget for the timely and cost effective implementation of the Remediation Work Plan for the Gateway - Davis Mill Site. CDPHE had previously engaged consulting services to conduct a site characterization/planning study, which resulted in the Preliminary Cleanup Plan Report, dated March 25, 2005, and the Site Characterization Summary Report, dated March 25, 2005, that contain more detailed information about the site and desired remediation of the site. This information was used in the development of the Project Work Plan.

### C. Design-Build Concept:

CDPHE selected a Design-Build concept to provide professional design, management and construction services for the design and construction of the Gateway - Davis Mill Site remediation. The Design-Build concept centers on utilization of a Design-Build Entity (FESI) who has assembled and leads a team composed of the Professional Engineers and Health Physicists form MFG, Inc. and other supporting consultants as required; and transporter(s) all under contract to FESI. In a client and owners representative role, CDPHE representatives are a part of the Design Build Team. During the pre-construction/design phase, FESI provided the required planning and documents and utilized the skills and knowledge of remediation and construction and managed the design and provided pre-construction services (i.e., develop schedules, prepare construction plans and specifications, subcontract work, etc.). During the remediation/construction phase, FESI coordinated with its Team Partners to assure proper implementation of the Project work plan objectives as well as provided remediation/construction services and management of the project (including the timely procurement management all trade contracts throughout and of the construction/remediation phase). It was the responsibility of the Project Team to provide the necessary services/work which included, but are not limited to the following:

- 1. Development of a complete project design and provide all required services in accordance with the RFP, CDPHE standards, and all applicable codes and regulations;
- 2. Provide all design and construction services necessary to implement the goals of the project, including but not limited to health physics protocols; engineering (civil, structural, environmental and safety design services) and any required specialty design consultants as required; construction services included scheduling, construction administration and management;
- 3. Oversee the complete design and remediation/construction processes;
- 4. Develop work schedules and coordinate project activities to meet project timelines;
- **5.** Coordinate/communicate the activities of the Project Team throughout the design and remediation/construction process;
- 6. Construct the project as contracted;
- 7. Design and remediate/construct the project within the total modified contracted project budget. This includes design, planning, construction administration, excavation and transportation of the contaminated soils, building cleanup and demolition, temporary residence equipment and livestock relocation, regrading and reclamation, verification surveys, and any construction fees, and other soft costs.

The Davis Mill Site Remediation Project Team and lines of responsibility are illustrated on **Figure 2** and can be found as an attachment to this completion report.

In support of project completion report; daily project activities were summaries and documented by means of various daily reports; safety briefings; sign-in sheet and project photographs. Electronic copies of daily project documentation are attached to this Completion Report as compact disc files. These electronic files can be found in:

Compact Disc - Archive Files listed as:

George E. Davis E. Davis Mill Site RESRAD Files Project Site Photographs Daily "BILL-OF-LADING" – Load Tickets Daily Project Field Reports Daily Project Sign-In Sheets DAILY SAFETY MEETING SUMMARY & SIGN-IN

# II. LOCATION:

The remediation work shall be located at the George E. Davis Mill Site located at 43201 Highway 141 (Mile Post 111), Gateway, Mesa County, Colorado. The UMETCO Uravan facility is located off Highway 141 approximately 38-miles south on Colorado Highway 141 of Gateway, Colorado; and located in the town of Uravan, Montrose County, Colorado. See Figure 1 for an illustration of the George E. Davis Mill Site; Gateway, Mesa County, Colorado.

## **III. PROJECT OBJECTIVES:**

The objectives for the project were to:

- Remove soils that exhibit radioactivity above the background range and dispose of them at UMETCO Minerals, Uravan, Colorado site. The UMETCO facility is located approximately 38-miles south of Gateway, Colorado on Colorado Highway 141.
- Perform the Project expeditiously and within allotted timeframe and as necessary to complete disposal of the contaminated materials by July 31, 2006 (revised closure date for the UMETCO facility).
- Perform the project in compliance with all state and federal laws and regulations, including compliance with state Radiation Control Program requirements and federal Nuclear Regulatory Commission (NRC) requirements.
- Perform the remediation of the Project in a manner that is acceptable to the property owner of the site (Mrs. Kathryn Willis) and includes appropriate coordination with the owner and the actions needed to temporarily relocate persons and animals as necessary during the cleanup.
- Regrade and complete the cleanup in a manner that completes the remediation activities with appropriate site grades and configuration.
- Prepare remediation plan to guide the implementation of the project and serve as documentation of the work performed.
- Perform verification surveys that demonstrate the condition of the completed site remediation, and provide as-built information documenting the project as implemented.
- Document and photograph daily field project activities. Specifically, document with a summary of daily site activities, including items of issue; daily project personnel attendance as witnessed by a daily project field personnel log-in and log-out time and personal radiological scan summary; and a daily project safety briefing summary report. See project daily reports found on the attached compact disc.

### IV. DESCRIPTION OF THE CONTAMINATED MATERIAL

The volume and weight of material based on data presented in the Site Characterization Summary Report for the George E. Davis (Gateway) Mill Site dated March 25, 2005, is estimated to be approximately 10,300 cubic meters (13,444 cubic yards) of material which exhibits radioactivity above the background concentration. The purpose of this project is to remove this in-place material and transport it to the UMETCO Uravan facility for management and disposal. FESI's Scope of Work and contract with the CDPHE was based on the rounded number of 14,000 in place (or bank) cubic yards; with a Phase II Study calculated density of 1.4 tons per cubic bank-yard. Loose cubic yards or compacted cubic yards as placed in the disposal location were not to be used as a means of calculating amount of work performed or payable. As an interim means to calculate radiological material excavated; soil density conversions were used to determine approximate bank yards excavated; i.e. 1.4 tons per cubic bank-yard. Based on a conversion factor of 1.5 grams per cubic centimeter for sandy loam, the estimated dry weight of the material is 15,450 metric tons (17,000 short tons). Based on the presence of an estimated additional 10 percent by weight moisture, the total weight to transport is estimated at 17,000 metric tons (18,700 short tons).

As a result of actual field excavation methodology and the use of front-end loader equipped with a load-cell to assure transport vehicle weight management for highway access and to provide an interim method of calculating daily cubic bank-yard excavated and managed; the actual soil density was calculated to be 1.27 tons per bank-yard. Specifically; 936-loads (21,844 tons) were transported from the Davis Mill Site to the UMETCO Facility site in Uravan, Colorado; with a final fill/cut topographical survey volume of approximately 17,200 cubic-yards

The Radionuclide Activity of the material based on data presented in the Site Characterization Summary Report for the George E. Davis (Gateway) Mill Site dated March 25, 2005, has an estimated average radionuclide activity of: U-238 decay chain radioisotopes: 33 picoCuries per gram each x 14 isotopes =462 pCi/g, U-235 decay chain radioisotopes: 1.5 pCi/g each x 11 isotopes = 16.5 pCi/g Th-232 decay chain radioisotopes: 1 pCi/g each x 10 isotopes = 10 pCi/g Therefore, the estimated average total activity is 489 pCi/g. Other contaminated materials include portions of the Mill building and associated sheds. Materials other than soils must be properly sized to conform to UMETCO's license requirements.

#### V. SCHEDULE

Project completion time was of the essence. CDPHE initially required that site remediation tasks be completed by June 30, 2006. However and due to UMETCO site access issues, and UMETCO Site remediation activities; the Project transportation and completion schedule was affected. In summary the project schedule is:

- Contract Signed by FESI on March 6, 2006 and by the State of Colorado on March 28, 2006
- Notice to Proceed Issued by CDPHE on March 29, 2006
- Preconstruction/Design Complete March 31, 2006
- Field Mobilization of Project Equipment and Personnel; March 22, 2006
- Relocated Property Owner Equipment & Livestock; March 27, 2006 to April 23, 2006.
- Began Excavation and Stock Piling of Radiological Impacted Site Materials & Soil; April 24, 2006.
- Initial Shipment of Radiological Material Transported to UMETCO; May 2, 2006
- Excavation and Transport of Radiological Impacted Materials with Last Shipment for Disposal at the UMETCO Uravan, Colorado Facility; June 21, 2006
- Reclamation and Physical Remediation/Construction Completed June 27, 2006
- Project Closeout reports October 15, 2006

Other contracts related to the project and/or site activities were pursued independently by CDPHE. CDPHE has contracted directly with UMETCO Minerals Corporation for receipt and disposal of the contaminated solids. No other contracts were issued by CDPHE.

The project schedule included regularly established job coordination meetings participated with FESI, its Subcontractors, UMETCO and CDPHE. Once the project was initiated with the remediation phase; job coordination meetings were held in Gateway, Colorado on a need be basis. Daily meeting were held with FESI Staff and MFG, Inc.

CDPHE and State Buildings Programs representatives may conduct routine inspections on the project site during the course of remediation/construction. The CDPHE project manager (Mr. Robert W. Terry; CDPHE Radiation Management Program) served as the liaison between the Project Team and CDPHE for the day-to-day coordination.

Contract plans, drawings and specifications were approved by the CDPHE and State Buildings Programs prior to the start of remediation/construction. The Project Team was responsible for obtaining all the necessary approvals and/or permits.

The completion end date for the project was amended to October 15, 2006 with the issuance of this Completion Report. Site remediation/construction activity was completed with off-site disposal on June 21, 2006, even though CDPHE's arrangement with UMETCO provided that disposal at the UMETCO facility was to be complete before or on June 30, 2006.

## VI. DAVIS MILL REMEDIATION WORK PLAN

#### A. Design and Project Planning:

FESI and MFG, Inc. completed the development of the following project documents and site specific remediation/construction plans. A copy of each was included as part of the Project Specific Work Plan as its own stand-alone set of Project Documents.

- 1. FESI obtained written permission from property owner to enter the Site and conduct the work. A copy of this written agreement is presented in Attachment A of the Work Plan.
- FESI submitted to CDPHE-WQCD an application for construction stormwater permit. A Colorado Discharge Permit System – Stormwater Certification COR-039 754, Mesa County; Gateway – Davis Mill Remediation was issued on March 28, 2006. A copy of this permit and the Davis Mill Remediation Stormwater Management Plan are presented in Attachment B of the Work Plan.
- 3. FESI prepared project and site specific planning documents for the project, these include a project schedule; an remediation/construction plan (indicating who will do what, responsibilities, and indicating how communications will be handled) contained and described in the Work Plan; and a Radiation Health and Safety Plan (RHSP). A copy of the RHSP is included as **Attachment C** of the Work Plan.
- 4. FESI submitted to the State of Colorado Department of Transportation Grand Junction Region; an application for Special Use Permit for highway access and neighboring CDOT site yard access. On April 3, 2006 CDOT issued a Special Use Permit (Permit Number 12,996) to FESI pertaining to Colorado Highway 141 access; and the associated work at the Davis Mill Site with access to the CDOT Gateway facility yard. A copy of the Special Use Permit is attached to the Work Plan as Attachment D.
- 5. FESI prepared a Traffic Control Plan for the Davis Mill Remediation Project. The Traffic Control Plan was developed in accordance with the project scope of work and to meet the conditions of the CDOT Special Use Permit discussed in paragraph VI.4 of the Work Plan. A copy of the project Traffic Control Plan is included in the Work Plan as Attachment E.
- 6. On April 12, 2006; FESI met with UMETCO and RECON personnel to discuss project schedule and the project's transportation plan and traffic schedule. Representatives of CDPHE (Robert W. Terry), MFG, Inc. (Janet Johnson, Randy Whicker, and Craig Little) and Sutherland Brothers, Inc. (Bob Sutherland; Transporter) were in attendance at this meeting. A project specific Bill of Lading was developed for transport custody control and material transfer information. The actual average number of transport-loads was 28-loads per day of site material transported to the UMETCO facility each work day utilizing an average of 7-transport vehicles. A copy of the project specific Bill-of-Lading is included in the Work Plan as Attachment F.
- 7. FESI prepared project specific design documents as discussed in the Work Plan. FESI's sub-contractor Inter-Mountain Engineering, LTD provided site specific topographical surveys for cut and fill calculations and a corresponding site drawing. The site topographical drawing (0.5-foot contour interval) was presented as

Attachment G to the Work Plan. This topographical survey data along with the postremediation survey data was used to calculate cut volumes for materials removed from the Davis Mill Site as a result of implementation of the scope of work objectives.

- 8. MFG, Inc. performed a site specific radiation survey as a reference of pre-remediation activity. A copy of the site radioactivity scan survey is illustrated in Attachment H of the Work Plan.
- **9.** MFG, Inc. developed a Davis Mill Site specific sampling and analysis Plan (SAP) which outlines the methods that will be used to evaluate remediation activities of performance meeting the project objectives. A copy of the SAP is presented as **Attachment I** to the Work Plan.

The above described planning documents were transmitted with the Work Plan to CDPHE for approval. On March 23, 2006 the site Work Plan was approved by CDPHE.

#### **B.** Site Remediation

The following project tasks were implemented as described below:

- 1. Frontier Environmental Services, Inc. (FESI) provided for project mobilization of construction equipment; site security control; establishment of a field office; decontamination trailer; temporary electrical power; personnel and tools. FESI established decontamination facilities, equipment areas, site management and field laboratory facilities for MFG, Inc. The project office/laboratory complex was outfitted with temporary sanitary facilities. Site communications was provided for by satellite telephone and local telephone service. The project decontamination trailer was equipped with lockers for storage of "street clothing".
- 2. FESI made provisions with the agreement of the property owner (Mrs. Kathryn Willis) for the relocation of persons, livestock and equipment located in the areas requiring cleanup to other areas on the property.
- 3. FESI provided for the survey of the pre-excavation post-excavation topography of the site by a professional land surveyor (Duane Fehringer, PLS, PE of Inter-Mountain Engineering, LTD.) and establishment of background radiation levels and soil radionuclide concentrations by a qualified radiation specialist (Randall Whicker of MFG, Inc.). Site survey control was "tied" to existing survey control located adjacent to the site; i.e., CDOT survey monument (Highway 141) and USGS Dolores River Gauging Station survey monument. See ATTACHMENTS C and D, respectively.
- 4. FESI provided equipment and personnel to implement the remediation of the Davis Mill site including selected areas surrounding residences and other site structures. Physical cleaning of the Mill building and associated sheds was partially accomplished concurrent with site remediation activities.
- 5. FESI mobilized earth moving equipment [CAT 330 Excavator; CAT 950 Front-End Loader(s) and CAT-D6-N Dozer] for the systematic excavation and seven (7) transport vehicles per day; even though ten (10) over-the-road transport vehicles were contracted for; were made available for the off-site shipment of elevated radionuclide soil materials. All cleanup activities were overseen by FESI and MFG, Inc. and who

monitored the work methods and progress. Silt fences and other erosion protection devices were installed as required by the planning documents (Stormwater Management Plan). FESI staked the outlines of the areas where soil was to be removed, highlighting where removal to different depths expected to be required to reach the cleanup criterion. Dust control procedures were implemented to control exposure. Standard dust control measures typical to the construction industry were anticipated, i.e. spraying with water. Prior to leaving the Project Site, transport trucks were inspected and if necessary decontaminated for highway access. Qualified FESI and/or MFG, Inc. radiation personnel verified status of decontamination of transport trucks or equipment that left the Project Site.

- 6. FESI provided for the efficient loading of transport vehicles at a specially managed loading and decontamination/inspection pad. A bill-of-lading for the materials being transported was issued for each load. Each transport vehicle was radiologically scanned and if necessary decontaminated prior to departure from the site. See Compact Disc Record File containing "Bills-of-Lading" (BOL).
- 7. FESI and Inter-Mountain Engineering, LTD (Duane Fehringer; PLS, PE) prepared the post-excavation topographic survey of the site for purpose of establishing quantities transported and disposed. In addition, FESI outfitted the CAT 950G Front-End Loader with a load-cell, which allowed for the routine tare of each transport vehicle loaded. This weight was used to evaluate the day-to-day amount of material excavated and transport in relation to the overall expected materials to be managed by the Project scope of work.
- 8. FESI provided equipment and personnel that facilitated the final Site grading including fill of on-site areas. Initial site topographical and post-remediation surveys will be used to establish final site grading to promote site stormwater drainage similar to pre-remediation drainage patterns. The impacted areas that are subject to erosion were managed consistent with the Stormwater Management Plan and Permit to prevent erosion and result in an acceptable finally stabilized site.
- **9.** FESI has repaired and/or replaced of disturbed or temporarily removed fences concurrent with the property owner.
- 10. FESI managed on-site generated cleanup and disposal of wash water and miscellaneous materials with the materials excavated and removed from the site. Decontamination water was allowed to evaporate in containment basins down-gradient of the Mill Structure. Residues from decontamination activities were managed with other materials designated for transport to the UMETCO facility in Uravan, Colorado.
- 11. FESI provided for the unconditional release decontamination and demobilization of remediation/construction equipment and decommissioning of the field facilities by the systematic cleaning and radiological scanning of site specific remediation equipment. Residues from equipment decontamination were managed with other materials transport to the UMETCO facility in Uravan, Colorado.
- **12.** FESI provided for the relocation of persons and livestock back to the Davis Site in the approximate pre-remediation location(s).

### C. Sequence of the George E. Davis Mill Site Remediation

FESI implemented the Project scope of work in a sequenced manner which facilitated the effective and efficient removal of radiological materials of concern at the Davis Mill Site.

The sequence of site activities was:

- 1. To provide the initial site radiological scan to validate initial site characterization results and to establish remedial areas and their delineation from non-remediation areas;
- 2. To construct off-site stormwater control features pursuant to the CDPHE Stormwater Permit;
- **3.** To construct temporary access/egress through the Gateway, Colorado CDOT Facility Yard;
- 4. To relocate property owner materials and equipment to designated non-remediation areas;
- 5. To construct temporary livestock pins and fenced areas for the relocation of livestock by the property owner during site remediation;
- 6. To construct decontamination retention catches for equipment decontamination and Davis Mill structure pressure wash water collection;
- 7. To excavate and consolidate Davis Mill Site radiological containing materials for transport material load-out and transport;
- 8. To decontaminate by pressure washing the interior portions of the Davis Mill Structure and associated out-buildings;
- 9. To relocate resident property materials and equipment from remedial areas to temporary locations to facilitate site remediation surrounding residences, and;
- **10.** To excavate residential soils and re-location of resident's property.
- **11.** To collect and analyze site remediation verification soil samples for final site status assessment.
- 12. To perform final site radiological scan and topographical surveys and report on the completion status and land use limitations as a result of the implementation of the Project Work Plan.

## VII. FINAL SITE REMEDIATION COMPLETION REPORT

#### A. INTRODUCTION – FINAL PROJECT COMPLETION REPORT

FESI and MFG, Inc. have prepared this Completion Report and Final Site Completion Report using criteria specified by CDPHE. The final report summarizes the final remediation radiological status of the George E. Davis Mill Site soils and building features.

This section of the overall Project Completion Report to the Colorado Department of Public Health and Environment concerning remedial activities at the George E. Davis Mill Site, Gateway, CO, in the spring and early summer of 2006, presents general background, methods, activities, and results related to radiological aspects of project HMWMD-RAD-01.

#### A. 1 Radiological Support Services for Remedial Activities

MFG Inc., of Fort Collins, CO provided sub-contracted radiological services for Frontier Environmental Services, Inc (FESI) of Wheat Ridge, CO in support of the 2006 cleanup of the Davis Mill Site in Gateway, CO. This support included authorization for FESI and its sub-contractors to conduct remedial activities involving radioactive materials in the State of Colorado under MFG's radioactive materials license with the Colorado Department of Public Health and Environment (CDPHE). In accordance with the terms of MFG's radioactive materials license and the project Work Plan (FESI 2006), MFG provided radiological oversight for the Davis Mill Site cleanup including implementation of a radiation health and safety protection program. Consistent with the scope of work described in the project Work Plan, MFG also provided 1) radiation detection and measurement instrumentation, 2) guidance with respect to radiological aspects of the cleanup, and 3) verification of the results of the cleanup with a final radiological status survey after completion of remedial activities.

#### A.2. Radiological Cleanup Criteria

As detailed and justified in Attachment I of the Work Plan (FESI 2006), the site-specific cleanup criterion for remedial activities at the Davis Mill Site was a net (above background) Ra-226 concentration of 2.6 pCi/g. This criterion, known as the derived concentration guideline level (DCGL<sub>W</sub>) in MARSSIM, the Multi-Agency Radiation Survey and Site Investigation Manual (NRC, 2000), was derived from a RESRAD analysis as the average site Ra-226 concentration expected to equal the specified dose-based release criterion of 25 mrem/yr above background (excluding the radon pathway) under a rural residential land use scenario. The analysis assumed that all uranium decay series radionuclides are in equilibrium. Based on the 2005 characterization survey conducted by Carter & Burgess, Inc. (Carter & Burgess, 2005), the upper range of background for Ra-226 based on gamma-spectroscopy measurements was 2.8 pCi/g. This resulted in a gross cleanup criterion of 5.4 pCi/g Ra-226. This criterion was used as a benchmark in guiding remedial activities.

As described in Attachment I of the Work Plan, the protocol for evaluation of results stated that if all final status survey soil sampling measurements in a given survey unit fell below this criterion, the survey unit would qualify for unrestricted release from the existing radioactive materials license attached to the site. If some samples did not meet this criterion, then in accordance with guidelines found in MARSSIM, the Wilcoxon Rank Sum Test (WRS) would be used as specified to evaluate whether or not the median *gross* concentration in the survey unit was statistically greater than the median of background plus the *net* DCGL<sub>w</sub> (i.e. background reference area median + 2.6 pCi/g).

In addition to evaluations of each survey unit against the DCGL<sub>w</sub>, any areas identified by gamma scans as having potential for elevated Ra-226 levels, would be sampled and

evaluated against a secondary "hot spot" criterion. To develop this secondary criterion, termed DCGL<sub>EMC</sub> in MARSSIM, RESRAD was used to calculate site-specific area factors for Ra-226. An example calculation of an area factor and DCGL<sub>EMC</sub> for the Davis Mill Site are as follows:

Ra-226 Area Factor	$= 10000 \text{ m}^2 \text{ dose} / 100 \text{ m}^2 \text{ dose}$
	= (24.18 mrem) / (10.45 mrem)
	= 2.3
DCGL <sub>EMC</sub>	= ( <i>net</i> $DCGL_W \times AF$ ) + background
	$= (2.6 \text{ pCi/g} \times 2.3) + 2.8 \text{ pCi/g}$
	= 8.8  pCi/g

Thus, 8.8 pCi/g represents the average Ra-226 concentration within a 100 m<sup>2</sup> area that would result in an above background dose of 25 mrem/yr (assuming the surrounding area is below the DCGL<sub>W</sub>). If calculations show that all hot spots in a survey unit, in combination with the general average concentration, result in a dose in excess of this criterion, the survey unit would fail the secondary requirement for unrestricted release.

As will be presented and discussed later in detail, the final status survey results revealed at least some individual measurements in each survey unit exceeded the 5.4 pCi/g gross DCGL<sub>w</sub> and in some cases "hot spots" exceeded DCGL<sub>EMC</sub> criteria as well. As a result, the "upper range" of background concept was abandoned in favor of the more conservative approach of using a mean value for background as actually measured by the on-site soils lab (2.1 pCi/g). All further statistical comparisons between survey units and background used mean or median values, measured by the same analytical system, in accordance with MARSSIM guidelines.

## A.3 Radiological Measurements

## A.3.1 Excavation Support: Gamma Surveys

Gamma survey instruments used to guide 2006 Davis Mill Site excavation activities involved  $2\times2$ " Ludlum Model 44-10 NaI detectors coupled to Ludlum Model 2350 rate meters. These survey instruments were used (without shielding) to verify the horizontal extent of areas on the Davis Mill Site requiring cleanup (as estimated both by the Carter & Burgess Characterization report and MFG's independent 2006 pre-cleanup gamma survey) and to guide the vertical extent (depth) of excavation required to achieve compliance with the cleanup criterion.

In 2005, a statistical correlation between Ra-226 concentration (pCi/g) and gamma exposure rate (uR/hr) was developed by MFG during cleanup of a uranium mill site in Washington State (using the same detector/meter system employed at the Davis Mill Site). Analysis of that relationship indicated that an unshielded gamma exposure rate

reading of 30 uR/hr at about 2 feet above the ground surface indicated a 95% probability that surface soils in the general vicinity below the detector would have Ra-226 concentrations less than 6 pCi/g (the gross cleanup criterion for that site).

In the absence of a site-specific correlation, a 30 uR/hr gamma "cut-off" reading was initially used to guide cleanup activities at the Davis Mill Site. Shortly after the cleanup began, however, a new cut-off value was established for site-specific field conditions at the site to better reflect soil Ra-226 concentrations expected to fall below 5.4 pCi/g. A cut-off with a 95% probability of compliance was estimated at about 18 uR/hr, however, such a low value could have resulted in a large amount of background level soils being cleaned up. Given budgetary limitations on the amount of soil that could be removed during the Davis Mill Site project, a new cut-off of 25 uR/hr was selected as a reasonable compromise. This is consistent with the literature value of 1.9  $\mu$ R/hr per pCi/g above background for the U-238 decay series in equilibrium (Huffert, 1995) and with a correction factor of 0.66 for energy dependence of NaI detectors.

Frontier Environmental Services personnel were instructed in the use of gamma detectors employed for remediation support. This included discussions of how to help distinguish between elevated gamma activities residing immediately below the detector versus "shine" (scattered gammas) from adjacent areas. All detector/meter pairings used for remediation support surveys were in current calibration with the manufacturer at the time of use. Daily QC measurements were not conducted for cleanup support detectors – the only detector/meter pairing subject to QC measurements before each use was that used for GPS-based gamma mapping surveys (backpack surveys) because backpack surveys comprised the permanent and official record of the site's gamma status.

#### A.3.2 Verification: Gamma Mapping Surveys

In addition to the remedial action support surveys used to guide excavations on a daily basis, GPS-based gamma mapping surveys (backpack surveys) were periodically

conducted using a data collection system that records UTM and gamma data simultaneously along with date and time (Figure 1). Backpack surveys are different from remedial action support surveys in that data are recorded and mapped to allow subsequent visual assessment of gamma exposure rate status at the time of the survey.

Gamma mapping surveys were conducted before, during, and after the cleanup to allow visual assessment of the effectiveness of the cleanup. Precleanup gamma mapping surveys recorded the initial gamma exposure rate status of the site using the same equipment that used to conduct the final status survey. This pre-cleanup survey was also used help to further define areas requiring excavation.

Backpack scanning coverage was at or close to 100% in all survey units for pre-cleanup and final status gamma mapping surveys. Exceptions were made for any areas within a survey unit that posed an unacceptable safety

CDPHE - Davis Mill Remediation Completion Report September 2006



Figure 1. Photo of the GPS-based backpack scanning system

Page 13 of 50

risk to scanning personnel (e.g. extremely rough terrain), or where scanning was not possible due to existing structures, large debris, or certain vegetation (e.g. trees, thick brush, etc.). Gamma mapping surveys were also conducted across areas of the site other than the survey units, but scanning coverage was not always maintained at 100% in these areas.

Daily OC measurements for the detector/meter pairing used in the backpack scanning system involved recording the average value of twenty 1-second exposure rate readings on a log sheet for both background and a check source (a Cs-137 button source). The QC measurement location and geometry was the same each day as initially established in developing respective control limits for this specific instrument pairing. A hand-held Garmin iQue PDA instrument, programmed by MFG to automatically calculate the mean and standard deviation of 20 successive readings, was used to simplify the daily QC procedure and reduce the potential for human error. Readings within  $\pm$  3 standard deviations from the mean of at least 10 initial control chart measurements indicated that instruments were working properly. However, as MFG has experienced at other site cleanup projects, fluctuations in ambient Rn-222 levels due to climatic variability (e.g. barometric pressure changes) or a general reduction in background radiation as the cleanup progresses due to source term material being removed from the site, can lead to readings outside control limits even though the instruments are functioning properly. Instrument control charts were thus periodically updated to include recent measurements on a "moving average" basis to reflect these additional temporal sources of background variability. Calibration certificates, daily QC log sheets, and/or control charts for all radiological instrumentation used on the project are included in Attachment J. · ,

#### A.3.3 Soil Sampling and Analysis

11

The primary analytical evidence of compliance with the Ra-226 cleanup criterion for individual soil samples at the Davis Mill Site was based on NaI gamma spectroscopy results generated in an on-site soils lab. This soils lab (Figure 2) was housed in an on-site trailer provided by FESI for the duration of the project, with respective functions that included sample preparation, sample analysis, data recording, and data management. MFG also performed on-site Radiation Safety Officer (RSO) duties out of this' on-site laboratory in accordance with the radiation safety plan.

. .

· .

and the second second

and a second second

**CDPHE - Davis Mill Remediation Completion Report** September 2006 ·1.

۲



Figure 2. On-site soils lab: MCA counting system (left), soil processing station (right).

#### A.3.3.1 Soil Sample Collection and Preparation

- Surface soil samples were collected in a manner consistent with the cleanup criterion (over a soil depth of 15 cm to represent an average corresponding concentration).
- The number of surface soil samples collected and respective locations within each survey unit was determined according to MARSSIM protocols. Following the DQO process described in MARSSIM, a minimum of 22 samples were collected in each survey unit for statistical comparison against a minimum of 22 samples that were collected in the background reference areas.
- Samples for three subsurface depth profiles were collected in areas demonstrated to have high gamma exposure rate readings at the site prior to, and/or after, the cleanup. These areas were all located in Survey Units 2 or 3 because of proximity to residents living on the property.
- UTM coordinates were taken at each sample location with a GPS instrument and recorded for mapping purposes.
- Samples were dried in ovens at about 180° C then sieved as necessary to remove and discard any rock fraction greater than 1 cm diameter. Because Ra-226 has greater association with smaller soil particle size fractions, omitting the larger rock fraction is conservative.
- Aliquots of homogenized samples were weighed and placed in counting tins. The tins were sealed with electrical tape before counting. All counting was performed the same day samples were sealed.
- At each stage of sample collection and processing, equipment was thoroughly cleaned to prevent cross-contamination.

CDPHE - Davis Mill Remediation Completion Report September 2006

Page 15 of 50

#### A.3.3.2 Soil Sample Analysis: NaI-based Gamma Spectroscopy

On-site soils lab instrumentation for Ra-226 analysis in soils samples included a  $3\times3$  inch Ludlum® Model 44-20 Nal detector coupled to a PC-based URSA-II® multi-channel analyzer (MCA) system. The system was the same as that developed for the cleanup of the Dawn Mining Company uranium mill site in Spokane WA in 1995 (Whicker et al. 2006). The MCA unit is small and portable and was run from an equally portable lap-top computer. Both sample and detector were shielded from background radiation during counting using a series of lead rings and plates.

Based on previous determinations of optimal sample count time that balances the number of samples that can be analyzed per day against the need to achieve sufficient accuracy (i.e. optimization of spectral resolution, counting statistics, and system detection limits relative to the cleanup criterion), sample count time was 20 minutes. An average Minimum Detectable Concentration (MDC) limit for this analytical method was calculated to be 0.7 pCi/g at the Davis Mill Site location using methods described in Principles of Radiological Health and Safety (Martin, 2003), and based on measurements of NIST-certified <sup>226</sup>Ra soil reference material standards and a background soil sample from the site.

Estimation of <sup>226</sup>Ra activity concentrations involved analysis of the number of counts within three energy regions of interest (ROI's) in soil sample gamma emission spectra. These ROI's encompass energy peaks for short-lived <sup>226</sup>Ra decay chain progeny including <sup>214</sup>Pb (295 and 352 keV) and <sup>214</sup>Bi (609 keV).

Because <sup>222</sup>Rn, a noble gas with a half life of 3.8 days, is an intermediate nuclide between <sup>226</sup>Ra and these decay chain progeny, and because the duration of the project was limited, on-site measurements after approximate secular equilibrium between <sup>222</sup>Rn and <sup>226</sup>Ra could be achieved (e.g. 21-day counts) was not possible. Instead, counts were taken before significant <sup>222</sup>Rn ingrowth in sealed samples could occur (0-day counts).

Previously established calibration curves, adjusted with site-specific measurements of secondary soil reference material standards to account for differences in background radiation, as well as statistical relationships between 0-day on-site NaI measurements and 21-day high-purity germanium (HPGe) results from Energy Laboratories Inc. (ELI) in Casper, Wyoming, were used to generate "full-ingrowth" <sup>226</sup>Ra estimates without any <sup>222</sup>Rn ingrowth waiting period. Ten percent of all soil samples were sent to ELI for secondary Ra-226 analysis using HPGe gamma spectroscopy. Results from the ELI analyses were used to ascertain the accuracy of this adjustment and modify it accordingly prior to final data analysis and reporting. Sealed samples retained on site during the project were not archived after NaI analysis, but samples sent to ELI were. Confirmatory samples were also collected and analyzed by the CDPHE at some of the same locations sampled by MFG during the final status survey.

Because NaI-based radionuclide quantification by MFG's on-site soil lab was based on previously established statistical relationships with corresponding HPGe measurements performed by ELI, quality assurance is partially related to ELI's accreditation and QC protocols. ELI is certified by the EPA as well as by seven different states. The laboratory follows strict chain of custody protocols, uses NIST-certified standards for instrument calibrations, and performs measurements on EPA or other certified reference material standards with each set of client samples to provide information on measurement accuracy. ELI also performs duplicate analyses on 10% of all client samples to provide information on measurement variability. MFG observed details of these QC protocols during a visit to ELI's Casper, Wyoming in June, 2005.

A NIST-certified <sup>137</sup>Cs source was used to energy calibrate the on-site NaI counting system at the beginning of each day and to monitor the system for spectral drift every 1-2 hours. MCA fine-gain settings were adjusted as needed. Daily system QC checks were also being performed at the beginning of each day. This involved taking measurements on designated "background" level sample (~ 1 pCi/g <sup>226</sup>Ra) and a designated "source" level sample (~ 14 pCi/g <sup>226</sup>Ra) and recording the concentration estimate on system control charts. Results falling within ± 3 standard deviations from the mean of 20 respective initial control chart measurements indicate that the counting system is working properly. Finally, duplicate measurements were performed on about 5% of samples, while about 1-2% of samples were split for dual analyses to assess sample aliquot variability and the effectiveness of sample homogenization. Proper chain-of-custody protocols were performed and documented for all soil samples sent to ELI for secondary analysis. Chain of custody forms are provided in Attachment J.

#### A.3.4 Water Sampling and Analysis

#### A.3.4.1 Groundwater Sampling

- Previous groundwater sampling results showed evidence of elevated levels of radionuclides at three well locations, including temporary monitoring wells CB-2 and CB-3, and the existing water supply well on CDOT property as shown in Figure 7 of the Davis Mill Site Characterization Report (Carter & Burgess 2005). Groundwater at or near these three locations was re-sampled near the end of cleanup operations to assess any changes.
- Two temporary groundwater monitoring wells were installed near the previous temporary groundwater monitoring wells CB-2 and CB-3 as shown in Figure 7 of the Davis Mill Site Characterization Report. Groundwater samples from these two wells were collected and sent to ELI for analysis, along with a third groundwater sample collected from the existing well located on CDOT property.
- Sampling techniques were consistent with those described in the Davis Mill Site Characterization Report.
- Groundwater sample analytes included those listed in the RFP scope of work.

#### A.3.4.2 Surface Water Sampling

• One surface water sample was collected from the pond just south of the mill building. The sample collection technique was similar to that described in the Davis Mill Site Characterization Report (Carter & Burgess, 2005). The sample was sent to ELI for analysis, and analytes included those listed in the scope of work.

### A.3.5 Application of the ALARA Principle

Although a gross Ra-226 soil concentration of 5.4 pCi/g was the initial target criterion for remedial screening measurements, a number of conservative methods were used to help insure that an ALARA (as low as reasonably achievable) result was "built-in" to cleanup protocols. One method was to excavate until gamma readings were below the 25  $\mu$ R/hr cut-off of at both 2 feet above the ground, as well as at the ground surface, providing a higher probability of compliance. Another ALARA protocol was to discard large rocks and preferentially select aliquots of finer particle sizes from soil samples. Radium-226 tends to be concentrated in the smallest soil particle size fraction and thus this practice is likely to introduce a slightly high conservative bias in analytical results relative to true overall concentrations.

## A.4 Implementation of Radiological and Other Health and Safety Protocols

A primary concern during cleanup operations was ensuring the health and safety of both workers and the public. All workers were required to receive radiation safety training and an attendance sheet was maintained (Attachment K). Daily safety meetings were conducted prior to the beginning of each work day to discuss potential hazards (e.g. radiological risks, accidents, dehydration, etc.) and to plan how to best mitigate associated risks.

Throughout the Mill Site cleanup project, a safety issue of concern was the risk of occupational accidents associated with cleanup activities. Power lines, falling debris, proximity to heavy equipment with limited operator visibility, and tripping/falling were among the primary potential hazards. To help mitigate the possible consequences of these kinds of physical hazards, workers wore protective safety equipment (hard hats, steel toed shoes, safety vests, and safety glasses) when working on the site. No significant accident-related incidents or near incidents were reported.

The Mill Site cleanup took place during the summer months with frequent hot, dry weather. The risk of worker dehydration and sunburn during long periods of exposure to heat and sun was another important health and safety consideration. Workers were encouraged each day to drink liquids frequently and pay close attention to signs of heat stress, as well as to wear plenty of sunscreen. There were no reports of significant heat related complications.

Finally, health risks associated with potential radiological hazards were mitigated through a combination of adherence to radiation safety regulations and ALARA protocols. The potential radiological hazard of greatest concern was inhalation or ingestion of dust particles containing small but measurable amounts of naturally occurring radionuclides (primarily Ra-226 and its daughter products). As a result, dust control measures and radiological air monitoring were continuously implemented. Such measures included thorough water spraying on cleanup areas and adjacent haul roads using water trucks and hoses, maintaining a general area air sampler near work areas, and the use of breathing zone lapel samplers by select workers in order to verify compliance with applicable State and Federal regulatory guidelines. The action level for response to potential inhalation (DAC). There were no instances in which this action level was exceeded by general area or lapel sampler monitoring results. General area air monitoring results are included in Attachment K.

The exteriors of haul trucks exiting the restricted zone on the mill site grounds were regularly inspected with radiological survey meters for signs of contamination to prevent any potential spread of radiological material. Decontamination and exit surveys (swipe tests) for removable contamination were conducted for all heavy equipment upon termination of use and removal from the site. Log sheets of routine contamination survey results were maintained by FESI. Examples of routine equipment survey results and final exit survey forms are provided in Attachment K. Eating was not allowed in restricted work areas, but dehydration concerns necessitated that workers be allowed to drink in work areas. Workers were required to use screw-cap type bottles and to wash hands and faces prior to drinking or eating. A wash station was provided near the trailer on the site. External gamma radiation, while not expected to pose a significant health risk, was monitored using TLD dosimeter badges supplied by US Dosimetry. The badges were worn by all site workers. No significant external doses were recorded. Badges were not required for truck drivers that transported material to Uravan. Personnel entering the site were required to sign in, as well as perform a radiological sign-out survey upon leaving the restricted zone. Sign-in/sign-out log sheets were maintained by FESI and personnel survey results were recorded on the form. Examples of these forms are included in Attachment K.

#### **B.** CLEANUP AND FINAL STATUS SURVEY RESULTS

#### **B.1** Cleanup Boundaries

Ser America

Areas of the Davis Mill Site targeted for potential excavation in 2006 are shown in Figure 3. Within this general area, five sub-areas were delineated for evaluation of residual Ra-226 concentrations in accordance with MARSSIM concepts (Figure 4). All of these survey units were designated as "Class 1" impacted areas based on the 2005 Carter & Burgess Characterization Report, as well as on unshielded surveys during the initial stages of the 2006 cleanup effort. MARSSIM suggests that ideally, the maximum size for a Class 1 survey unit would not exceed 2000 m<sup>2</sup>, however, larger areas are acceptable depending on the situation. In this case, Class 1 survey units ranged from about 4,700 m<sup>2</sup>

to  $12,000 \text{ m}^2$  due to the large overall size of the site and constraints on the amount of funding available for sampling and analysis.



Figure 3. Aerial photo showing approximate boundary of areas targeted for potential excavation on mill site grounds during the 2006 cleanup project.



Figure 4. Surveyors' contour map showing delineation of five Class 1 radiological survey units within the overall area targeted for potential excavation during the 2006 cleanup project.

## B.2 Gamma Mapping Survey Results

Although the 2005 characterization report for the site (Carter & Burgess 2005) included a gamma mapping survey, an independent survey was conducted by MFG in March of 2006 in order to evaluate the pre-cleanup gamma status using the exact instrumentation, radiological units (uR/hr), and mapping systems that would be used for final status verification surveys. The results of this pre-cleanup survey are shown in Figure 5. Initial cleanup efforts focused first on areas of greatest contamination as depicted by red or dark maroon shaded areas in Figure 5. Unlike the pre-cleanup survey, the final status gamma mapping survey was not conducted all at one time at the end of the project. Instead, the surveys were conducted survey unit by survey unit after respective excavations had ceased. The composite results of the final status gamma mapping survey are shown in Figure 6.



Figure 5. Pre-cleanup gamma status of the Davis Mill Site prior to remedial activities in 2006 (this gamma mapping survey was performed in March, 2006).



Figure 6. Final gamma status of the Davis Mill Site after all remedial activities were completed (as of June 26, 2006).

Visual comparison of pre-cleanup and post-cleanup gamma survey maps demonstrates the degree to which gamma exposure rates across the Davis Mill Site were reduced as a result of the cleanup. Statistics for the final gamma survey data are shown in Table 1. In Survey Units 1 through 3, the average exposure rate after the cleanup was about the same as the upper limit measured in background locations. Although cleanup efforts in Survey Units 4 and 5 did not result in a level of remediation that appeared possible based on the Site Characterization Report (Carter & Burgess 2005), it was beyond the scope of this project to further remediate this general area because in many locations contamination exists below the groundwater table. The 14,000 cubic yard limit for contaminated soil removal as specified in the Work Plan (FESI 2006) was significantly exceeded in achieving the post-remediation results shown in Figure 6.

Table 1. Gamma scan statistics from the final status survey.

Statistic	Background Areas (uR/hr)	Survey Unit 1 (uR/hr)	Survey Unit 2 (uR/hr)	Survey Unit 3 (uR/hr)	Survey Unit 4 (uR/hr)	Survey Unit 5 (uR/hr)
Max	20	32	30	37	522	480
Min	10	13	12	13	11	11
Mean	14	19	20	20	56	31
Std Dev	3	3	3	3	63	29
n	1068	8338	5635	5980	4431	6262
Percentiles:			· · · · · · · · · · · · · · · · · · ·			
10%	11	15	17	16	21	16
25%	12	16	18	18	25	20
50%	14	18	20	20	34	25
75%	16	21	22	22	55	31
90%	18	24	24	25	112	47

Statistical percentiles for gamma readings illustrate extremely right-skewed distributions in Survey Units 4 and 5, meaning that the highest remaining exposure rates are very limited in aerial extent. In other words, while the cleanup did not eliminate all areas of elevated exposure rates, the "footprint" of source term material was greatly reduced. For example, after the 2006 cleanup effort, 90% of the area in Survey Unit 4 has exposure rate readings less than 112 uR/hr, and half of the area has readings less than 34 uR/hr. This is a significant improvement over pre-cleanup conditions where perhaps only 20% of the same area had exposure rate readings less than 100 uR/hr. Furthermore, high-level contamination in areas of closest proximity to residents currently living on the site (Survey Units 2 and 3) was largely eliminated. Finally, it is important to recognize that gamma exposure rates measured by NaI detectors are only relative measurements. True exposure gamma exposure rates can only be measured with a pressurized ion chamber (HPIC). At background levels, HPIC measurements will typically show exposure rates about two thirds that of NaI detectors. NaI systems are useful for cleanup projects like the Davis Mill Site because they can quickly and effectively demonstrate relative comparisons between background and survey unit readings, identify areas in need of remediation, and demonstrate the effectiveness of remedial activities.

#### **B.3** Soil Sampling Results

#### **B.3.1 Data Quality**

57

. . . .

· 24

 $1.8_{\odot}$ 

As specified in the Work Plan (FESI 2006), ten percent of soil samples were analyzed for Ra-226 concentration both by MFG's on-site soils lab and by a commercial lab (ELI). Initial calibration algorithms used by MFG during the course of the cleanup were adjusted posteriori based on ELI's HPGe gamma spectroscopy results. After evaluation of the accuracy of this adjustment (Figure 7), a final data set was prepared for statistical analysis and presentation in this report. Figure 7 shows good agreement for the adjustment, with a 95% prediction band width of about 2.4 pCi/g. This comparison indicates that a given HPGe-based estimate from ELI has a 95% probability of falling within  $\pm 2.4$  pCi/g of a NaI-based estimate as measured on site by MFG's mobile soils Energy Laboratories Inc. has reported levels of accuracy or precision for lab. HPGe-based gamma spectroscopy can vary by as much as  $\pm 2-3$  pCi/g (Whicker et al. 2006). This suggests that data from the NaI-based analytical method is similar in terms of accuracy and precision to that of ELI. Further evidence of acceptable measurement precision for NaI-based measurements performed on site can be found by examination of duplicate analysis results in the data tables provided in Attachment E.

CDPHE - Davis Mill Remediation Completion Report

; ;

Page 23 of 50


Figure 7. Correlation between ELI's HPGe results and NaI-based estimates from MFG's on-site laboratory.

#### **B.3.2** Surface Soils: Ra-226 Concentration Results

di.

:k

During the course of the 2006 cleanup of the Davis Mill Site, approximately 250 soil samples were collected and analyzed for Ra-226 concentration in the on site soils lab. Of these, about 106 samples were collected and analyzed for interim screening purposes in support of excavation activities. The other 144 samples were collected as part of the final status verification survey. Most (but not all) final status verification survey samples were used in the MARSSIM-based statistical assessment of surface soils for compliance with the 25 mrem/yr release criterion. Some final status survey samples, such as subsurface or composite samples, were collected for additional characterization purposes. Out of 28 samples initially designated as background reference samples, 4 were omitted from statistical analyses due to their proximity to impacted areas.

All Final Survey soil sampling results analyzed in the MFG on-site soils lab are included in Attachment E. That attachment also provides results from ELI for a select subset of these samples that includes a wide spectrum of analytes including naturally occurring radionuclides by HPGe gamma spectroscopy, as well as gross alpha, gross beta, Ra-226, and natural uranium results by wet radiochemistry methods.

With respect to on-site soils lab data, a summary of aerial extent of each survey unit, estimated average depth (thickness) of remaining residual Ra-226 concentration, and descriptive summary statistics for Ra-226 concentrations in surface soil samples are shown in Table 2. All but four of the samples included in this table were part of the MARSSIM surveys and statistical analyses. The additional four samples were judgment-based composite samples of potentially elevated areas, thought to be

additionally relevant to post-remediation dose assessments (Section 3.0). Post-remediation dose assessments for Survey Units 4 and 5 were planned before the cleanup was completed because it was believed in advance of the final survey that these survey units were likely to fail MARSSIM analyses for compliance (discussed later).

Parameter	Background Areas	Survey Unit 1	Survey Unit 2	Survey Unit 3	Survey Unit 4	Survey Unit 5	Survey Units 4+ 5	All Survey Units
	Survey Unit Are	as and Ave	rage Depth	(thickness)	of Elevated I	Ra-226 Laye	r at surface	
Area (m <sup>2</sup> )	-	11,927	4,732	7,574	6,582	8,375	14,957	39,190
Danth t (ma)	· · · · · · · · · · · · · · · · · · ·	045	0.45	0.45	0	4	4.5	

Table 2. Ra-226 concentration statistics from the final status survey.

	Ra-226 Concentration Statistics (pCl/g)									
Mean	2.1	2.6	3.9	3.2	19.8	9.6	14.3	8.0		
Std Dev	0.2	1.5	3.7	2.5	45.9	17.7	33.8	22.9		
Max	2.6	9.1	16.7	12.6	220.8	81.8	220.8	220.8		
Min	1.8	1.7	2.0	1.9	1.7	1.8	1.7	1.7		
No. Samples	24	22	22	24	24	28	52	120		

50%	2.0	2.1	2.7	2.3	3.8	3.3	3.4	2.5
75%	2.2	2.4	3.3	2.8	12.2	5.8	10.5	3.8
90%	2.3	2.9	4.6	3.7	42.5	18.7	31.5	13.5
95%	2.4	3.4	13.1	8.9	66.2	43.9	59.8	29.2

Ra-226 Concentration Percentiles (pCi/g)

\*Depths of elevated layer by Survey Unit was not sampled - these estimates are based on observations during cleanup

(subsurface contamination with existing clean cover material is not evaluated)

An overlay of Ra-226 ranges and sampling locations for final status soil samples on the final status gamma map is shown in Figure 8. The upper limit of the lowest concentration range category in this map was chosen to be 4.7 pCi/g because that represents the final gross cleanup criterion as mentioned previously. Additional maps showing greater detail in terms of soil sample locations and results are provided in Attachment F.



Figure 8. Ra-226 concentration ranges and surface soil sampling locations from the final status survey.

Figure 8 demonstrates a reasonable general correlation between Ra-226 concentration and gamma exposure rate reading. However, there are some unexpectedly frequent inconsistencies where soil samples had high Ra-226 concentrations in areas of relatively low gamma readings and visa versa. This highlights a problem that was discovered during implementation of the MARSSIM survey at this site. Part of the data quality objective (DQO) assessment process in MARSSIM is intended to help select scanning equipment and methodologies capable of meeting a theoretical "minimum detectible concentration" (MDC) criterion. This is meant to insure that "hot spots" between systematic soil sampling locations will be detected by gamma scanning. One suggested method to aid in achieving this conceptual goal, is to use computer-based models such as MicroShield to determine detector response to various radionuclides, amounts of shielding, detector heights, and scan speeds.

Methods to improve "scan MDC's" include using larger detectors, traveling at very slow speeds, and holding the detector a few inches from the ground surface while scanning. Such options were not practical for this project given the size of the site, the terrain involved, the limited budget, and the short time frame allowed to develop a work plan and begin the cleanup. MFG's past experience has been that a 2" x 2" NaI detector held at 2-3 feet above the ground, and traveling at a speed of 2-3 mph, can reliably detect slightly elevated Ra-226 contamination in areas as small as about 20 m<sup>2</sup> provided the source material is relatively uniform in terms of horizontal and vertical distribution.

The current scanning technology used by MFG is particularly well suited for scanning large sites, rough terrain, and mapping the results on nearly a real time basis. However, at the Davis Mill Site it was not uncommon to find that small-scale variability in contamination (to within a few feet or less) was very high. An unshielded gamma detector, small enough and light enough to be carried with reasonable efficiency at a site like this cannot be expected to "see" very small pockets of contamination (perhaps a foot or less in diameter), particularly if there is any overlying clean soil to shield gamma rays. If a small pocket of contamination is present at or near the soils surface, a soil sample taken in that exact location will detect the elevated material, yet a second sample collected just a foot away can easily come up clean for residual contamination. If that assumption is significantly violated, the statistical results can be questioned on that basis. Fortunately, in Survey Units 1-3 the levels of residual activity did appear reasonably uniform in most areas, while in Survey Units 4-5, variability turned out to be irrelevant with respect to MARSSIM results.

## **B.3.3 MARRSIM Sampling and Analysis Results**

Implementation of MARSSIM protocols for designing a final status survey includes developing a statement of data quality objectives (DQO) in advance. For the Davis Mill Site final status survey, a slightly abbreviated version of the original DQO statement is as follows:

- i. <u>State the problem</u>: A characterization survey at the Davis Mill Site has identified residual (above background) levels of radionuclide contamination (Carter & Burgess, 2005). Frontier Environmental Services, Inc. and MFG, Inc. have been contracted by the CDPHE to excavate contaminated soils and transport them to UMETCO for proper disposal. UMETCO no longer receive materials for disposal after June 30, 2006, so remedial activities at the Davis Mill Site must be completed by this date. A final radiological status survey will be conducted to determine whether or not each survey unit at the site qualifies for unrestricted release under NRC decommissioning standards.
- **ii.** <u>Identify the decision</u>: Is the level of residual contamination in a given survey unit below the release criteria.
- iii. <u>Identify inputs to the decision</u>: Post-cleanup soil Ra-226 data generated by the Frontier/MFG team will be used to determine compliance with the release criterion in a given survey unit. A combination of NRC decommissioning standards and guidelines, as well as pre-cleanup soil radionuclide data from the Davis Mill Site Characterization Report (Carter & Burgess, 2005), were used to develop the site-specific soil cleanup criterion.
- **iv.** Define the study boundaries: Based on Figures 4, 6, and 21 in the Davis Mill Site Characterization Report (Carter & Burgess, 2005), five impacted Class 1 survey units have been defined (see Appendix I, FESI 2006). A non-impacted background reference area has also been defined. An independent pre-cleanup gamma scan will be conducted by MFG prior to cleanup activities. If warranted, analysis of the scan data could result in modification of survey unit boundaries, though major modifications are not expected.
- v. <u>Develop a decision rule</u>: The Ra-226 soil concentration data in each survey unit will be numerically evaluated against a gross cleanup criterion (DCGL<sub>W</sub>) of 5.4 pCi/g. As indicated in MARSSIM, if all data in the survey unit are less than this criterion, the survey unit meets the conditions for unrestricted release and no statistical test is required. If multiple samples in a given survey unit remain above the gross criterion, the Wilcoxon Rank Sum Test (WRS) will be used to evaluate whether or not the median gross concentration in the survey unit is statistically greater than the median of background plus the *net* DCGL<sub>W</sub> (i.e. background reference area sample result + 2.6 pCi/g).

In addition to evaluations of each survey unit against the  $DCGL_W$ , any areas identified by gamma scans as having potential for elevated Ra-226 levels, will be additionally sampled and evaluated against a secondary "hot spot" criterion as described in MARSSIM.

vi. <u>Specify limits on decision errors</u>: Based on past MFG experience, the expected variability in Ra-226 measurements among samples from a given survey unit is likely to approach  $\pm 2 \text{ pCi/g}$  from the mean.

The null hypothesis for statistical testing (if required) is that the survey unit exceeds the cleanup criterion. A Type I error would occur if a survey unit were to be incorrectly released for unrestricted use. The consequences of this type of error would include the potential for a future rural resident living on the site to receive a dose greater than 25 mrem/yr above background. A Type II error would occur if a survey unit were to be incorrectly prohibited from an unrestricted use designation. The consequences of this type of error could include prevention of future development or uses of the site which otherwise might provide economic or other benefits to the local community.

The next step in the implementation of MARSSIM was to design the final status survey. First, initial survey unit delineations were modified based on the additional information provided by the independent pre-cleanup gamma mapping scan conducted by MFG in March of 2006, as well as based on actual observations made during the cleanup (Figure 4 shows final survey unit delineations). Next, the number of samples required was calculated according to MARSSIM guidelines. There are several parameters that impact the number of samples needed to satisfy statistical testing requirements. These include the following:

- 1. Acceptable rates on Type I and Type II decision errors ( $\alpha$  and  $\beta$  respectively).
  - For the Davis Mill Site  $\alpha$  was set at 0.05 (meaning only a 5% chance that a Type I error would occur). This value for  $\alpha$  is commonly accepted by regulators as being adequately protective in terms of insuring that the 25 mrem/yr dose limit for any survey unit will be correctly assessed by the final status survey and respective statistical testing.
  - For the Davis Mill Site  $\beta$  was set at 0.15 (meaning only a 15% chance that a Type II error would occur). This error rate can vary and is typically up to the licensee to select – it affects the amount of risk the licensee is willing to accept that a clean survey unit will fail the test due to an insufficient number of samples being taken.
  - The values chosen for  $\alpha$  and  $\beta$  are independent of one another in terms of limiting respective chances of Type I or Type II errors.
- 2. Selection of the lower bound on the grey region (LBGR)
  - A MARSSIM default value of 50% of the DCGL (1.3 pCi/g) was used for the Davis Mill Site.
- 3. Anticipated variability (standard deviation) in soil Ra-226 concentration in the survey units after remediation.

- For the Davis Mill Site, a value of  $\pm$  1.3 pCi/g was used

Actual standard deviations for Survey Units 1-3 turned out to range from ± 1.5 to ± 3.7 pCi/g. As higher standard deviation values are used in this computation, the number of samples required quickly becomes unreasonable (e.g. if a standard deviation of 2.0 pCi/g had been used, 54 samples per survey unit would have been needed, requiring a total of 324 samples at the site to be collected and analyzed just for the final status survey alone – far more than the project budget or time frame could support).

Using these input parameters, a total of 22 samples in each survey unit were determined to be needed (along with 22 background reference area samples). Next, systematic grid sampling locations were determined using a square sampling pattern and the corresponding formula for calculating distances between sampling locations in each respective survey unit. The systematic grid design was randomized by throwing a pin flag in the air in the general area near the potential location of the first sample, and beginning the sampling grid wherever it landed. In some cases, the sampling grid appeared a little short of covering all areas in a given survey unit. This was likely due to inherent measurement error in survey unit area calculations and/or in measuring distances over rough or obstructed terrain. In these cases, extra systematic samples were taken to insure accurate representation. Several extra background reference area samples were also taken to insure the best possible representation.

Once all systematic samples were collected and analyzed, the data was reviewed along with the gamma mapping scan results. It became apparent that all survey units had at least some soil concentration results above the initial cleanup criterion of 5.4 pCi/g. As mentioned earlier, this resulted in a decision to abandon that initial concentration criterion and perform all further analyses using the mean of background values as actually measured by the on-site soils lab. The final gross Ra-226 criterion for compliance was 4.7 pCi/g (the 2.1 pCi/g average for background + the 2.6 pCi/g DCGL).

In further reviewing the data, areas having gamma readings in excess of 30 uR/hr were flagged for further investigation, as were areas with soil sampling results greater than 4.7 pCi/g. Investigation of these areas included careful scanning close to the ground at very slow speeds to determine the aerial extent of any elevated readings. Localized soil samples were then collected to estimate the average Ra-226 concentration within each of these potential "hot spots." Photo diagrams of these areas with respective delineations, sampling locations, results, and statistics are shown in Attachment H. No hot spot investigations were conducted in survey units 4 and 5 because it was clear from the systematic data that these survey units would fail the initial MARSSIM assessment.

The first assessment MARSSIM employs is to simply compare mean of the systematic grid samples with that of background. If the mean Ra-226 concentration in the survey unit exceeds the mean of background by an amount greater than the DCGL, the survey unit does not meet the 25 mrem/yr standard for unrestricted release and thus fails to

qualify for free release. No statistical testing is performed. If, however, the mean concentration in the survey unit is greater than the mean of background, but the difference is less than the net DCGL, the Wilcoxon Rank Sum (WRS) test is used to evaluate compliance. As with all MARSSIM hypothesis tests, the null hypothesis for this test is that the survey unit does not meet the release criterion. The WRS test is a distribution-free, non-parametric statistical assessment that doesn't assume a normal distribution of the data. The WRS test evaluates differences in median values rather than mean values. Under the WRS test, if the median of the survey unit does not *statistically* exceed the median of background plus the DCGL (given the variability in measurements), the survey unit passes the primary test for compliance. A secondary Elevated Measurement Comparison or "hot spot" test must then be performed (see section 1.2). If the survey unit also passes this test, then it can qualify for free release.

Once all of the systematic and elevated measurement results were compiled, a computer code software program called COMPASS (ORAU/ORISE 2000, 2001) was used to analyze and compare the data for each survey unit against background data. The COMPASS code includes a DQO assessment and performs all MARSSIM statistical testing. Computer output reports of MARSSIM analyses for each survey unit at the Davis Mill Site are provided in Attachment G. A summary of MARSSIM analysis results and relevant statistics is shown in Table 3.

Size (n)	Median (pCi/g)	Mean (pCi/g)	Std. Dev. (pCi/g)	Test Results	Elevated Measurement Areas	Test Results		
22	2.1	2.6	1.5	Pass	1	Pass		
22	2.7	3.9	3.7	Pass	2	Pass		
24	2.3	3.2	2.5	Pass	3	Fail		
23	3.6	17.7	45.6	Failed compar	rison of means against DC	GL		
25	2.8	7.2	11.2	Failed comparison of means against DCGL				
There are a	Size (n) 22 22 24 23 25	Size         Median (pCi/g)           22         2.1           22         2.7           24         2.3           23         3.6           25         2.8	Size         Median (pCi/g)         Mean (pCi/g)           22         2.1         2.6           22         2.7         3.9           24         2.3         3.2           23         3.6         17.7           25         2.8         7.2	Size         Median (pCi/g)         Mean (pCi/g)         Std. Dev. (pCi/g)           22         2.1         2.6         1.5           22         2.7         3.9         3.7           24         2.3         3.2         2.5           23         3.6         17.7         45.6           25         2.8         7.2         11.2	Size         Median (pCi/g)         Mean (pCi/g)         Std. Dev. (pCi/g)         Test Results           22         2.1         2.6         1.5         Pass           22         2.7         3.9         3.7         Pass           24         2.3         3.2         2.5         Pass           23         3.6         17.7         45.6         Failed compare           25         2.8         7.2         11.2         Failed compare	Size (n)Median (pCi/g)Mean (pCi/g)Std: Dev. (pCi/g)Test ResultsElevated Measurement Areas222.12.61.5Pass1222.73.93.7Pass2242.33.22.5Pass3233.617.745.6Failed comparison of means against DC252.87.211.2Failed comparison of means against DC		

Table 3. Summary statistics and results for MARSSIM testing

Background 24 2.1 2.1 0.2

These results indicate that Survey Units 1 and 2 meet the 25 mrem/yr dose standard for residual surface soil contamination and thus can qualify for unrestricted release. During remediation, two small areas of sub-surface soil contamination were identified and excavated in Survey Unit 2 (see photos, Attachment M). After this remediation, soil samples (see samples with ID prefixes "WRC" and "AT" under "Final Status Subsurface Samples" in Attachment E) indicated that no significant residual sub-surface contamination remained in these areas. There was no evidence of the existence of other areas of sub-surface contamination in these two survey units.

Survey Unit 3 passed the WRS test, but failed the Elevated Measurement Comparison test for compliance. A primary reason for this failure was residual contamination around the roots of a tree next to one of the resident trailer homes (see photo diagram labeled SU3-HS2 in Attachment H). This tree is the only source of shade for residents in this particular trailer and was a consideration in deciding not to excavate further to eliminate

this relatively small (20 m<sup>2</sup>) area of residual activity. Any radiological risks associated with this small area were considered negligible compared to the risks of heat exhaustion during summer months for residents living in this trailer had the tree been removed. Furthermore, by the time this hot spot was identified, the budgetary limit on total volume of soil to be removed from the site was already exceeded. This latter issue was the reason further remediation was not attempted for the other two hot spots identified in Survey Unit 3. The CDHPE should consider whether it is reasonable to exclude Survey Unit 3 from free release based solely on the result of the secondary EMC test in MARSSIM. For this reason, a post-remediation dose assessment using RESRAD was performed (Section 3.0) using actual data obtained from the final status survey to see if the 25 mrem/yr standard could still be met, or whether some kind of partial future use restriction on this portion of the property might be warranted as an appropriate compromise.

As expected, both Survey Unit 4 and Survey Unit 5 failed the comparison of mean values with background relative to the DCGL. As a result, COMPASS did not perform any statistical testing. Contamination in both survey units exists below the groundwater table and thus these areas could not be fully remediated. Contaminated soils in these areas were generally excavated until the gamma cut-off value was attained or until the groundwater table was close to being breached. Efforts were made wherever possible to avoid excavating soil to the point of exposing the groundwater table so that current residents could continue to access and use most areas of the property. It is not known how deep below the groundwater table contamination in this area resides. Digging backhoe test pits to sample soils below the groundwater table is not possible, and no provisions for bore-hole sampling equipment were anticipated or budgeted for this purpose. Clearly the area of highest surficial contamination left on the property exists in Survey Unit 4 around the pond formed during remediation (see photos, Attachment M). A post-remediation dose assessment for Survey Units 4 and 5 was performed (Section 3.0) to determine likely doses for the current land use, as well as for alternate potential future uses.

#### **B.3.4 Sub-surface Soils: Ra-226 Concentration Results**

In accordance with the Work Plan (FESI 2006), three locations at the Davis Mill Site were selected for subsurface soil sampling. Survey Units 4 and 5 were ruled out for subsurface sampling due to reasons mentioned in the preceding paragraph. Instead, sub-surface samples were collected from the walls of trenches or pits excavated to remove contaminated sub-surface soils that had been identified during the cleanup. Sub-surface sampling was conducted after gamma readings in these trenches or pits suggested that the former pockets or seams of contaminated sub-surface material had been successfully removed. Sub-surface sampling was conducted incrementally in order to generate Ra-226 depth profiles at these locations. The results are provided in Attachment E. All subsurface samples from the three pits were below the 4.7 pCi/g cleanup criterion for surface soils.

#### **B.4 Water Sampling Results**

The results from ELI for surface and groundwater samples are provided in Attachment E. These results, in addition to soil sampling results from the on-site soils lab, were used for the post-remediation dose assessment (Section 3.0). At temporary groundwater monitoring wells number 1 and 2, groundwater was reached at 6.7 feet and 1.0 feet respectively. Well 1 was located approximately 20 feet to the east of where groundwater sample CB-2 was collected by Carter & Burgess during their 2005 site characterization study (Carter & Burgess 2005). Well 2 was located approximately 75 feet to the southeast of where groundwater sample CB-3 was collected by Carter & Burgess in their 2005 study. GPS coordinates for these locations are provided in Attachment E. The CDOT well and pond were the same sources as sampled by Carter & Burgess in 2005.

Post-remediation water sampling results for the 2006 Davis Mill Site cleanup indicated that in all cases, the only measurable radioactivity was due to the presence of uranium (Ra-226 was not measured at levels above analytical detection limits). Of all the water samples taken, the highest measured levels of gross alpha, gross beta, and uranium were found in the groundwater sample from Well 1. As can be seen by the comparisons shown in Table 4, a similar spatial relationship for the relative levels of these radio-analytes in generally corresponding groundwater locations was found by Carter & Burgess in 2005. The 2005 pre-cleanup data, however, showed lower values in all cases compared to the 2006 post-cleanup data. This is not surprising as the entire area, presumably including its groundwater dynamics, was disturbed during the cleanup. Given that a great deal of source term material was removed from Survey Units 4 and 5 during the cleanup, it is likely that over time groundwater radionuclide concentrations will decline and eventually will stabilize below pre-cleanup levels. The surface water sample collected by Carter & Burgess showed surprisingly high Ra-226 levels prior to the cleanup, whereas the post-cleanup level was very low.

Table 4. Comparison of radio-analyte data for 2005 pre-cleanup water samples and generally corresponding 2006 post-cleanup samples.

Pre-cleanup Data (Carter & Burgess 2005)

CB-2	Groundwater	34.8	12.5	0.0444	0.6
CB-3	Groundwater	16.2	6.9	0.0232	<0.2
CDOT	Groundwater	22.3	5.2	0.0236	0.3
Pond	Surface water	15.6	14	0.0026	5

Corresponding Post-cleanup Data

Well 1	Groundwater	126	52.8	0.163	< 0.2
Well 2	Groundwater	58.8	28.6	0.0743	< 0.2
CDOT	Groundwater	45.5	17	0.073	< 0.2
Pond	Surface water	44.4	20.7	0.0223	< 0.2

## **B.5 Mill building decontamination**

The Work Plan included provisions for decontamination of the mill building by pressure washing. This objective was only partially achieved. During the course of the cleanup, conditions and remedial strategies were changing in close consultation between FESI and the CDPHE. Early on during the project, three lower levels of the interior of the mill building were cleaned of debris followed by an initial pressure washing. Swipe tests were collected in these areas and analyzed. The results are included in the field notes provided in Attachment L. Before an attempt was made to further pressure wash these areas, or to clean and decontaminate the fourth and highest interior level of the building, the possibility of demolishing the mill and using part of the underlying hill side for clean backfill in other areas of the site was being discussed. As such, decontamination efforts ceased. Eventually, a decision was made not to take down the mill but by that time the budget for decontamination had shifted to the more important issue of removing as much of the remaining contaminated soil from the site as possible. Because soils around the mill building could not be fully remediated within the scope of this project, decontaminating the remainder of the mill building interior no longer made practical sense.

## C. POST-REMEDIATION DOSE ASSESSMENT

The potential doses to individuals residing on the Davis Mill Site were estimated using the RESRAD Computer Code. The potential doses to individuals residing on the Davis Mill Site prior to remediation and respective initial cleanup criterion for the Davis Mill Site were also derived using RESRAD.

#### C.1 **RESRAD** Computer Code

RESRAD was developed by the U. S. Department of Energy (DOE) to evaluate the radiation doses and risks to members of the public from residual radioactive materials. The computer code was first issued in 1989. The version used in this analysis, RESRAD 6.22, was issued in February 2004. RESRAD is part of a family of codes that are designed to estimate radiation doses to individuals and ecological receptors from residual radioactivity. Further information on the RESRAD codes can be obtained from the User's Manual for RESRAD, Version 6 (Yu 2001).

RESRAD can be used to calculate the dose from a single radionuclide or a mixture of radionuclides, such as that which exists at sites where naturally occurring radionuclides are of concern. The user specifies soil concentrations for each nuclide. The Code can also be used to establish soil cleanup criteria based on a user-specified dose to a member of the public. The output from the code provides the doses from each individual radionuclide in a mixture by each exposure pathway as well as the total dose from all nuclides and pathways. Doses are calculated for user-designated time periods. RESRAD also calculates the peak total dose from the radionuclide mixture.

The Code requires user input parameter values in the following categories applicable to the particular location:

- Soil concentrations;
- Contaminated zone characteristics;
- Cover and hydrological characteristics;
- Saturated zone characteristics;
- Unsaturated zone characteristics; and
- Occupancy

Where no site-specific information is available, RESRAD provides default parameter values. For the pre-cleanup Davis Mill Site dose assessment for developing a cleanup criterion, site-specific parameter values provided in the Site Characterization Summary Report for the Davis Mill Site were used (Carter & Burgess 2005). Where no site-specific parameter values were available, the RESRAD default values for site characteristics were used. The occupancy factors and consumption values used depended on the selected exposure scenario. The NRC's indoor shielding factor of 0.33 was used instead of the RESRAD default factor of 0.7 (NUREG CR 5512 as quoted by EPA, 1996).

RESRAD calculates the dose to a member of the public for the following pathways:

- Direct gamma radiation;
- Inhalation of dust;
- Inhalation of radon and its decay products;
- Meat ingestion;
- Plant ingestion;
- Soil ingestion; and
- Water pathways.

The user selects the appropriate pathways for a particular exposure scenario.

# C.2 Derivation of the Ra-226 Cleanup Criterion

MFG, Inc. adjusted the initial residual Ra-226 criterion proposed by Carter Burgess, based on their RESRAD analyses, to be consistent with the Nuclear Regulatory Commission's decommissioning standard as set forth in 10CFR20.1402 and as amplified in the Federal Register Notice dated Monday, July 22, 1997. The Carter Burgess analysis included indoor radon in the determination of the residual Ra-226 concentration that would result in a potential dose to a site resident of 25 mrem per year, the 10CFR20.1402 decommissioning standard for unrestricted use. However, the preamble to the Federal Register Notice on the Final Decommissioning Rule makes it clear that the intent of the NRC was to exclude indoor radon from the 25 mrem per year criterion. The notice states the following: "...the Commission believes that it is not practical for licensees to distinguish between radon from licensed activities at a dose comparable to a 0.25 mSv/y (25 mrem/y) dose criterion and radon which occurs naturally. Therefore, in

implementing the final rule, licensees will not be expected to demonstrate that radon from licensed activities is indistinguishable from background on a site-specific basis. Instead, this "*may be considered to have been demonstrated on a generic basis when radium, the principal precursor to radon, meets the requirements for unrestricted release without including doses from the radon pathway*" (emphasis added). [These statements can be found on page 39083 of the July 22, 1997 Federal Register.] MFG, Inc. proposed, and CDPHE accepted, a residual Ra-226 cleanup criterion of 2.6 pCi/g above background. The RESRAD dose assessment included all U-238 decay series nuclides in equilibrium, i.e., all nuclides in the decay series are present at the same concentration as the Ra-226. The ratio of Th-232 decay series radionuclides was assumed to be as indicated by the Carter & Burgess report.

# C.3 **Post-remediation Dose Assessment**

The post-remediation dose assessment addresses Survey Units 3, 4, and 5. Survey Units 1 and 2 can be released for unrestricted use based on the MARSSIM analysis described in Section 2. The potential annual doses to individuals residing within Survey Units 1 and 2 have been demonstrated to be less than 25 mrem (excluding indoor radon) based on the dose assessment performed to establish the cleanup criterion.

Since the purpose of the post-remediation dose assessment is to determine how the Davis Mill Site property can be used in the future given the current radionuclide concentrations at the site, the best estimates of the measured Ra-226 concentrations, i.e., mean values, were used in the dose assessments for Survey Units 3, 4, and 5. Using the upper 95% confidence limits would compound the conservatism inherent in the RESRAD dose assessment and could result in recommendations for more restrictive use of the site than is warranted based on real potential dose to members of the public.

## C.3.1. Survey Unit 3

Survey Unit 3 passed the MARSSIM guidelines for average and median residual Ra-226 concentration but failed the elevated measurement test because of three small areas where residual Ra-226 concentrations exceeded combined elevated measurement criteria in the MARSSIM analyses (see photo diagrams for HS3-1, HS3-2, and HS3-3 provided in Attachment H for reference). These elevated measurement criteria were based on area factors as calculated in RESRAD. In order to demonstrate that Survey Unit 3 meets the 25 mrem per year dose criterion for unrestricted release, the RESRAD Code was run for each of the three elevated measurement areas for two scenarios. In the first scenario, it was assumed that a member of the public would build a residence directly on the elevated measurement area. The assumed occupancy factor was dependent on the size of the area. The second scenario assumed the individual used the area for a vegetable garden but lived in another area of Survey Unit 3. Due to their small size, the elevated measurement areas could only provide a small fraction of the annual vegetable intake by a site resident. Either the default values or the Carter & Burgess RESRAD values were used for the other RESRAD input parameters. Table 5 includes the occupancy and consumption factors for each of the elevated measurement areas.

Location	Area (m <sup>2</sup> )	Ra-226 Conc. above background (pCi/g)	Exposure Scenario	Indoor Residential Occupancy Factor	Outdoor Occupancy Factor	Vegetable Consumption Fraction
HS-1	6	3.2	Residence	0.125	0	0
HS-1	6	3.2	Garden	0	0.05	0.025
HS-2	20	8.1	Residence	0.25	0	0
HS-2	20	8.1	Garden	0	0.05	0.05
HS-3	9	8.4	Residence	0.125	0	0
HS-3	9	8.4	Garden	0	0.05	0.025

Table 5:	Elevated	Measurement	Area	Occup	bancy and	Consum	ption V	Values
					-		•	

The default RESRAD indoor occupancy factor is 0.5 (i.e. an individual spends half of his or her time in the residence). For the purpose of this assessment it was assumed that an area no greater than  $10 \text{ m}^2$  would be occupied for approximately one-fourth of the indoor residence time and an area no greater than  $20 \text{ m}^2$  would be occupied for approximately half of the indoor residence time.

The outdoor occupancy time directly on the elevated measurement area where a vegetable garden might be located was assumed to be 0.05 or 8 hours per week. That is highly conservative. In fact, the probability that a resident would cultivate any of these elevated measurement areas is remote. In addition, the depth of contamination in the elevated measurement areas was assumed to be 1.0 meter. Therefore, the RESRAD analysis for Survey Unit 3 is very conservative.

In addition to the residential and garden scenarios for the elevated measurement areas, two RESRAD analyses were performed for the average residual radionuclide values for the survey unit, one assuming no residential exposure and one assuming all pathways. The calculated average annual dose to a resident on Survey Unit 3 was added to the dose for the garden scenario for each of the elevated measurement areas. The calculated dose, excluding residential exposure, was added to the dose for the elevated measurement area residential scenario. Carter & Burgess parameter values were used in the analysis. The occupancy and plant consumption fractions were adjusted to account for occupancy on the elevated measurement areas.

RESRAD provides doses over various time intervals. For the scenarios in this dose assessment, the initial calculated doses are the peak doses. The results of the RESRAD analyses are given in Table 6. The RESRAD output files are included on compact disk as Attachment I to this report.

Area	Scenario	External Gamma	Plant	Total Dose
		Dose	Consumption	(mrem/y)
		(mrem/y)	Dose	
			(mrem/y)	
Survey Unit 3	Non-	2.96	12.88	16.60
	residential			
Survey Unit 3	Residential	4.33	11.59	16.89
· ·	(All			,
	pathways)			
HS-1	Residential	· 0.52	0	0.52
HS-1	Garden	1.08	1.50	2.59
HS-2	Residential	4.54	0	4.54
HS-2	Garden	2.74	9.47	12.25
HS-3	Residential	2.35	Ó	2.35
HS-3	Garden	2.85	3.93	6.81
$HS-1r + SU 3nr^{(1)}$	Residential	3.48	12.88	. 17.12
HS-1g + SU-3r	Garden	5.41	13.09	19.48
HS-2r + SU-3nr	Residential	7.50	12.88	21.14
HS-2g + SU-3 r	Garden	7.07	21.06	29.14
HS-3r + SU-3nr	Residential	5.31	12.88	18.95
HS-3g + SU-3r	Garden	7.18	15.52	23.70

Table 6: Estimated Annual Doses for Survey Unit 3

<sup>(1)</sup> nr means non-residential occupancy; r means residential occupancy

Survey Unit 3 meets the decommissioning standard of 25 mrem per year for all scenarios except a garden on HS3-2. The average concentrations in HS3-2 are skewed by the concentration in the root ball of a tree. The average Ra-226 concentration in HS-2, excluding the tree root ball is 6.2 pCi/g (4.1 pCi/g above background) or about half the concentration used in the RESRAD analysis. It is highly unlikely that the area would be used for a vegetable garden because of the presence of the tree. The estimated doses for the garden scenario on HS3-2 would be approximately half the values listed above.

Based on the RESRAD analysis for reasonable exposure scenarios, Survey Unit 3 meets the decommissioning standard and can be released for unrestricted use.

#### C.3.2 Survey Units 4 and 5

Survey Units 4 and 5 did not pass the initial MARSSIM comparative assessment of mean values. Mean Ra-226 concentrations in both survey units exceeded the gross soil cleanup criterion. Under MARSSIM, if the mean value in the survey unit exceeds the gross DCGL criterion, then the survey unit fails based solely on this comparison and no further statistical tests are performed. Therefore, Survey Units 4 and 5 should not be released for unrestricted use.

The Ra-226 concentrations in Survey Unit 4 varied greatly, ranging from near background to 221 pCi/g. Sixteen of the twenty-three soil samples taken and analyzed showed Ra-226 concentrations below the criterion. The average concentration over the survey unit is primarily driven by a single sample that had a Ra-226 concentration approximately three times the average value and fifty times the criterion. The survey unit includes the area directly beneath the old mill building. Observations during remediation suggested that tailings may have once been stored in this general location. Attempts to remove as much contaminated soil from this area as possible resulted in the formation of a small pond to the west of the mill building (see SU-4 photos in Attachment M) as excavations reached below the water table.

Survey Unit 5 also had highly variable Ra-226 concentrations, ranging from background to 82 pCi/g. Seven of the 25 grid samples had concentrations exceeding the cleanup criterion. An additional four samples were taken in "hot spot" areas and included in the overall average.

While unrestricted use is not appropriate for either Survey Unit 4 or Survey Unit 5, limited uses such as cattle grazing and recreational use (such as hiking, ball fields, etc.) would result in doses below the decommissioning standard. The RESRAD code was run for a cattle grazing, milk production and recreational use scenarios for the two survey units combined since it is likely that beef cattle or milk cows would range freely over both survey units. In fact, domestic animals would likely graze over the entire site. Limiting the analysis to the two failed survey units is very conservative and overestimates the potential dose from meat and milk.

The average Ra-226 concentration for the combined Survey Units 4 and 5 was 14.3 pCi/g. The recreational and cattle grazing scenario assumed a member of the public would spend approximately 10% of his or her time in Survey Units 4 and 5. The same individual was assumed to obtain the default RESRAD fraction (33%) of his or her meat and milk from animals grazing full time in the area. Carter & Burgess site-specific parameter values were used in the analysis. The depth of contamination was assumed to be 2 meters, the estimated depth for Survey Unit 4. The total area of contamination was 14,957 m<sup>2</sup>. The results of the RESRAD analysis are given in Table 7.

Pathway	Estimated Dose
	(mrem/y)
Direct Gamma Radiation	6.64
Inhalation of particulates	0.09
Meat ingestion	8.17
Milk Ingestion	5.14
Soil Ingestion	0.05
Total Annual Dose for	20.09
Recreational/Animal Grazing	
Scenario	
Total Annual Dose for	6.69
Recreational Scenario	

 Table 7: Estimated Annual Doses for Limited Uses of Survey Units 4 and 5

The potential total dose from all pathways in the limited use scenario is less than 25 mrem per year. Therefore, the limited uses assumed for the scenario are acceptable for Survey Units 4 and 5.

Exposure pathways for a recreational scenario on Survey Units 4 and 5 would be limited to direct gamma radiation and ingestion of soil. The occupancy parameters would be the same as for the Limited Use scenario. That is, it is unlikely that a recreational user would spend more than 5% of his or her time within the survey units.

#### C.3.2.1 New Pond in Survey Unit 4

Excavations in Survey Unit 4 resulted in the formation of a small pond (New Pond) directly west of and below the mill building. As mentioned previously, this location may have once been used to store tailings from mill operations. Despite efforts to remove as much contaminated soil as possible from this location, additional remediation was not possible as the groundwater table was breached resulting in the formation of the New Pond. Soils underlying and bordering the New Pond still exhibit relatively high levels of residual radioactivity. The current residents asked for a determination as to whether it is "safe" to drink milk and eat meat from animals grazing and drinking water from sources on their property including the New Pond.

No direct water quality measurements of suspended sediment concentration (SSC) or radionuclide activity concentration were obtained from the New Pond during the reclamation and verification process for the site. Therefore, estimates of dose to individuals consuming meat and milk from animals drinking pond water have been made based on measured groundwater concentrations, measured soil concentrations in the vicinity of the New Pond, and assumed SSC.

The New Pond is not the only source of water for animals grazing on the Davis Mill Site. There are several other ponds on the property, notably the pre-existing pond to the southeast of the mill buildings. The New Pond is in an area devoid of vegetation so would not be as attractive to grazing animals as the other ponds on the site that have forage nearby. However, it is a potential source of livestock water. The dose calculation assumes a very conservative value of 0.5 for the fraction of water livestock obtain from the New Pond.

Two temporary groundwater wells were installed in an area near the New Pond. The water from the wells was analyzed for uranium and Ra-226. The Ra-226 concentrations were below detection limits. The maximum measured uranium concentration was 0.161 mg/L (110 pCi/L). This concentration was used in the dose analysis for groundwater radionuclides since it is assumed that the water in the New Pond comes from groundwater.

The area has been disturbed so a significant amount of sediment would be likely to be in the water consumed by livestock, particularly since the animals would stir up sediment in the process of reaching the water. We found no values in the literature for SSC in stock The area has been disturbed so a significant amount of sediment would be likely to be in the water consumed by livestock, particularly since the animals would stir up sediment in the process of reaching the water. We found no values in the literature for SSC in stock pond water. However, a study by the U. S. Geological Survey (USGS) compared SSC and total suspended solids (TSS) measured concentrations using data from over 600 water samples representing seven rivers (Glysson, undated). While these sources are not directly comparable to stock ponds, the SSC values can be used as ballpark numbers for the New Pond with the understanding that they introduce significant uncertainty into the calculations. The USGS analyzed over 600 samples. The highest single SSC measurement was 4,600 mg/L. This value was used in the New Pond dose calculations.

The activity concentration in the water was estimated by assuming a SSC of 4,600 mg/L and a sediment concentration of 90 pCi/g. The sediment concentration is the average of the four highest soil sample concentration measurements in the vicinity of the New Pond. These are likely to be conservative assumptions and would probably result in an overestimate of potential dose. The sediment concentration was added to the uranium concentration in groundwater to obtain a total concentration for each of the nuclides in the U-238 decay series. The U-238 decay series radionuclides (U-234, Th-230, Ra-226, and Pb-210 were assumed to be in equilibrium in the soil and groundwater. Uranium-235 and its decay products were assumed to be present at 0.045 times the activity of the U-238.

Transfer coefficients and usage factors from NCRP Report No. 123I (NCRP 1996) were used to estimate the uptake and transfer of radionuclides from intake by beef cattle and milk cows to meat and milk. Beef cattle were assumed to drink 50 liters of water per day and milk cows, 60 liters per day. The calculation assumes that the residents eat 100 kg of beef from the site per year and drink 300 liters of milk produced on site. That is, the residents had no other source of meat and milk. This is also a very conservative assumption. The transfer coefficients are based on uptake of radionuclides from feed and water. The uptake of insoluble sediments by animals may be lower, introducing another conservative factor into the calculation. Dose Coefficients were obtained from "The ICRP Database for Dose Coefficients for Workers and Members of the Public" (IRCP 2001).

The doses were calculated as shown in Table 8. The estimated dose due to eating meat from cattle drinking New Pond water was 3.6 mrem per year. The estimated dose due to drinking milk from cows drinking New Pond water was 7.3 mrem per year.

Meat											
Nuclide	Pond	Cons. Rate	Fraction	Transfer factor	Conc.	Intake	Intake	Intake	DCF	Dose	Dose
	Conc.	Beef Cattle	from new	meat	Meat	meat	meat	meat	Sv/Bq	Sv/y	mrem/y
	pCi/L	L/d	pond	d/kg	pCi/kg	kg/y	pCi/y	Bq/y			
U-238	469	50	0.5	8.00E-04	9.38E+00	100	9.38E+02	3.47E+01	4.50E-08	1.56E-06	0.2
U-234	469	50	0.5	8.00E-04	9.38E+00	100	9.38E+02	3.47E+01	4.90E-08	1.70E-06	0.2
Th-230	414	50	0.5	1.00E-04	1.04E+00	100	1.04E+02	3.83E+00	2.10E-07	8.04E-07	0.1
Ra-226	414	50	0.5	1.00E-03	1.04E+01	100	1.04E+03	3.83E+01	2.80E-07	1.07E-05	1.1
Pb-210	414	50	0.5	8.00E-04	8.28E+00	100	8.28E+02	3.06E+01	6.90E-07	2.11E-05	2.1
U-235	19	50	0.5	8.00E-04	3.80E-01	100	3.80E+01	1.41E+00	4.70E-08	6.61E-08	0.0
Pa-231	19	50	0.5	5.00E-06	2.38E-03	100	2.38E-01	8.79E-03	7.10E-07	6.24E-09	0.0
Ac-231	19	50	0.5	2.00E-05	9.50E-03	100	9.50E-01	3.52E-02	1.10E-06	3.87E-08	0.0
Total										3.60E-05	3.6
Milk						•					
Nuclide	Pond	Cons. Rate	Fraction	Transfer factor	Conc.	Intake	Intake	Intake	DCF	Dose	Dose
	Conc.	Milk Cow	from	Milk	Meat	milk	milk	milk	Sv/Bq	Sv/y	mrem/y
	pCi/L	L/d	new pond	d/L	pCi/kg	L/y	pCi/y	Bq/y			
U-238	469	60	0.5	4.00E-04	5.63E+00	300	1.69E+03	6.25E+01	4.50E-08	2.81E-06	0.3
U-234	469	60	0.5	4.00E-04	5.63E+00	300	1.69E+03	6.25E+01	4.90E-08	3.06E-06	0.3
Th-230	414	60	0.5	5.00E-06	6.21E-02	300	1.86E+01	6.89E-01	2.10E-07	1.45E-07	0.0
Ra-226	414	60	0.5	1.00E-03	1.24E+01	300	3.73E+03	1.38E+02	2.80E-07	3.86E-05	3.9
Pb-210	414	60	0.5	3.00E-04	3.73E+00	300	1.12E+03	4.14E+01	6.90E-07	2.85E-05	2.9
U-235	19	60	0.5	8.00E-04	4.56E-01	300	1.37E+02	5.06E+00	4.70E-08	2.38E-07	0.0
Pa-231	19	60	0.5	5.00E-06	2.85E-03	300	8.55E-01	3.16E-02	7.10E-07	2.25E-08	0.0
Ac-227	19	60	. 0.5	2.00E-06	1.14E-03	300	3.42E-01	1.27E-02	1.10E-06	1.39E-08	0.0
Total		1								7.34E-05	7.3

Table 8: Dose calculation for sediment in New Pond water: contribution to meat and milk dose

While there is considerable uncertainty in the assessment due to the lack of measured water concentrations, the calculated doses are likely to be overestimates. Even if the concentrations are in error by a factor of two, the estimated doses are low compared to background.

While the calculated doses indicate that there is no valid reason to restrict animals immediately from drinking water in the New Pond, it would be advisable to obtain real measured concentrations. Animals should be allowed to drink the water pending analysis of water quality. This assessment in no way considers the potential impact of nonradioactive constituents on the quality of meat and milk from animals drinking from the New Pond.

#### C.3.3 Combined Doses from All Sources

While it is possible for a resident on an elevated measurement area in Survey Unit 3 to also eat meat and drink milk from animals grazing on Survey Units 4 and 5, it is not likely. Therefore, the doses for the three survey units were not combined. To do so would result in unnecessarily restrictive limits on the types of activities that may be allowed on the site.

For the same reason, the dose from drinking shallow groundwater was not included in the dose assessment. The groundwater is not used at the present time for either domestic use or irrigation since there is an irrigation ditch through the property. Wells for domestic

water use would be installed in a deeper aquifer since the shallow groundwater is likely to be impacted by animal wastes and other contaminants that would make it non-potable.

## C.3.4. Indoor Radon Dose

While the decommissioning standard excludes indoor radon, as noted in Section 3.2, the dose calculations were performed for various individual scenarios. However, these dose calculations should not be used to determine whether a particular survey unit can be released.

Indoor radon doses were calculated using the RESRAD Code. In order to simplify analysis, the only nuclide used in the RESRAD Code was Ra-226, the parent of Rn-222. In addition, radon was the only pathway used in the analysis. The estimated doses form inhalation of radon decay products indoors are given in Table 9.

				Estimated Annual Indoor Rn Dos (mrem/y)				
Location	Depth of Contamination (meters)	Area of Contamination (sq. meters)	Ra-226 Conc. (pCi/g)	Slab (foundation depth =0	Garden Level (foundation depth = 1 m)	Basement (foundation depth = 1.75 m)		
Background	2	10,000	2.1	111	147	120		
SU1	0.15	11,927	2.6	65	0.54	0.54		
SU2	0.15	4,732	3.9	97	0.51	0.51		
SU3	0.15	7.574	3.2	80	0.53	0.53		
SU4	2	6,582	19.8	1038	1377	1125		
SU5	1	8,375	9.6	479	8.55	8.55		

Table 9: Gateway Indoor Radon Dose

The RESRAD estimated doses are somewhat puzzling in that the dose from a full basement is less than the dose from a slab on grade foundation. The RESRAD Manual states that "The indoor (radon) concentration is calculated by a model in which radon enters the room through the floor and through ventilation inflow from the outdoor air." (Yu 2001, p 150) In a later section of that document, Yu indicates that the below-grade walls are also considered (Yu 2001, p. 157). However, the equation provided in the manual only includes radon flux from the floor built on the contaminated area. Therefore, in cases where the foundation extends below the maximum depth of the contaminated zone, the calculated radon dose becomes dependent only on inflow from ambient outdoor air. However, where foundations extend partially into the contaminated zone (i.e., garden level foundations for SU4 and background), the estimated garden level dose is greater than the slab dose, indicating that the code does, in fact, include some horizontal transport of radon from soil to sub-surface interior spaces.

By comparison, the average estimated indoor radon dose to members of the public in the United States, based on radon concentration measurements, is approximately 200 mrem per year. The reason this dose is greater than the RESRAD estimated dose for

background is that the input used for the code limited the area with Ra-226 in soil to finite dimensions.

As noted above, the indoor radon pathway was excluded from the dose estimates performed for the purpose of determining whether the survey units can be released for unrestricted use based on the NRC's decommissioning rule that specifically excludes indoor radon dose from the 25 mrem per year dose criterion.

#### C.3.5 Dose from Crops Grown on Site

The plant, meat, and milk ingestion pathways were included in the dose analysis for SU4 and SU5 and are discussed in Section 3.3.2. The RESRAD Code was also run assuming all default parameter values. The code was run for background as well as the gross average radionuclide concentration in each of the survey units. Doses were estimated for background concentrations at three different depths corresponding to the estimated depth of the residual contamination levels above background. The background doses were subtracted from the calculated doses for each of the survey units. The results are summarized in Tables 10a, b, and c.

Pathway	Dose (mrem/y) including background				
Location	Background	Background	Background		
Area (square meters)	10,000	10,000	10,000		
Depth of contamination (meters)	2	1	0.15		
Average Ra-226 Conc. (pCi/g)	2.1	2.1	2.1		
Ground (mrem/y)	8.30E+00	8.29E+00	7.33E+00		
Inhalation (mrem/y)	1.17E-01	1.16E-01	1.15E-01		
Plant - default consumption (mrem/y)	2.45E+01	2.46E+01	3.66E+00		
Meat (mrem/y)	9.40E-01	9.40E-01	4.24E-01		
Milk (mrem/y)	5.92E-01	5.91E-01	2.52E-01		
Soil (mrem/y)	5.83E-01	5.82E-01	5.77E-01		
Total - default consumption (mrem/y)	3.52E+01	3.51E+01	1.24E+01		

Table 10a: Gateway RESRAD Background Dose Assessment – All Pathways (Excluding Indoor Rn)

Table 10b: Gateway RESRAD Dose Assessment – All Pathways (Excluding Indoor Rn)

Pathway	Dose (mrem/y) from Survey Units					
Location	SU1	SU2	SU3	SU4	SU5	
Area (square meters)	11,927	4,732	7,574	6,582	8,375	
Depth of contamination (meters)	0.15	0.15	0.15	2	1	
Average Ra-226 Conc. (pCi/g)	2.6	3.9	3.2	19.8	9.6	
Ground (mrem/y)	9.10E+00	1.35E+01	1.12E+01	8.83E+01	4.20E+01	
Inhalation (mrem/y)	1.46E-01	2.00E-01	1.69E-01	1.19E+00	5.84E-01	
Plant - default consumption (mrem/y)	5.04E+00	7.56E+00	6.19E+00	2.32E+02	1.12E+02	
Meat (mrem/y)	6.29E-01	3.74E-01	4.86E-01	5.84E+00	3.59E+00	
Milk (mrem/y)	3.73E-01	2.21E-01	2.91E-01	3.67E+00	2.27E+00	
Soil (mrem/y)	7.17E-01	1.08E+00	8.77E-01	5.89E+00	2.85E+00	

**CDPHE - Davis Mill Remediation Completion Report** September 2006 Page 43 of 50

Total - default consumption (mrem/y)	1.60E+01	2.30E+01	1.92E+01	3.37E+02	1.65E+02

Pathway	Dose (mrem/y) background subtracted) <sup>1</sup>					
Location	SU1	SU2	SU3	SU4	SU5	
Area (square meters)	11,927	4,732	7,574	6,582	8,375	
Depth of Contamination (meters)	0.15	0.15	0.15	2	1	
Average Ra-226 Conc. (pCi/g)	2.6	3.9	3.2	19.8	9.6	
Ground (mrem/y)	1.77E+00	6.17E+00	3.82E+00	8.00E+01	3.37E+01	
Inhalation (mrem/y)	3.10E-02	8.50E-02	5.36E-02	1.07E+00	4.68E-01	
Plant - default consumption (mrem/y)	1.38E+00	3.90E+00	2.53E+00	2.07E+02	8.77E+01	
Meat (mrem/y)	2.05E-01	-5.00E-02	6.16E-02	4.90E+00	2.65E+00	
Milk (mrem/y)	1.21E-01	-3.10E-02	3.92E-02	3.08E+00	1.68E+00	
Soil (mrem/y)	1.40E-01	5.03E-01	3.00E-01	5.31E+00	2.27E+00	
Total - default consumption (mrem/y)	3.60E+00	1.06E+01	6.76E+00	3.02E+02	1.30E+02	

 Table 10c:
 Gateway RESRAD Dose Assessment – Background Dose Subtracted

<sup>1</sup>The negative net doses for SU2 for meat and milk ingestion are an artifact of the way RESRAD calculates consumption fraction.

#### C.3.5.1 Radionuclides in Soil

RESRAD calculates the dose from ingestion of crops grown in soils with residual radionuclide contamination. RESRAD automatically calculates the fraction of fruits and vegetables grown on soils with residual contamination based on the area, i.e., the area factor. Using the average residual radionuclide concentrations for each survey unit and the RESRAD calculated consumption fraction the estimated net annual doses (i.e., background dose subtracted) due to ingestion of fruits and vegetables grown on the survey unit were 1.4 mrem per year, 3.9 mrem per year, 2.53 mrem per year, 207 mrem per year, and 88 mrem per year for SU1, SU2, SU3, SU4, and SU5 respectively. (See Table 10c) This analysis indicates that SU1, SU2, and SU3 are suitable for growing crops for human consumption.

#### C.3.5.2 Radionuclides in Groundwater

The analysis in Section 3.3.5.1 addresses the existing residual radioactivity in the soils. However, analysis of groundwater shows elevated concentrations of uranium. If groundwater is used to irrigate crops, the residual radionuclide concentrations in the soil will increase slightly. Analysis of groundwater in the two wells in SU4 showed Ra-226 concentrations below detection and uranium at 0.163 mg/L and 0.074 mg/L for Wells 1 and 2 respectively. The uranium activity concentrations for the two wells were 110 pCi/L and 50.3 pCi/L respectively. The average uranium activity concentrations using the specific activity of natural uranium (677 pCi/mg) correlated well with the measured gross alpha and gross beta concentrations.

The following calculations assume the usage parameter values in NCRP Report 123I, Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and *Ground* (NCRP 1996). Assuming an irrigation rate of 5 liters per square meter per day for 150 days per year, and the average uranium concentration in groundwater, the total amount of radioactivity added to the surface soil per year would be as follows:

Annual input =  $5 \text{ L/m}^2$ -d x 150 d/y x 70.3 pCi/L = 5.27E4 pCi/y

Assuming a plow depth of 15 cm and a soil density of 1.7 g/cm<sup>3</sup>, the added activity per gram of soil at the surface would be as follows:

Soil concentration =  $5.27E4 \text{ pCi/y} \times 1E-4 \text{ m}^2/\text{cm}^2/(15 \text{ cm} \times 1.7 \text{ g/cm}^3) = 0.21 \text{ pCi/g}$ 

Assuming equilibrium between U-238 and U-234 in groundwater the estimated potential increase in U-238 concentration would be 0.10 pCi/g. This is less than 5 percent of the existing background soil concentration and approximately 0.5 percent of the average soil concentration in SU4. Therefore, the dose from plants grown on SU4 could increase by approximately 0.5%.

Because most of the source term has been removed, groundwater concentrations are expected to decrease significantly over the next few years. Therefore, it is not reasonable to project the impact of irrigating crops with groundwater at the measured concentrations into the future.

#### C.3.6 Dose from Animals Grazing on Site

The estimated doses from meat and milk from animals grazing on SU4 and SU5 were calculated by RESRAD using default consumption fractions (Table 10c).

## C.3.6.1 Radionuclides in Soil

The estimated annual doses for SU1, SU2, and SU3 were less than 1 mrem per year. The estimated net doses for SU4 and SU5 from meat ingestion were 4.9 and 2.7 mrem per year respectively. The estimated doses for SU4 an SU5 from milk ingestion were 3.1 and 1.7 mrem per year respectively (See Table 10c). As noted in Section 3.3.2, domestic animal grazing even on the areas of the site with the highest levels of residual radionclide concentrations would not result in doses greater than 25 mrem per year to members of the public consuming meat and milk. The consumption fractions used in the analysis are appropriate for residents consuming home-grown beef and milk. The potential doses to members of the public if the meat and milk were sold for consumption by non-residents would be much lower since the fraction of meat and milk consumed from the site would be much lower.

## C.3.6.2 Radionuclides in Groundwater

Beef cattle and milk cows could also consume slightly contaminated groundwater. RESRAD does not take into account water consumption unless the groundwater is contaminated by future leaching from the soil. RESRAD does not allow input of existing groundwater concentrations. Therefore, the doses from this pathway were calculated manually using standard usage parameters from NCRP Report 1231 (NCRP, 1996).

Three sources of drinking water for the animals were considered separately: Well 1, Well 2, and the pre-existing pond southeast of the mill building. The uranium concentrations in the three sources are given in Table 11. The potential doses to members of the public consuming meat and milk from animals drinking water from these sources were calculated as follows:

Concentration in meat = Water intake (L/d) x transfer factor (d/kg) x Conc. (pCi/L)

Concentration in milk = Water intake (L/d) x transfer factor (d/L) x Conc. (pCi/L)

The annual intakes by members of the public were estimated assuming an individual drinks 300 liters of milk per year and consumes 100 kg of meat. The concentrations in beef were assumed to be representative of concentrations in other animals that might be used for meat.

Intake (meat) = Conc. in beef x 100 kg/y

Intake (milk) = Conc. in milk x 200 L/y

The annual doses were calculated by multiplying the annual intake by the International Commission on Radiological Protection (ICRP) dose coefficient for natural uranium (ICRP, 2001). This analysis assumes that the residents get all of their meat and milk from animals' drinking impacted ground water or pond water from the site. The usage and transfer factors are given in Table 11 along with the results of the calculations.

 Table 11: Dose from Groundwater Consumption by Domestic Animals

Source	Well 1	Well 2	Pre-existing Pond
U-nat Concentration in Water (pCi/L)	110	50.3	15.1
Daily water consumption by beef cattle (L/d)	50	50	50
Daily water consumption by milk cows (L/d)	60	60	60



**CDPHE - Davis Mill Remediation Completion Report** September 2006

Transfer Coefficient water to meat (d/kg)	0.0008	0.0008	0.0008
Transfer Coefficient water to milk (d/L)	0.0004	0.0004	0.0004
Concentration in meat (pCi/kg)	4.4	2.0	0.60
Concentration in milk (pCi/L)	2.6	1.2	0.36
Annual intake in meat (pCi/y)	440	200	60
Annual intake in milk (pCi/y)	780	360	108
ICRP Dose Coefficient for natural uranium (mrem/pCi)	1.7E-4	1.7E-4	1.7E-4
Estimated annual dose from meat intake (mrem/y)	<0.1	<0.1	<0.01
Estimated annual dose from milk intake (mrem/y)	0.1,4	<0.1	<0.1
Estimated annual dose from routine direct ingestion of groundwater (mrem/y)	13.7	6.2	non-potable
Estimated annual dose from incidental ingestion of groundwater (mrem/y)	0.9	0.4	non-potable

## C.3.7 Direct Ingestion of Groundwater

The shallow groundwater at the site is not likely to be potable. However, the doses to individuals consuming groundwater were calculated assuming a drinking water intake of 2 liters per day for 365 days per year. This is an unlikely scenario for the shallow groundwater.

 $Dose = 2 L/d \times 365 d/y \times Concentration \times Dose coefficient$ 

The estimated doses are given in Table 11.

A more reasonable exposure scenario would be incidental ingestion of groundwater. An intake rate of 0.25 L/d for 200 days per year for a total of 50 L/y was assumed. That is equivalent to one glass of water every day during the late spring, summer, and early fall.

# C.3.8 Playground Scenario

Soil ingestion was included in all of the RESRAD analyses since it is a viable exposure pathway for all scenarios. In SU4 and SU5 soil ingestion at a rate of 36.5 grams per year (100 mg/day), the default full-time occupancy value, resulted in estimated doses of 5.89 mrem per year and 2.85 mrem per year. The estimated daily intake of soil for a child is 200 mg/day. Assuming a child plays on a playground for several hours per day for six months of the year, and that he or she ingests half his or her daily soil intake while on the playground, the dose would be approximately half the estimated RESRAD dose. It should be noted, however, that the dose to the child can be adjusted for intake but that RESRAD does not specifically calculate doses to children.

It is unlikely that a playground could be constructed on the most contaminated portions of SU4 and SU5. If indeed, the area was put to such a use, it would be covered with a protective surface, preventing direct contact with soils. However, it would not be prudent to put a child's playground in the area with greatest residual contamination in SU4 or SU5 without some sort of ground cover.

# **D.** CONCLUSIONS

From both radiological and economic perspectives, the 2006 cleanup of the George E. Davis Mill Site could be considered successful. Although full remediation of the site was not achieved, a large amount of the most highly contaminated source term material was removed from the site. Given all possible alternatives, the relative cost of material removal, transport, and disposal was extremely low. Contaminated soils in areas nearest to where residents are currently living on the site were largely eliminated. Two of the five survey units (Survey Units 1 and 2) passed all MARSSIM-based analyses for compliance with the 25 mrem/yr dose criterion. About 4 acres, or over 40% of the total area targeted for potential remediation, now appears to meet this standard as a result of the cleanup.

Although Survey Unit 3 did not quite meet the 25 mrem/yr standard based on MARSSIM elevated measurement analyses, the overall concentrations met the cleanup criterion. The post-remediation dose assessment for this area demonstrates that for any reasonable land use scenario, Survey Unit 3 meets the 25 mrem/year decommissioning standard.

Survey Units 4 and 5 did not meet the criterion for cleanup and should not be released for unrestricted use. However, limited use such as livestock grazing and recreation activities would not result in annual doses to members of the public in excess of 25 mrem per year. The area should not be used for cultivation of crops for human consumption since the projected doses exceed 25 mrem per year.

Other specific land and water uses were considered for Survey Units 4 and 5 including use of groundwater for irrigation, stock water, and direct ingestion. Irrigation and stock watering with groundwater would be acceptable under the limited use scenarios. Routine direct ingestion of groundwater should not be allowed on the basis of keeping doses As Low As Reasonable Achievable (ALARA) even thought the annual dose from that single pathway would not exceed 25 mrem per year. Incidental ingestion of groundwater would result in a dose less than 1 mrem per year so is not a significant risk from radionuclides. However, the chemical and biological contaminants in the ground and surface water most likely render it non-potable.

## E. **REFERENCES**

Carter & Burgess. 2005. Site Characterization Summary Report, George E. Davis Mill Site, 43210 Highway 141, Gateway, Mesa County, Colorado.

Environmental Protection Agency. 1996. Reassessment of Radium and Thorium Soil Concentrations and Annual dose Rates. Office of Radiation and Indoor Air. July 22.

FESI (Frontier Environmental Services, Inc.). 2006. Work Plan for the George E. Davis Mill Remediation Project, HMWMD-RAD-01, Gateway, Mesa County, Colorado. Prepared for the State of Colorado Department of Public Health and Environment. April, 2006.

Glysson, G. D., J. R. Gray, and L. M. Conge. Undated. Adjustment of Total Suspended solids Data for Use in Sediment Studies. US Geological Survey, National Center, Reston, VA. (from the web, no further information available).

Huffert, A. M., K. M. Miller. 1995. Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria. NUREG\_1506. Draft Report for Comment. August 1995.

ICRP (International Commission on Radiological Protection). 2001. ICRP Database of Dose Coefficients for Workers and Members of the General Public. V 2.01. 1998-2000.

Johnson, J.A. Meyer, H.R., and Vidyasagar, M. 2006. "Characterization of Surface Soils at a Former Uranium Mill." Operational Radiation Safety. Supplement to Health Physics, Vol. 90, February, 2006.

Martin, J.E., Lee, C. 2003. Principles of Radiological Health and Safety. John Wiley & Sons.

NCRP (National Council on Radiation Protection and Measurements). 1996. Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground. NCRP Report No. 123I. NCRP. Bethesda, MD.

NRC (U.S. Nuclear Regulatory Commission). 2000. Multi-Agency Radiological Site Survey and Investigation Manual. NUREG-1575, Rev. 1. August 2000 (with 2001 modifications).

NRC (U.S. Nuclear Regulatory Commission). 1997. Radiological Criteria for License Termination; Final rule. Federal Register July 21, 1997 p 39083.

NRC (U.S. Nuclear Regulatory Commission). 2004. Code of Federal Regulations. 10CFR20.1402.

ORAU/ORISE (Oak Ridge Associated Universities / Oak Ridge Institute for Sciences and Education). 2000, 2001. COMPASS code, Version 1.0., developed under the sponsorship of the U.S.. Nuclear Regulatory Commission for implementation of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) in support of the decommissioning license termination rule (10 CFR Part 20, Subpart E).

Whicker, R., Whicker, M, Johnson, J. Meyer, B. 2006. Mobile soils lab: on-site radiological analysis supporting remedial activities. Operational Radiation Safety. Supplement to Health Physics, Vol. 91(2), August, 2006.

Yu, C., A. J. Zielen, J. J. Cheng, D. J. LePoire, E. Gnanapragasam, S. Kamboj, J. Amish, A. Wallo III, W. A. Williams, H. Peterson. 2001. User's Manual for RESRAD Version 6. ANL/EAD-4. Environmental Assessment Division, Argonne National Laboratory. Argonne, IL.

# FIGURE 1

# GEORGE E. DAVIS MILL SITE LOCATION MAP





GATEWAY\_HAUL.DWG

# FIGURE 2

# **PROJECT ORGANIZATIONAL CHART**

Frontier Environmental Services, Inc. Project Organization Chart CDPHE Gateway, Colorado Davis Mill Project



Figure 2

# ATTACHMENT A

# SITE OWNER ACCESS AGREEMENT

# CONSENT FOR RIGHT OF ENTRY FOR REMEDIATION ACTIVITIES

At The Davis Mill Site Gateway, Colorado

Mrs. Katherine B. Willis hereby represents to The State of Colorado, Department of Public Health and Environment (CDPHE), that the undersigned is the land owner of the following real property located in the County of Mesa and the State of Colorado: the Davis Mill physically located at 43201 Colorado Highway 141; Gateway, Colorado.

As such, the undersigned hereby grants to the agents and employees of the State of Colorado, Department of Public Health and Environment and its Contractor -Frontier Environmental Services, Inc. and their sub-contractor(s), permission to enter upon such property and land to remediate and mitigate past mine milling practices and to do all things necessary or expedient for the protection of human health and environment by the systematic removal of radiological materials from the Davis Mill Site.

Consent is given to enter upon the above described property for the length of time necessary to remediate the Davis Mill Site and to adequately re-grade the site postremediation pursuant to the Contract entered into between the State of Colorado; Department of Public Health and Environment and Frontier Environmental Services, Inc. (Contractor). Reference: CDPHE Project Number HMWMD-RAD-01 and Contract Number FEA-06-00043.

The land owner has a responsibility to ensure that any existing physical assets not specifically addressed by the Contract are identified by the undersigned or their agent as not to be addressed or acted upon by the Contractor - Frontier Environmental Services, Inc.

M<del>rs. K</del>atherine **B**. Willis Witnessed By:

Date

# ATTACHMENT B

# **SUMMARY**

# OF

# GEORGE E. DAVIS MILL SITE PROJECT SPECIFIC BILL-OF-LADING ISSUED

## SUMMARY OF GEORGE E. DAVIS SITE PROJECT SPECIFIC BILL-OF-LADING ISSUED

Date:	Number of Vehicles:	Total Loads Shipped:	Accumulated Loads:	Daily Tare Tons:	Accumulated Tons:	*Daily Cubic Yards:	*Accumulated yd <sup>3</sup> :
Tuesday, May 02, 2006	7	23	23.0	527.0	527.0	376.4	376.4
Wednesday, May 03, 2006	7	28	51.0	643.6	1170.6	459.7	836.1
Thursday, May 04, 2006	8	34	85.0	796.8	1967.4	569.1	1405.3
Friday, May 05, 2006	7	28	113.0	654.4	2621.8	467.4	1872.7
Monday, May 08, 2006	7	32	145.0	754.0	3375.8	538.6	2411.3
Tuesday, May 09, 2006	8	32	177.0	753.6	4129.4	538.3	2949.6
Wednesday, May 10, 2006	8	32	209.0	756.2	4885.6	540.1	3489.7
Thursday, May 11, 2006	8	. 32	241.0	759.4	5645.0	542.4	4032.1
Friday, May 12, 2006	8	31	272.0	738.5	6383.5	527.5	4559.6
Monday, May 15, 2006	8	32	304.0	760.0	7143.5	542.9	5102.5
Tuesday, May 16, 2006	6	23	327.0	541.0	7684.5	386.4	5488.9
Wednesday, May 17, 2006	7	31	358.0	749.2	8433.7	535.1	6024.1
Thursday, May 18, 2006	8	34	392.0	798.4	9232.1	570.3	6594.4
Friday, May 19, 2006	8	32	424.0	739.8	9971.9	528.4	7122.8
Monday, May 22, 2006	8	20	444.0	466.7	10438.6	333.4	7456.1
Tuesday, May 23, 2006	8	33	477.0	769.5	11208.1	549.6	8005.8
Wednesday, May 24, 2006	8	40	517.0	928.9	12137.0	663.5	8669.3
Thursday, May 25, 2006	No Loads Shipped Due	e To UMETCO Facility	Shut-Down; De-contam	ation Pad Repair Activi	ties		
Friday, May 26, 2006	No Loads Shipped Due	e To UMETCO Facility	Shut-Down; De-contam	ation Pad Repair Activi	ties		
Tuesday, May 30, 2006	6	15	532.0	347.5	12484.5	248.2	8917.5
Wednesday, May 31, 2006	6	32	564.0	745.3	13229.8	532.4	9449.9
Thursday, June 01, 2006	8	40	604.0	931.3	14161.1	665.2	10115.1
Friday, June 02, 2006	7	35	639.0	816.7	14977.8	583.4	10698.4
Monday, June 05, 2006	7	38	677.0	882.9	15860.7	630.6	11329.1
Tuesday, June 06, 2006	7	36	713.0	839.4	16700:1	599.6	11928.6
Wednesday, June 07, 2006	8	38	751.0	839.5	17539.6	599.6	12528.3
Thursday, June 08, 2006	8	26	777.0	609.0	18148.6	435.0	12963.3
Friday, June 09, 2006	4	15	792.0	326.2	18474.8	233.0	13196.3
Monday, June 12, 2006	8	34	826.0	795.1	19269.9	567.9	13764.2
Tuesday, June 13, 2006	5	22	848.0	519.7	19789.6	371.2	14135.4
Wednesday, June 14, 2006	6	13	861.0	304.7	20094.3	217.6	14353.1
Thursday, June 15, 2006	6	28	889.0	653.4	20747.7	466.7	14819.8
Friday, June 16, 2006	6	22	911.0	513.4	21261.1	366.7	15186.5
Monday, June 19, 2006	3	7	918.0	164.3	21425.4	117.4	15303.9
Tuesday, June 20, 2006	3	14	932.0	324.3	21749.7	231.6	15535.5
Wednesday, June 21, 2006	. 4	. 4	936.0	94.2	21843.9	67.3	15602.8
Daily Average:	6.8	27.5	N/A	642.5	N/A	458.9	N/A
Total:	N/A	936	N/A	21843.9	N/A	15602.8	N/A

ATTACHMENT B:
#### SUMMARY OF GEORGE E. DAVIS SITE PROJECT SPECIFIC BILL-OF-LADING ISSUED

Date:	Number of Vehicles:	Total Loads Shipped:	Accumulated Loads:	Daily Tare Tons:	Accumulated Tons:	*Daily Cubic Yards:	*Accumulated yd <sup>3</sup> :
Tuesday, May 02, 2006	7	- 23	23.0	527.0	527.0	415.0	415.0
Wednesday, May 03, 2006	7	28	51.0	643.6	1170.6	506.8	921.7
Thursday, May 04, 2006	8	34	85.0	796.8	1967.4	627.4	1549.1
Friday, May 05, 2006	7	. 28	113.0	654.4	2621.8	515.3	2064.4
Monday, May 08, 2006	7	32	145.0	754.0	3375.8	593.7	2658.1
Tuesday, May 09, 2006	8	32	177.0	753.6	4129.4	593.4	3251.5
Wednesday, May 10, 2006	8	. 32	<sup>·</sup> 209.0	756.2	4885.6	595.4	3846.9
Thursday, May 11, 2006	8	32	241.0	759.4	5645.0	598.0	4444.9
Friday, May 12, 2006	· 8	31	. 272.0	738.5	6383.5	581.5	5026.4
Monday, May 15, 2006	8	32	304.0	760.0	7143.5	598.4	5624.8
Tuesday, May 16, 2006	6	23	327.0	541.0	7684.5	426.0	6050.8
Wednesday, May 17, 2006	7	31	358.0	749.2	8433.7	589.9	6640.7
Thursday, May 18, 2006	8	34	392.0	798.4	9232.1	628.7	7269.4
Friday, May 19, 2006	8	32	424.0	739.8	× 9971.9	582.5	7851.9
Monday, May 22, 2006		20	444.0	466.7	10438.6	367.5	8219.4
Tuesday, May 23, 2006	8	33	477.0	769.5	11208.1	605.9	, 8825.3
Wednesday, May 24, 2006	8	40	517.0	928.9	12137.0	731.4	9556.7
Thursday, May 25, 2006	No Loads Shipped Due	To UMETCO Facility	Shut-Down; De-contam	ation Pad Repair Activit	ies		
Friday, May 26, 2006	No Loads Shipped Due	To UMETCO Facility	Shut-Down; De-contam	ation Pad Repair Activit	ies		
Tuesday, May 30, 2006	. 6	15	532.0	347.5	12484.5	273.6	9830.3
Wednesday, May 31, 2006	6	32	564.0	745.3	13229.8	. 586.9	10417.2
Thursday, June 01, 2006	8	40	604.0	931.3	14161.1	733.3	11150.5
Friday, June 02, 2006	7	35	639.0	816.7	14977.8	643.1	11793.5
Monday, June 05, 2006	7	38	677.0	882.9	15860.7	695.2	12488.7
Tuesday, June 06, 2006	7	36	713.0	839.4	16700.1	660.9	13149.7
Wednesday, June 07, 2006	. 8	38	751.0	839.5	17539.6	661.0	13810.7
Thursday, June 08, 2006	8	26	777.0	609.0	18148.6	479.5	14290.2
Friday, June 09, 2006	4	15	792.0	326.2	18474.8	256.9	14547.1
Monday, June 12, 2006	. 8	34	826.0	795.1	19269,9	626.1	15173.1
Tuesday, June 13, 2006	5	22	848.0	519.7	19789.6	409.2	15582.4
Wednesday, June 14, 2006	6	13	861.0	304.7	20094.3	239.9	15822.3
Thursday, June 15, 2006	6	28	889.0	653.4	20747.7	514.5	16336.8
Friday, June 16, 2006	6	22	911.0	513.4	21261.1	404.3	16741.0
Monday, June 19, 2006	3	7	918.0	164.3	21425.4	129.4	16870.4
Tuesday, June 20, 2006	3	14	932.0	324.3	21749.7	255.4	17125.7
Wednesday, June 21, 2006	4	4	936.0	94.2	21843.9	74.2	17199.9
Daily Average:	6.8	27.5	N/A	642.5	N/A	458.9	N/A
Total:	N/A	936	N/A	21843.9	N/A	17199.9	N/A

ATTACHMENT B:

# ATTACHMENT C

# PRE-REMEDIATION DAVIS MILL SITE TOPOGRAPHICAL SURVEY DRAWING

# THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: PROJECT NO.: 06-0021S, SHEET 1 OF 1 "TOPOGRAPHICAL MAP GATEWAY PROJECT MESA COUNTY, CO."

> WITHIN THIS PACKAGE... OR, BY SEARCHING USING THE DOCUMENT/REPORT PROJECT NO.: 06-0021S

# **D-01**

# ATTACHMENT D

# POST-REMEDIATION DAVIS MILL SITE TOPOGRAPHICAL SURVEY DRAWING WITH CUT/FILL VOLUME CALCULATION

# THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: PROJECT NO.: 06-0021S, SHEET 1 OF 1 "SITE VOLUMES GATEWAY PROJECT MESA COUNTY, CO."

# WITHIN THIS PACKAGE... OR, BY SEARCHING USING THE DOCUMENT/REPORT PROJECT NO.: 06-0021S

# **D-02**

# ATTACHMENT E

# FINAL STATUS SURVEY SOIL AND WATER SAMPLING RESULTS

#### DAVIS MILL SITE REMEDIATION PROJECT, GATEWAY, CO

#### ANALYTICAL SOIL SAMPLE RESULTS FOR Ra-226

Analyzed by

MFG INC. in the On-site Soils Laboratory

Sample	Sample	Latitude	Longitude	Date	Canned Sample	Ra-226
Description			(west, ad)	Conected	weight (g)	(peng)
INAL STATUS BACKGROUND S	AMPLES					
South Meadow*	GWB-1	38.678960	108.97763	5/4/2006	130.1	2.1
South Meadow*	GWB-2	38.679220	108.97714	5/4/2006	114.8	2.2
South Meadow*	GWB-3	38.678700	108.97788	5/4/2006	124.5	2.2
South Meadow*	GWB-4	38.678480	108.97812	5/4/2006	132.1	1.9
South Meadow	GWB-5	38.678250	108.97768	5/4/2006	137.4	1.9
South Meadow	GWB-6	38.678600	108.97739	5/4/2006	131.4	1.9
South Meadow	GWB-7	38.678410	108.97683	5/4/2006	147.5	1.8
South Meadow	GWB-8	38.678860	108.97682	5/4/2006	139.3	2.1
South Meadow	GWB-9	38.679820	108.97597	5/4/2006	165.8	1.8
South Meadow	GWB-10	38.679470	108.97626	5/4/2006	157.6	1.9
South Meadow	GWB-11	38.679200	108.97600	5/4/2006	170.4	1.9
South Meadow	GWB-12	38.679180	108.97542	5/4/2006	116.0	2.1
South Meadow	GWB-13	38.678780	108.97533	5/4/2006	121.5	2.0
South Meadow	GWB-14	38.678540	108.97537	5/4/2006	126.2	2.0
South Meadow	GWB-15	38.678130	108.97602	5/4/2006	137.7	2.0
South Meadow	GWB-16	38.677750	108.97602	5/4/2006	148.0	1.8
South Meadow	GWB-17	38.678010	108.97672	5/4/2006	139.7	1.8
South Meadow	GWB-18	38.678750	108.97607	5/4/2006	134.0	2.0
South Meadow	GWB-19	38.679550	108.97663	5/4/2006	149.6	2.2
South Meadow	GWB-20	38.680230	108.97646	5/4/2006	104.9	2.6
South Meadow	GWB-21	38.680510	108.97647	5/4/2006	107.5	2.2
South Meadow	GWB-22	38,680660	108.97657	5/4/2006	127.2	2.2
South Meadow	GWB-23	38,680940	108,97691	5/4/2006	126.2	2.2
South Meadow	GWB-24	38.681140	108.97713	5/4/2006	112.8	2.4
South Meadow	GWB-25	38.679810	108.97627	5/10/2006	148.0	2.0
South Meadow	GWB-26	38.679180	108.97634	5/10/2006	146,4	2.1
South Meadow	GWB-27	38.678680	108.97614	5/10/2006	108.2	2.3
South Meadow	GWB-28	38.678700	108.97696	5/10/2006	147.3	2.1
NAL STATUS SAMPLES FOR S						
		29 691050	109 07721	6/14/2006	162 7	2.2

SU1-1	SU1-1	38.681050	108.97731	6/14/2006	163.7	2.3
SU1-2	SU1-2	38.680870	108.97715	6/14/2006	184.7	2.1
SU1-3	SU1-3	38.680690	108.97704	6/14/2006	199.2	2.9
SU1-4	SU1-4	38.680500	108.97694	6/13/2006	178.7	2.0
SU1-5	SU1-5	38.680320	108.97681	6/13/2006	177.4	2.1
SU1-6	SU1-6	38.680100	108.97664	6/13/2006	182.0	2.5
SU1-6 (split)**	SU1-6 (split)			6/13/2006	176.5	2.4
SU1-7	SU1-7	38.680670	108.97729	6/14/2006	164.8	2.5
SU1-8	SU1-8	38.680460	108.97720	6/13/2006	170.5	2.2
SU1-9	SU1-9	38.680280	108.97708	6/13/2006	199.6	2.1
SU1-10	SU1-10	38.680020	108.97689	6/13/2006	187	1.7
SU1-11	SU1-11	38.680290	108.97742	6/13/2006	172.4	2.0
SU1-11 (2nd count)**	SU1-11 (2)			6/13/2006	172.4	1.9
SU1-12	SU1-12	38.680110	108.97729	6/13/2006	171.1	2.0
SU1-13 .	SU1-13	38.679940	108.97714	6/13/2006	215.4	3.5
SU1-14	SU1-14	38.680320	108.97756	6/13/2006	195	2.0
SU1-15	SU1-15	38.680150	108.97754	6/13/2006	146.4	2.2
SU1-16	SU1-16	38.679980	108.97745	6/13/2006	186.1	2.0
SU1-17	SU1-17	38.680240	108.97781	6/13/2006	184.6	9.1
SU1-18	` SU1-18	38.680030	108.97778	6/13/2006	181	2.1
SU1-19	SU1-19	38.679840	108.97765	6/13/2006	203.3	2.0
SU1-20	SU1-20	38.680130	108.97800	6/13/2006	152.5	2.9
SU1-21	SU1-21	38.679890	108.97795	6/13/2006	175.8	2.1
SU1-21 (2nd count)**	SU1-21 (2)			6/13/2006	175.8	2.2
SU1-22	SU1-22	38.679730	108.97786	6/13/2006	190.9	2.1

\*Not used in statistical analyses as background samples due to proximity to impacted areas \*\* Duplicate or split samples not used in statistical analyses. Composite samples not used in MARSSIM analyses

Oceanda	0	1 - 61 - 1	I and the late	Dete	Canned	
Description	ID	(North, dd)	(West, dd)	Collected	Weight (g)	(p
				•••••		
SU2-1	SU2-1	38.681200	108.97809	6/14/2006	114.2	
SU2-2	SU2-2	38.681330	108.97794	6/14/2006	153.4	
SU2-3	SU2-3	38.681400	108.97784	6/14/2006	145.6	
SU2-4	SU2-4	38.681430	108.97763	6/14/2006	126.8	. 1
SU2-4 (2nd count)**	SU2-4 (2)			6/14/2006	126.8	1
SU2-5	SU2-5	38.681520	108.97751	6/14/2006	172	
SU2-6	SU2-6	38.681410	108.97742	6/14/2006	144.8	
SU2-7	SU2-7	38.681300	108.97756	6/14/2006	148.5	
SU2-8	SU2-8	38.681250	108.97775	6/14/2006	181.4	
SU2-9	SU2-9	38.681130	108.97790	6/14/2006	139.9	
SU2-10	SU2-10	38.681010	108.97791	6/14/2006	163.3	:
SU2-11	SU2-11	38.681120	108.97772	6/14/2006	130.8	
SU2-12	SU2-12	38.681210	108.97755	6/14/2006	129.1	
SU2-13	SU2-13	38.681210	108.97750	6/14/2006	125.5	: :
SU2-14	SU2-14	38.681290	108.97731	6/14/2006	147.3	:
SU2-15	SU2-15	38.681180	108.97720	6/14/2006	105.9	
SU2-16	SU2-16	38.681120	108.97730	6/14/2006	120.2	1
SU2-17	SU2-17	38.681090	108.97752	6/14/2006	137.9	:
SU2-18	SU2-18	38.680980	108.97762	6/14/2006	167.7	
SU2-19	SU2-19	38.680850	108.97764	6/14/2006	119.8	
SU2-19 (Split)**	SU2-19 (split)			6/14/2006	119.8	
SU2-20	SU2-20	38.680890	108.97752	6/14/2006	125.2	
SU2-21	SU2-21	38.680810	108.97733	6/14/2006	174.7	
SU2-21 (2nd count)**	SU2-21 (2)			6/14/2006	174.7	
SU2-22	SU2-22	38.680720	108.97744	6/14/2006	150.5	

#### FIN/ LES I

SU3-1	SU3-1	38.680240	108.97830	6/18/2006	149.2	2.3
SU3-2	SU3-2	38.680330	108.97816	6/18/2006	163.5	2.3
SU3-3	SU3-3	38.680460	108.97797	6/18/2006	163.6	2.0
SU3-4	SU3-4	38.680570	108.97781	6/18/2006	173.8	12.6
SU3-5	SU3-5	38.680690	108.97766	6/18/2006	146	3.0
SU3-6	SU3-6	38.680740	108.97773	6/18/2006	123.1	3.4
SU3-7	SU3-7	38.680690	108.97793	6/18/2006	166.8	2.5
SU3-8	SU3-8	38.680600	108.97812	6/18/2006	142.0	2.6
SU3-8 (2nd count)**	SU3-8 (2)			6/18/2006	142.0	2.6
SU3-9	SU3-9	38.680480	108.97829	6/18/2006	174.2	1.9
SU3-10	SU3-10	38.680400	108.97844	6/18/2006	140.7	2.2
SU3-11	SU3-11	38.680520	108.97857	6/18/2006	172.2	1.9
SU3-12	SU3-12	38.680620	108.97840	6/18/2006	171.3	2.2
SU3-12 (Split)**	SU3-12 (Split)			6/18/2006	133	2.0
SU3-12 (Split)** SU3-13	SU3-12 (Split) SU3-13	38.680740	108.97827	6/18/2006 6/18/2006	133 170.5	2.0 2.4
SU3-12 (Split)** SU3-13 SU3-14	SU3-12 (Split) SU3-13 SU3-14	38.680740 38.680860	108.97827 108.97808	6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7	2.0 2.4 2.6
SU3-12 (Split)** SU3-13 SU3-14 SU3-15	SU3-12 (Split) SU3-13 SU3-14 SU3-15	38.680740 38.680860 38.680950	108.97827 108.97808 108.97792	6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6	2.0 2.4 2.6 9.9
SU3-12 (Split)** SU3-13 SU3-14 SU3-15 SU3-16	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16	38.680740 38.680860 38.680950 38.681050	108.97827 108.97808 108.97792 108.97804	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6 168.2	2.0 2.4 2.6 9.9 2.2
SU3-12 (Split)** SU3-13 SU3-14 SU3-15 SU3-16 SU3-17	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-17	38.680740 38.680860 38.680950 38.681050 38.680970	108.97827 108.97808 108.97792 108.97804 108.97820	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6 168.2 132.1	2.0 2.4 2.6 9.9 2.2 2.1
SU3-12 (Split)** SU3-13 SU3-14 SU3-15 SU3-16 SU3-17 SU3-18	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-16 SU3-17 SU3-18	38.680740 38.680860 38.680950 38.681050 38.680970 38.680970 38.680870	108.97827 108.97808 108.97792 108.97804 108.97804 108.97820 108.97839	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6 168.2 132.1 153.4	2.0 2.4 2.6 9.9 2.2 2.1 2.1
SU3-12 (Split)**           SU3-13           SU3-14           SU3-15           SU3-16           SU3-17           SU3-18           SU3-19	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-16 SU3-17 SU3-18 SU3-19	38.680740 38.680860 38.680950 38.681050 38.680970 38.680870 38.680870 38.680740	108.97827 108.97808 108.97792 108.97804 108.97820 108.97839 108.97851	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6 168.2 132.1 153.4 168.6	2.0 2.4 2.6 9.9 2.2 2.1 2.1 2.1
SU3-12 (Split)**           SU3-13           SU3-14           SU3-15           SU3-16           SU3-17           SU3-18           SU3-19           SU3-20	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-16 SU3-17 SU3-18 SU3-19 SU3-20	38.680740 38.680860 38.680950 38.681050 38.680970 38.680870 38.680870 38.680740 38.680630	108.97827 108.97808 108.97792 108.97804 108.97820 108.97839 108.97851 108.97867	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6 168.2 132.1 153.4 168.6 161.5	2.0 2.4 2.6 9.9 2.2 2.1 2.1 2.1 2.1 2.8
SU3-12 (Split)**           SU3-13           SU3-14           SU3-15           SU3-16           SU3-17           SU3-18           SU3-19           SU3-20           SU3-21	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-17 SU3-18 SU3-19 SU3-20 SU3-21	38.680740 38.680860 38.680950 38.681050 38.680970 38.680870 38.680740 38.680630 38.680630 38.680770	108.97827 108.97808 108.97792 108.97804 108.97820 108.97839 108.97851 108.97867 108.97879	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133 170.5 131.7 150.6 168.2 132.1 153.4 168.6 161.5 158.4	2.0 2.4 2.6 9.9 2.2 2.1 2.1 2.1 2.1 2.8 2.6
SU3-12 (Split)**           SU3-13           SU3-14           SU3-15           SU3-16           SU3-17           SU3-18           SU3-19           SU3-20           SU3-21           SU3-22	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-17 SU3-18 SU3-19 SU3-20 SU3-21 SU3-22	38.680740 38.680860 38.680950 38.681050 38.680970 38.680870 38.680740 38.680630 38.680630 38.680770 38.680870	108.97827 108.97808 108.97792 108.97804 108.97820 108.97839 108.97851 108.97867 108.97879 108.97862	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133         170.5         131.7         150.6         168.2         132.1         153.4         168.6         161.5         158.4         155	2.0 2.4 2.6 9.9 2.2 2.1 2.1 2.1 2.1 2.8 2.6 3.8
SU3-12 (Split)**           SU3-13           SU3-14           SU3-15           SU3-16           SU3-17           SU3-18           SU3-19           SU3-20           SU3-21           SU3-22           SU3-23	SU3-12 (Split) SU3-13 SU3-14 SU3-15 SU3-16 SU3-17 SU3-18 SU3-19 SU3-20 SU3-20 SU3-21 SU3-22 SU3-23	38.680740 38.680860 38.680950 38.681050 38.680970 38.680870 38.680740 38.680630 38.680770 38.680770 38.680870 38.680870 38.681000	108.97827 108.97808 108.97792 108.97804 108.97804 108.97839 108.97839 108.97851 108.97867 108.97879 108.97862 108.97850	6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	133         170.5         131.7         150.6         168.2         132.1         153.4         168.6         161.5         158.4         155         156.5	2.0 2.4 2.6 9.9 2.2 2.1 2.1 2.1 2.1 2.8 2.6 3.8 3.0

\*Not used in statistical analyses as background samples due to proximity to impacted areas \*\* Duplicate or split samples not used in statistical analyses. Composite samples not used in MARSSIM analyses

Sample	Sample	Latitude	Longitude	Date	Canned Sample	Ra-226
Description	ID	(North, dd)	(West, dd)	Collected	Weight (g)	(pCi/g)
			<u></u>			
FINAL STATUS SAMPLES FOR SUR	VEY UNIT 4					
SU4-1	SU4-1	38.679360	108.97948	6/21/2006	176	2.3
SU4-1 (2nd count)**	<u>SU4-1 (2)</u>			6/21/2006	176	2.1
SU4-2	SU4-2	38.679260	108.97937	6/21/2006	171.1	2.4
SU4-3	SU4-3	38.679130	108.97926	6/21/2006	158.5	2.5
SU4-4	SU4-4	38.679260	108.97909	6/21/2006	146.4	2.8
SU4-5	SU4-5	38.679370	108.97919	6/21/2006	135.5	3.2
SU4-6	SU4-6	38.679490	108.97931	6/21/2006	113.6	2.9
SU4-7	SU4-7	38.679580	108.97915	6/21/2006	124.5	14.3
SU4-8	SU4-8	38.679450	108.97906	6/21/2006	178.9	2.2
SU4-9	SU4-9	38.679350	108.97893	- <del>6</del> /21/2006	128.4	10.4
SU4-10	SU4-10	38.679440	108.97876	6/21/2006	165.8	18.8
SU4-11	SU4-11	38.679570	108.97887	6/21/2006	149.3	47.1
SU4-12	SU4-12	38.679720	108.97896	6/21/2006	185.8	4.0
SU4-13	SU4-13	38.679800	108.97882	6/21/2006	167.3	4.5
SU4-14	SU4-14	38.679670	108.97872	6/21/2006	172.2	11.5
SU4-15	SU4-15	38.679550	108.97861	6/21/2006	138	220.8
SU4-16	SU4-16	38.679600	108.97849	6/21/2006	143.1	4.3
SU4-17	SU4-17	38.679760	108.97857	6/21/2006	166.8	31.7
SU4-18	SU4-18	38.679890	108.97869	6/21/2006	124.7	3.6
SU4-19	SU4-19	38.679960	108.97849	6/22/2006	150.1	2.4
SU4-20	SU4-20	38.679840	108.97839	6/22/2006	165.9	1.7
SU4-21	SU4-21	38.679830	108.97809	6/22/2006	174.3	9.8
SU4-22	SU4-22	38.679950	108.97823	6/22/2006	154.7	1.7
SU4-23	SU4-23	38.680070	108.97837	6/22/2006	168.5	2.0
SU4-24 (hot spot composite)**	SU4-24	38.679520	108.97872	6/21/2006	. 161	69.6

#### FINAL STATUS SAMPLES FOR SURVEY UNIT 5

SU5-1	SU5-1	38.679170	108.97912	6/16/2006	121	2.2
SU5-2	SU5-2	38.679010	108.97897	6/16/2006	129.3	2.1
SU5-3	SU5-3	38.678910	108.97887	6/16/2006	140.1	2.1
SU5-4	SU5-4	38,679000	108.97865	6/16/2006	131.0	2.6
SU5-5	SU5-5	38.679120	108.97876	6/16/2006	123.9	11.0
SU5-6	SU5-6	38.679270	108.97890	6/16/2006	103.1	13.5
SU5-6 (2nd count)**	SU5-6 (2)			6/16/2006	103.1	10.7
SU5-7	SU5-7	38.679350	108.97868	6/16/2006	158.9	3.8
SU5-8	SU5-8	38.679230	108.97855	6/16/2006	183.6	3.4
SU5-9	SU5-9	38.679080	108.97841	6/16/2006	110.9	14.3
SU5-10	SU5-10	38.679140	108.97823	6/16/2006	152.5	2.1
SU5-11	SU5-11	38.679290	108.97832	6/16/2006	158.1	2.2
\$U5-12	SU5-12	38.679430	108.97845	6/16/2006	148.5	29.1
SU5-13	SU5-13	38.679500	108.97825	6/16/2006	184.9	1.8
SU5-14	SU5-14	38.679360	108.97816	6/16/2006	127	4.2
SU5-15	SU5-15	38.679180	108.97805	6/16/2006	162.3	1.9
SU5-16	SU5-16	38.679220	108.97787	6/16/2006	160.3	2.1
SU5-17	SU5-17	38.679410	108.97799	6/16/2006	161.4	51.9
SU5-18	SU5-18	38.679580	108.97803	6/16/2006	181.2	1.8
SU5-18 (2nd count)**	SU5-18 (2)			6/16/2006	181.2	1.9
SU5-19	SU5-19	38.679640	108.97777	6/16/2006	176.9	2.8
SU5-20	SU5-20	38.679490	108.97776	6/16/2006	178.9	3.8
SU5-21	SU5-21	38.679290	108.97768	6/16/2006	74.9	10.3
SU5-22	SU5-22	38.679470	108.97741	6/16/2006	180	3.1
SU5-23	SU5-23	38.678960	108.97814	6/16/2006	104.2	4.3
SU5-24	SU5-24	38.678910	108.97836	6/16/2006	141.3	2.0
SU5-25	SU5-25	38.678850	108.97854	6/16/2006	134.9	2.1
SU5-26 (hot spot composite 1)**	SU5-26	38.678930	108.97837	6/16/2006	146.9	3.4
SU5-26 (2nd count)**	SU5-26 (2)			6/16/2006	146.9	3.2
SU5-27 (hot spot composite 2)**	SU5-27	38.679320	108.97833	6/16/2006	134.7	3.5
SU5-28 (hot spot composite 3)**	SU5-28	38.679490	108.97861	6/16/2006	149.5	81.8

\*Not used in statistical analyses as background samples due to proximity to impacted areas \*\* Duplicate or split samples not used in statistical analyses. Composite samples not used in MARSSIM analyses







					Canned	
Sample	Sample	Latitude	Longitude	Date	Sample	Ra-226
Description	ID	(North, dd)	(West, dd)	Collected	Weight (g)	(pCi/g)
Survey Unit Hot Spot Characterizati	on Samples					
SU1-HS1-1	SU1-HS1-1	38.680240	108.97781	7/24/2007	175.0	2.3
SU1-HS1-2	SU1-HS1-2			7/24/2007	170.3	3.1
SU1-HS1-3	SU1-HS1-3			7/24/2007	183.5	3.2
SU1-HS1-4	SU1-HS1-4			7/24/2007	168.7	4.7
SU1-HS1-5	SU1-HS1-5			7/24/2007	180.1	10.1
SU2-HS1-1	SU2-HS1-1	38.681430	108.97763	717/2006	141.7	4.5
SU2-HS1-2	SU2-HS1-2	-		717/2006	129.7	4.3
SU2-HS1-3	SU2-HS1-3			717/2006	104.8	4.3
SU2-HS1-4	SU2-HS1-4			717/2006	109.3	3.3
SU2-HS1-5	SU2-HS1-5			717/2006	114.7	3.1
SU2-HS1-6	SU2-HS1-6			717/2006	120.1	3.3
SU2-HS1-7	SU2-HS1-7			717/2006	119.5	3.1
SU2-HS1-8	SU2-HS1-8			717/2006	132.3	3.2
SU2-HS1-9	SU2-HS1-9			717/2006	148.7	3.2
	·			· · · · · · · · · · · · · · · · · · ·	<b>_</b>	
SU2-HS2-1	SU2-HS2-1	38.681120	108.97730	7/19/2006	162.3	3.0
SU2-HS2-2	SU2-HS2-2			7/19/2006	174,7	4.0
SU2-HS2-3	SU2-HS2-3			7/19/2006	141.6	22.1
SU2-HS2-4	SU2-HS2-4	'		7/19/2006	148.2	4.0
SU2-HS2-5	SU2-HS2-5			7/19/2006	125.3	4.5
SU2-HS2-6	SU2-HS2-6			7/19/2006	122.9	7.3
SU2-HS2-7	SU2-HS2-7			7/19/2006	138.4	4.6
SU2-HS2-8	SU2-HS2-8			7/19/2006	108.2	3.0
SU2-HS2-9	SU2-HS2-9		÷ .	7/19/2006	128.6	3.1
SU2-HS2-10	SU2-HS2-10			7/19/2006	138.7	3.5
·	· · · · · · · · · · · · · · · · · · ·				·····	
SU3-HS1-1	SU3-HS1-1	38.680950	108.97792	7/20/2007	176.6	2.2
SU3-HS1-2	SU3-HS1-2			7/20/2007	158.2	7.4
SU3-HS1-3	SU3-HS1-3			7/20/2007	171.3	7.4
SU3-HS1-4	SU3-HS1-4			7/20/2007	171.1	2.3
SU3-HS1-5	SU3-HS1-5			7/20/2007	168.0	7.3
			100 0			
SU3-HS2-1	SU3-HS2-1	38.680730	108.97789	//20/2007	1/4.7	7.1
SU3-HS2-2	SU3-HS2-2			//20/2007	143.8	3.1
SU3-HS2-3	SU3-HS2-3			7/20/2007	167.8	13.5
SU3-HS2-4	SU3-HS2-4			7/20/2007	1/7.6	4.2
SU3-HS2-5	<u>SU3-HS2-5</u>			//20/2007	190.2	2.8
SU3-HS2-6	SU3-HS2-6	ļ	<u></u>	//20/2007	154.9	10.0
SU3-HS2-/	SU3-HS2-7			//20/2007	156.4	45.5
SU3-H52-8	SU3-HS2-8			7/20/2007	161.0	3.8
SU3-H52-9	SU3-HSZ-9			//20/2007	14/.2	2.6
SU3-HS2-10	L SU3-HS2-10	L		//20/2007	159.2	9.1
0110110011			400 07704	7/00/000-	L 450 4	
SU3-HS3-1	SU3-HS3-1	38.680570	108.97781	//20/2007	150.4	30.7
SU3-HS3-2	SU3-HS3-2			//20/2007	1/5.6	6.8
SU3-HS3-3	SU3-HS3-3			//20/2007	176.4	3.1
SU3-HS3-4	SU3-HS3-4	l		//20/2007	162.4	4.3
SU3-HS3-5	1 SU3-HS3-5	1		//20/2007	1/3.1	7.6

#### FINAL STATUS SUB-SURFACE SAMPLES

Willis Root Cellar Depth Profile 0-1'	WRC-DP-1	38.681340	108.97754	6/11/2006	157.1	3.3
Willis Root Cellar Depth Profile 1-2'	WRC-DP-2			6/11/2006	157.6	2.2
Arthur's Trailer Depth Profile 0-1'	AT-DP-1	38.680950	108.97747	6/11/2006	159.0	2.1
Arthur's Trailer Depth Profile 1-2'	AT-DP-2			6/11/2006	148.9	3.0
Arthur's Trailer Depth Profile 2-3'	AT-DP-3			6/11/2006	156.9	4.5
Arthur's Trailer Depth Profile 3-4'	AT-DP-4			6/11/2006	189.5	1.9
Trailer Court Deep Pit 0-2'	TC-DP-1	38.680900	108.97797	6/11/2006	155.4	4.4
Trailer Court Deep Pit 2-4'	TC-DP-2 (2nd)			6/14/2006	120.0	2.0
Trailer Court Deep Pit 4-6'	TC-DP-3			6/11/2006	178.3	2.0



#### DAVIS MILL SITE REMEDIATION PROJECT, GATEWAY, CO

#### ANALYTICAL SOIL AND WATER SAMPLE RESULTS

Analyzed by

ENERGY LABORATORIES INC. (CASPER, WY)

#### **REPORTING TERMS:**

GAMMA – Analysis by high purity germanium (HPGe) gamma spectroscopy

CHEM – Analyses involving wet radiochemical methods

PQL = Practical Quantitation Limit, data above this value is considered to be reliable and reproducible within standard limits

MDL = Method Detection Limit, this is the statistical lowest limit of the measurement method determined in clean laboratory matrices. Data above this value, yet less than the PQL is deemed to be 'estimated'

	Sample ID	Collection Date	Matrix	Test No	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis Date
	GWB-8	5/4/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Bismuth 212	GAMMA	0	0	2	1	pCi/g-dry	.7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Bismuth 214	GAMMA	1.4	0.4	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
ſ	GWB-8	5/4/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Cobalt 60	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0.	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	lodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Iodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Lead 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
1	GWB-8	5/4/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Radium 224	GAMMA	0	0	2	1	pCi/g-dry	7/1//2006
	GWB-8	5/4/2006	Soil	E901.1	Radium 226	GAMMA	1.4	0.4	2	1	pCi/g-dry	7/17/2006
	GWB-8	5/4/2006	Soil	E901.1	Radium 228	GAMMA	0	. 0	2	1	pCi/g-dry	7/1//2006
	GVVB-8	5/4/2006	Soll	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	//1//2006
	GVVB-8	5/4/2006	Soll	E901.1	Strontium 87	GAMIMA	0	0		1	pCI/g-ary	7/17/2006
	GVVB-0	5/4/2006	Soil	E901.1	Thailium 200	GAIVINA	0	0	2	4	pCi/g-ary	7/17/2006
	GVVD-0	5/4/2006	Soil	E901.1	Thorium 224	GAIVIIVIA	0	0	2		pCi/g-dry	7/17/2006
	GWD-0	5/4/2006	Soil	E901.1	7ino 65	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	GWB-0	5/4/2006	Soil		Moisture	GAIVIIVIA	0	0	0.1	0	pci/g-ury	9/22/2006
	GWB-8	5/4/2006	Soil	F900 0	Gross Bota	CHEM	25.8	07	2	1		8/23/2006
	GWB-8	5/4/2006	Soil	F903.0	Radium 226	CHEM	0.6	0.7	0.01	0.01	pCi/g-dry	8/28/2006
		0/4/2000	001	2000.0		OTICIVI	0.0	0.1	0.01	0.01	polig diy	0/20/2000
		5/4/2006	Soil	E900.0	Gross Alpha	CHEM	53	0.6	1	0.5	nCi/a-dry	8/23/2006
	GWB-8 GWB-8	5/4/2006	Soil	E900.0 SW6020	Gross Alpha Uranium, Natural	CHEM	5.3 0.74	0.6	0.02	0.5	pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006
	GWB-8 GWB-8	5/4/2006 5/4/2006 Collection	Soil Soil	E900.0 SW6020	Gross Alpha Uranium, Natural	CHEM CHEM	5.3 0.74 Final	0.6	1 0.02	0.5	pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 Analysis
	GWB-8 GWB-8 Sample ID	5/4/2006 5/4/2006 Collection Date	Soil Soil Matrix	E900.0 SW6020 Test No	Gross Alpha Uranium, Natural Analyte	CHEM CHEM Test Type	5.3 0.74 Final Value	0.6 Precision (±)	1 0.02 PQL	0.5 0.02 MDL	pCi/g-dry pCi/g-dry Units	8/23/2006 8/24/2006 Analysis Date
	GWB-8 GWB-8 Sample ID GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006	Soil Soil Matrix Soil	E900.0 SW6020 Test No E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228	CHEM CHEM Test Type GAMMA	5.3 0.74 Final Value 0	0.6 Precision (±) 0	1 0.02 PQL 2	0.5 0.02 MDL	pCi/g-dry pCi/g-dry Units pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006	Soil Soil Matrix Soil Soil	E900.0 SW6020 Test No E901.1 E901.1	Analyte Actinium 228 Americium 241	CHEM CHEM Test Type GAMMA GAMMA	5.3 0.74 Final Value 0 0	0.6 Precision (±) 0 0	1 0.02 PQL 2 2	0.5 0.02 MDL 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection 5/4/2006 5/4/2006 5/4/2006	Soil Soil Matrix Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133	CHEM CHEM Test Type GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0	0.6 Precision (±) 0 0 0	1 0.02 PQL 2 2 2	0.5 0.02 MDL 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 <b>Analysis</b> Date 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Matrix Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1	Actinium 228 Americium 241 Barium 133 Bismuth 212	CHEM CHEM Test Type GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0	0.6 Precision (±) 0 0 0	1 0.02 PQL 2 2 2 2	0.5 0.02 MDL 1 1 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Matrix Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1	Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 0 2.8	0.6 Precision (±) 0 0 0 0 0.5	1 0.02 PQL 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Matrix Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1	Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0	0.6 Precision (±) 0 0 0 0 0.5 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 5 0 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 <b>Collection</b> 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 <b>MDL</b> 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry           Units           pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 <b>Collection</b> <b>Date</b> 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Aralyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 <b>MDL</b> 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry           Units           pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 Sample ID GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Aralyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry           Units           pCi/g-dry	8/23/2006 8/24/2006 <b>Analysis</b> Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131	CHEM CHEM <b>Test Type</b> GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry           Units           pCi/g-dry	8/23/2006 8/24/2006 <b>Analysis</b> Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212	CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry           Units           pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214	CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/23/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/23/2006 8/24/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/23/2006 8/24/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/23/2006 8/24/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/23/2006 8/24/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	GWB-8 GWB-20	5/4/2006 5/4/2006 Collection Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-20	5/4/2006 5/4/2006 <b>Collection</b> Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 226	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006 <b>Collection</b> Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 209	CHEM CHEM CHEM GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006 <b>Collection</b> Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 224	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006 <b>Collection</b> Date 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 228	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006
	GWB-8 GWB-8 GWB-20	5/4/2006 5/4/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E900.0 SW6020 E901.1	Gross Alpha Uranium, Natural Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture	CHEM CHEM CHEM GAMMA	5.3 0.74 Final Value 0 0 0 0 2.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.6 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	1 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.5 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/23/2006 8/24/2006 7/17/2006</td></td<>	8/23/2006 8/24/2006 7/17/2006

Sample ID	Collection	Matrix	Test No	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis Date
SU1-12	6/14/2006	Soil	F901 1	Actinium 228	GAMMA	0	0	2	1	nCi/a-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Americium 241	GAMMA	0	<u> </u>	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Bismuth 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	F901 1	Bismuth 214	GAMMA	16	0.3	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Cobalt 60	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	lodine 125	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	lodine 131	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Lead 212	GAMMA	0	0	. 2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	F901 1	Radium 224	GAMMA	0	0	2	1	pCi/g-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901 1	Radium 226	GAMMA	1.6	0.3	2	1	pCi/g-drv	7/17/2006
SU1-12	6/14/2006	Soil	F901 1	Radium 228	GAMMA	0	0	2	1	pCi/g-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Strontium 87	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Thallium 208	GAMMA	0	0	2	1	pCi/g-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	E901.1	Zinc 65	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU1-12	6/14/2006	Soil	USDA26	Moisture		1.7		0.1	0	%	8/22/2006
	Collection					Final					Analysis
Sample ID	Date	Matrix	Test No	Analyte	Test Type	Value	Precision (±)	PQL	MDL	Units	Date
SU1-17	6/14/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Bismuth 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Bismuth 214	GAMMA	7.4	1	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Cesium 134	GAMMA	0.	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Cesium 137	GAMMA	0	0.	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Cobalt 60	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0 ·	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	lodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	lodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Lead 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Radium 224	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Radium 226	GAMMA	7.4	1	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1.	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Strontium 87	GAMMA	0	. 0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Thallium 208	GAMMA	0	0 ′	2	1	pCi/g-dry	7/17/2006
SU1-17,	6/14/2006	Soil	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1 '	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	E901.1	Zinc 65	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU1-17	6/14/2006	Soil	USDA26	Moisture	· .	0.8		0.1	0	%	8/22/2006
SU1-17	6/14/2006	Soil	E900.0	Gross Alpha	CHEM	43.9	1.2	1	0.5	pCi/g-dry	8/23/2006
SU1-17	6/14/2006	Soil	E900.0	Gross Beta	CHEM	58.4	0.9	2 ·	1	pCi/g-dry	8/23/2006
SU1-17	6/14/2006	Soil	E903.0	Radium 226	CHEM	6	0.3	0.01	0.01	pCi/g-dry	8/28/2006
SU1-17	6/14/2006	Soil	SW6020	Uranium, Natural	CHEM	9.41		0.02	0.02	pCi/g-dry	8/24/2006

-

Sample ID	Collection Date	Matrix	Test No	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis Date
SU2-4	6/14/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4 SU2-4	6/14/2006	Soil	E901.1 E901.1	Barium 133 Bismuth 212	GAMMA	0	0	2	1	nCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Bismuth 214	GAMMA	17.9	2.1	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4 SU2-4	6/14/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	lodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Iodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4 SU2-4	6/14/2006	Soil	E901.1 E901.1	Lead 212	GAMMA	0	0	2	1	nCi/g-ary	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Manganese 54	GAMMA	Ō	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Radium 226	GAMMA	17.9	2.1	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4 SU2-4	6/14/2006	Soil	E901.1	Strontium 87	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-4	6/14/2006	Soil	E901.1	Zinc 65	GAMMA	0	· 0	2	1	pCi/g-dry	7/17/2006
ample ID	Collection	Matrix	Test No.	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis
SU2-15	6/14/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-15	6/14/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-15	6/14/2006	Soil	E901.1	Barium 133 Bismuth 212	GAMMA	0	0	2	1	nCi/g-dry	7/17/2006
SU2-15	6/14/2006	Soil	E901.1	Bismuth 214	GAMMA	8.2	1.2	2	1	pCi/g-dry	7/17/2006
SU2-15	6/14/2006	Soil	. E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
CI 12 15	6/14/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU2-15 CU2-15	6/11/2006	Coil	E001 1			0	0	<u></u>			
SU2-15 SU2-15	6/14/2006 6/14/2006	Soil Soil	E901.1 E901.1	Gross Gamma	GAMMA	0	I 0 I	2	1	pCi/g-ary	7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil	E901.1 E901.1 E901.1	Gross Gamma Iodine 125	GAMMA GAMMA	0	0	2	1	pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1	Gross Gamma Iodine 125 Iodine 131	GAMMA GAMMA GAMMA	0 0 0	0 0 0	2 2 2	1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214	GAMMA GAMMA GAMMA GAMMA	0 0 0 0	0 0 0 0	2 2 2 2 2	1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54	GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0	0 0 0 0 0	2 2 2 2 2 2 2	1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2	1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Padium 224	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0		2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1	pCl/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 0 0 8.2	0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1	pCl/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 8.2 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1	pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 8.2 0 0 0	0 0 0 0 0 0 0 0 0 1.2 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry pCl/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15 SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 8.2 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 226 Strontium 86 Strontium 87 Thallium 208 Thorium 228	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 8.2 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 1.2 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCl/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 228 Thorium 234	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 8.2 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 228 Thorium 234 Zinc 65	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
3U2-15           SU2-15	6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture Gross Alpha	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 8/22/2006 8/23/2006
SU2-15	6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.0 E900.0 E900.0	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture Gross Alpha Gross Beta	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA CHEM CHEM	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCl/g-dry pCl/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 8/22/2006 8/23/2006
SU2-15           SU2-15	6/14/2006 6/14/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E901.1 E901.1	Gross Gamma lodine 125 lodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture Gross Alpha Gross Beta Radium 226	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA CHEM CHEM CHEM	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry	7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 8/22/2006 8/23/2006 8/23/2006

· · · ·

											•
	Collection			2000 C	1	Einal	la de la companya de				Analysis
Sample ID	Date	Matrix	Test No	Analyte	Test Type	Value	Precision (±)	PQL	MDL	Units	Date
SU3-1	6/18/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Bismuth 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
<u>SU3-1</u>	6/18/2006	Soil	E901.1	Bismuth 214	GAMMA	2.1	0.5	2	1	pCi/g-dry	7/17/2006
SU3-1 SU2-1	6/18/2006	Soll	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-ary	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Cohalt 60	GAMMA	0	0	2	1	nCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	lodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	lodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Lead 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
<u>SU3-1</u>	6/18/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2.	1	pCi/g-dry	7/17/2006
<u> </u>	6/18/2006	Soll	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	· 1	nCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Radium 226	GAMMA	2.1	0.5	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Strontium 87	GAMMA	. 0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Thallium 208	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU3-1	6/18/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
303-1	0/10/2000	301	C.901.1	2000							
SU3-1	6/18/2006	Soil	USDA26	Moisture		1		01	0	%	8/22/2006
SU3-1	6/18/2006	Soil	USDA26	Moisture		1 Final	<b>9</b>	0.1	0	<u>~</u> %	8/22/2006 Analysis
SU3-1 Sample ID	6/18/2006 Collection Date	Soil Matrix	USDA26	Moisture Analyte	Test Type	1 Final Value	Precision (±)	0.1 PQL	0 MDL	% Units	8/22/2006 Analysis Date
SU3-1 Sample/ID SU3-9	6/18/2006 Collection Date 6/18/2006	Soil Matrix Soil	USDA26 Test No E901.1	Moisture Analyte Actinium 228	Test Type GAMMA	1 Final Value 0	Precision (±)	0.1 PQL 2	0 MDL	%       Units       pCi/g-dry	8/22/2006 Analysis Date 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006	Soil Matrix Soil Soil	USDA26 Test No E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241	Test Type GAMMA GAMMA	1 Final Value 0 0	Precision (±)	0.1 PQL 2 2	0 MDL 1 1	pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006	Soil Matrix Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133	<b>Test Type</b> GAMMA GAMMA GAMMA	1 Final Value 0 0	Precision (±) 0 0 0	0.1 PQL 2 2 2	0 MDL 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Matrix Soil Soil Soil	USDA26 Test:No E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212	Test Type GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0	Precision (±) 0 0 0 0 0 0	0.1 PQL 2 2 2 2	0 MDL 1 1 1 1	%       Units       pCi/g-dry       pCi/g-dry       pCi/g-dry       pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample (D) SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Matrix Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214	GAMMA GAMMA GAMMA GAMMA GAMMA	Final Value 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1	%       PCi/g-dry       pCi/g-dry       pCi/g-dry       pCi/g-dry       pCi/g-dry       pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Matrix Soil Soil Soil Soil Soil	USDA26 Test:No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 127	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Matrix Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Matrix Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	% DCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9 SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQI 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54	GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9 SU	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Padium 222	Cest Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224	Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226	Cest Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final. Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228	Cest Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9 SU	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86	Camma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precision (±)	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9 SU	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 87	Camma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9 SU	6/18/2006 <b>Collection</b> <b>Date</b> 6/18/2006	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208	Cest Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9 SU	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 228	Camma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 228	Test Type GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9 SU	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture	Test Type GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.	Moisture Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture Gross Alpha	Test Type GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 7/17/2
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E901.0 E900.0 E900.	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 212 Lead 214 Marganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture Gross Alpha Gross Beta	Test Type GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 8/23/2006 8/23/2006
SU3-1 Sample ID SU3-9	6/18/2006 Collection Date 6/18/2006 6/18	Soil Soil Soil Soil Soil Soil Soil Soil	USDA26 Test No E901.1 E900.0 E900.0 E900.0 E903.0	Moisture Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65 Moisture Gross Alpha Gross Beta Radium 226	Test Type GAMMA	1 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0	Precision (±)  Precis	0.1 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2	0 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1	% PCi/g-dry pCi/g-dry	8/22/2006 Analysis Date 7/17/2006 8/23/2006 8/23/2006 8/23/2006

	Sample ID	Collection Date	Matrix	Test No	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis Date
	SU3-22	6/18/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/q-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Bismuth 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Bismuth 214	GAMMA	5.7	0.9	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Cobalt 60	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	- Soil	E901.1	Gross Gamma	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Iodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	lodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Lead 212	GAMMA	0	· 0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
ļ	SU3-22	6/18/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Radium 224	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Radium 226	GAMMA	5.7	0.9	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
	SU3-22	6/18/2006	Soil	E901.1	Strontium 87	GAMMA	0	0	2	1	pCi/g-dry	7/1//2006
	SU3-22	6/18/2006	Soll	E901.1	Thallium 208	GAMMA	0	0	2	1	pCi/g-ary	//1//2006
	SU3-22	6/18/2006	Soll	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-ary	//1//2006
	SU3-22	6/18/2006	Soll	E901.1	Thorium 234	GAMMA	0	. 0	2		pCi/g-ary	7/1//2006
	<u>SU3-22</u>	6/18/2006	Soll	E901.1		GAIVIMA		0	2	1		7/17/2006
	SU3-22	6/18/2006	Soll	USDA26	Crease Alaba	CUTA	1.4		0.1		<u>%</u>	8/22/2006
	503-22	6/18/2006	Soll	E900.0	Gross Alpha	CHEM	29.6			0.5		8/23/2006
	303-22	0/10/2000	301	E900.0	UIUSS Dela		44	1 0.0				0/23/2000
1	SI 13 22	6/19/2006	Soil	E003.0	Dadium 226	CHEM	A A	0.2	0.01	0.01	nCila day	9/29/2006
	SU3-22	6/18/2006	Soil	E903.0	Radium 226	CHEM	4.4	0.2	0.01	0.01	pCi/g-dry	8/28/2006
	SU3-22 SU3-22	6/18/2006 6/18/2006	Soil Soil	E903.0 SW6020	Radium 226 Uranium, Natural	CHEM CHEM	4.4 6.76	0.2	0.01 0.02	0.01	pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006
	SU3-22 SU3-22 Sample ID	6/18/2006 6/18/2006 Collection	Soil Soil Matrix	E903.0 SW6020 Test No	Radium 226 Uranium, Natural Analyte	CHEM CHEM Test Type	4.4 6.76 Final Value	0.2 Precision (±)	0.01 0.02 PQL	0.01 0.02 MDL :	pCi/g-dry pCi/g-dry Units	8/28/2006 8/24/2006 Analysis
	SU3-22 SU3-22 Sample ID	6/18/2006 6/18/2006 Collection Date 6/21/2006	Soil Soil Matrix	E903.0 SW6020 Test No	Radium 226 Uranium, Natural Analyte	CHEM CHEM Test Type	4.4 6.76 Final Value	0.2 Precision (±)	0.01 0.02 PQL	0.01 0.02 MDL -	pCi/g-dry pCi/g-dry Units	8/28/2006 8/24/2006 Analysis Date
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006	Soil Soil Matrix Soil	E903.0 SW6020 Test No E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241	CHEM CHEM Test Type GAMMA GAMMA	4.4 6.76 Final Value 0	0.2 Precision (±) 0	0.01 0.02 PQL 2	0.01 0.02 MDL - 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil	E903.0 SW6020 Test:No E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133	CHEM CHEM Test Type GAMMA GAMMA	4.4 6.76 Final Value 0 0	0.2 Precision (±) 0 0	0.01 0.02 PQL 2 2 2	0.01 0.02 MDL 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection, Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil	E903.0 SW6020 Test:No E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212	CHEM CHEM Test Type GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0	0.2 Precision (±) 0 0 0	0.01 0.02 PQL 2 2 2 2 2	0.01 0.02 MDL	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection, Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil	E903.0 SW6020 Test:No E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 0 1.6	0.2 Precision (±) 0 0 0 0 0 0	0.01 0.02 PQL 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection, Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil	E903.0 SW6020 Test:No E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0	0.2 Precision (±) 0 0 0 0 0 0.4 0	0.01 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1	pCi/g-dry pCi/g-dry Units pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection, Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test.No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0	0.2 Precision (±) 0 0 0 0 0 0 0.4 0 0	0.01 0.02 PQL 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection, Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test.No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final 0 0 0 0 0 1.6 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 <b>PQL</b> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 TestINO E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final 0 0 0 0 0 1.6 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 <b>PQL</b> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 TestINO E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final 0 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final 0 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/117/2006 7/117/2006 7/117/2006 7/117/2006 7/117/2006 7/117/2006 7/117/2006 7/117/2006 7/117/2006 7/117/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection, Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Matrix Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 <b>PQL</b> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date cr 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 <b>PQL</b> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 17/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22 SU3-22 Sample ID SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1 SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22           SU3-22           SU3-22           Sample ID           SU4-1	6/18/2006 6/18/2006 Collection Date 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1 E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22           SU3-22           SU3-22           Sample ID           SU4-1	6/18/2006 6/18/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22           SU3-22           Su3-22           Sample ID           SU4-1	6/18/2006 6/18/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/28/2006 8/24/2006 Analysis Date 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006 7/17/2006
	SU3-22           SU3-22           Su3-22           Sample ID           SU4-1	6/18/2006 6/18/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/28/2006 8/24/2006 Analysis Date</td></td<>	8/28/2006 8/24/2006 Analysis Date
	SU3-22           SU3-22           Su3-22           Sample ID           SU4-1	6/18/2006 6/18/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/28/2006 8/24/2006 Analysis Date
	SU3-22           SU3-22           Su3-22           Su4-1	6/18/2006 6/18/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87	CHEM CHEM Test Type GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/28/2006 8/24/2006 Analysis Date
	SU3-22           SU3-22           Su3-22           Su4-1           SU4-	6/18/2006 6/18/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 1.6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/28/2006 8/24/2006 <b>Analysis</b> Date</td></td<>	8/28/2006 8/24/2006 <b>Analysis</b> Date
	SU3-22           Su4-1           SU4-1	6/18/2006 6/18/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 224	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/28/2006 8/24/2006 8/24/2006 7/17/2006</td></td<>	8/28/2006 8/24/2006 8/24/2006 7/17/2006
	SU3-22 SU3-22 SU3-22 Su3-22 Sample ID SU4-1	6/18/2006 6/18/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 228	CHEM CHEM CHEM GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA	4.4 6.76 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry           pCi/g-dry <td< td=""><td>8/28/2006 8/24/2006 <b>Analysis</b> Date</td></td<>	8/28/2006 8/24/2006 <b>Analysis</b> Date
	SU3-22           Su4-1           SU4-1	6/18/2006 6/18/2006 6/21/2006	Soil Soil Soil Soil Soil Soil Soil Soil	E903.0 SW6020 Test No E901.1 E901.	Radium 226 Uranium, Natural Analyte Actinium 228 Americium 241 Barium 133 Bismuth 212 Bismuth 214 Cesium 134 Cesium 137 Cobalt 60 Gross Gamma Iodine 125 Iodine 131 Lead 212 Lead 214 Manganese 54 Potassium 40 Radium 223 Radium 224 Radium 224 Radium 226 Radium 228 Strontium 86 Strontium 87 Thallium 208 Thorium 234 Zinc 65	CHEM CHEM CHEM GAMMA	4.4 6.76 Final Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.2 Precision (±) 0 0 0 0 0 0 0 0 0 0 0 0 0	0.01 0.02 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.01 0.02 MDL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pCi/g-dry	8/28/2006 8/24/2006 7/17/2006

.

Sample ID	Collection Date	Matrix	Test No	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis Date
SU4-7	6/21/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Bismuth 212	GAMMA	0.	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Bismuth 214	GAMMA	14.9	1.7	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Cobalt 60	GAMMA	0	· 0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	lodine 125	GAMMA	0	0	· 2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	lodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Lead 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Lead 214	GAMMA	Ō	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1.	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Radium 224	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Radium 226	GAMMA	. 14.9	1.7	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Strontium 87	GAMMA	0	0	. 2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Thallium 208	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Thorium 228	GAMMA	0	0.	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	E901.1	Zinc 65	GAMMA	0	00	2	1	pCi/g-dry	7/17/2006
SU4-7	6/21/2006	Soil	USDA26	Moisture		1.8		0.1	0	%	8/22/2006
Sample ID	Collection Date	Matrix	Test No	Analyte	Test Type	Final Value	Precision (±)	PQL	MDL	Units	Analysis Date
SU5-1	6/16/2006	Soil	E901.1	Actinium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Bismuth 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Bismuth 214	GAMMA	2.2	0.5	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Cobalt 60	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	lodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	lodine 131	GAMMA	0	00	2	1 .	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Lead 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Radium 224	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Radium 226	GAMMA	2.2	0.5	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Strontium 87	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Thallium 208	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1	pCi/g-dry	//17/2006
SU5-1	6/16/2006	Soil	E901.1	Zinc 65	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-1	6/16/2006	Soil	USDA26	Moisture		0.8		0.1	0	%	8/22/2006
SU5-1	6/16/2006	Soil	E900.0	Gross Alpha	CHEM	6.9	0.6	1	0.5	pCi/g-dry	8/23/2006
SU5-1	6/16/2006	Soil	E900.0	Gross Beta	CHEM	27	0.7	2	1	pCi/g-dry	8/23/2006
SU5-1	6/16/2006	Soil	E903.0	Radium 226	CHEM	0.9	0.1	0.01	0.01	pCi/g-dry	8/28/2006
SU5-1	6/16/2006	Soil	SW6020	Uranium. Natural	CHEM	1.14		0.02	0.02	DCi/a-drv	8/24/2006

· · · · · · ·

Sample ID	Collection	Matrix	Test No	Analyte	Test Type	Final	Precision (±)	PQL	NDL	Units	Analysis Date
SU5-5	6/16/2006	Soil	E901 1	Actinium 228	GAMMA	0	<u> </u>	2	1	nCi/a-drv	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Americium 241	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Barium 133	GAMMA	0	0	2	1	pCi/a-drv	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Bismuth 212	GAMMA	. 0	0	2	1	pCi/g-drv	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Bismuth 214	GAMMA	12.2	1.5	2	1	pCi/a-drv	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Cesium 134	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Cesium 137	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Cobalt 60	GAMMA	0	0	2	1	pCi/a-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Gross Gamma	GAMMA	0	0	- 2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Iodine 125	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	lodine 131	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Lead 212	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Lead 214	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Manganese 54	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Potassium 40	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Radium 223	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Radium 224	GAMMA	Ó	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Radium 226	GAMMA	12.2	1.5	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Radium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Strontium 86	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Strontium 87	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Thallium 208	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Thorium 228	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Thorium 234	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	E901.1	Zinc 65	GAMMA	0	0	2	1	pCi/g-dry	7/17/2006
SU5-5	6/16/2006	Soil	USDA26	Moisture		1		0.1	0	%	8/22/2006
SU5-5	6/16/2006	Soil	E900.0	Gross Alpha	CHEM	36.2	1.1	1	0.5	pCi/g-dry	8/23/2006
SU5-5	6/16/2006	Soil	E900.0	Gross Beta	CHEM	45.9	0.8	2	1	pCi/g-dry	8/23/2006
SU5-5	6/16/2006	Soil	E903.0	Radium 226	CHEM	6.8	0.3	0.01	0.01	pCi/g-dry	8/28/2006
SU5-5	6/16/2006	Soil	SW6020	Uranium, Natural	CHEM	4.48		0.02	0.02	pCi/g-dry	8/24/2006

Sample ID	Latitude (North, dd)	Longitude (West, dd)	Collection Date	Matrix	Test No	Analyte	Test Type	Final Value	PQL	Units
Well 1	38.67982	108.97871	6/20/2006	Aqueous	A4500-CI B	Chloride	DIS	43	1 -	mg/L
Well 1			6/20/2006	Aqueous	E900.0	Gross Alpha	DIS	126	1	pCi/L
Well 1			6/20/2006	Aqueous	E900.0	Gross Beta	DIS	52.8	2	pCi/L
Well 1			6/20/2006	Aqueous	E353.2	Nitrogen, Nitrate+Nitrite as N	DIS	290	3	mg/L
Well 1			6/20/2006	Aqueous	A4500-NO2 B	Nitrogen, Nitrite as N	DIS	<0.1	0.1	mg/L
Well 1			6/20/2006 ·	Aqueous	A4500-H B	pH	DIS	3.37	0.01	s.u.
Well 1			6/20/2006	Aqueous	E903.0	Radium 226	TOT	<0.2	0.2	pCi/L
Well 1			6/20/2006	Aqueous	A4500-SO4 E	Sulfate	DIS	58	1	mg/L
Well 1			6/20/2006	Aqueous	E200.8	Uranium	TOT	0.163	0.0003	mg/L
Well 2	38.67960	108.97897	6/20/2006	Aqueous	A4500-CI B	Chloride	DIS	8	1	mg/L
Well 2			6/20/2006	Aqueous	E900.0	Gross Alpha	DIS	58.8	1	pCi/L
Well 2			6/20/2006	Aqueous	E900.0	Gross Beta	DIS	28.6	2	pCi/L
Well 2			6/20/2006	Aqueous	E353.2	Nitrogen, Nitrate+Nitrite as N	DIS	249	3	mg/L
Well 2			6/20/2006	Aqueous	A4500-NO2 B	Nitrogen, Nitrite as N	DIS	<0.1	0.1	mg/L
Well 2			6/20/2006	Aqueous	A4500-H B	pH	DIS	3.06	0.01	s.u.
Well 2			6/20/2006	Aqueous	E903.0	Radium 226	TOT	<0.2	0.2	pCi/L
Well 2			6/20/2006	Aqueous	A4500-SO4 E	Sulfate	DIS	17	1	mg/L
Well 2			6/20/2006	Aqueous	E200.8	Uranium	TOT	0.0743	0.0003	mg/L
CDOT Well	38.68029	108.97883	6/20/2006	Aqueous	A4500-CI B	Chloride	DIS	152	1	mg/L
CDOT Well			6/20/2006	Aqueous	E900.0	Gross Alpha	DIS	45.5	1	pCi/L
CDOT Well			6/20/2006	Aqueous	E900.0	Gross Beta	DIS	17	2	pCi/L
CDOT Well			6/20/2006	Aqueous	E353.2	Nitrogen, Nitrate+Nitrite as N	DIS	240	3	mg/L
CDOT Well			6/20/2006	Aqueous	A4500-NO2 B	Nitrogen, Nitrite as N	DIS	<0.1	0.1	mg/L
CDOT Well	[ 		6/20/2006	Aqueous	A4500-H B	рН	DIS	2.9	0.01	s.u.
CDOT Well			6/20/2006	Aqueous	E903.0	Radium 226	TOT	<0.2	0.2	pCi/L
CDOT Well			6/20/2006	Aqueous	A4500-SO4 E	Sulfate	DIS	45	1	mg/L
CDOT Well		ļ	6/20/2006	Aqueous	E200.8	Uranium	TOT	0.073	0.0003	mg/L
Pond	38.67939	108.97800	6/20/2006	Aqueous	A4500-CI B	Chloride	DIS	10	1	mg/L
Pond		l	6/20/2006	Aqueous	E900.0	Gross Alpha	DIS	44.4	1	pCi/L
Pond			6/20/2006	Aqueous	E900.0	Gross Beta	DIS	20.7	2	pCi/L
Pond			6/20/2006	Aqueous	E353.2	Nitrogen, Nitrate+Nitrite as N	DIS	267	3	mg/L
Pond			6/20/2006	Aqueous	A4500-NO2 B	Nitrogen, Nitrite as N	DIS	<0.1	0.1	mg/L
Pond			6/20/2006	Aqueous	A4500-H B	pH	DIS	2.58	0.01	S.U.
Pond			6/20/2006	Aqueous	E903.0	Radium 226	TOT	<0.2	0.2	pCi/L
Pond			6/20/2006	Aqueous	A4500-SO4 E	Sulfate	DIS	13	1	mg/L
Pond			6/20/2006	Aqueous	E200.8	Uranium	TOT	0.0223	0.0003	mg/L

· .

# ATTACHMENT F

# FINAL STATUS SURVEY: MAPS OF SURFACE SOIL SAMPLING LOCĂTION AND RESULTS

MAPS OF SURFACE SOIL SAMPLING LOCATIONS

~



#### Background Reference Area: Final Status Surface Soil Sampling Locations and Ra-226 Concentrations



Survey Unit 1: Final Status Surface Soil Sampling Locations and Ra-226 Concentrations



Survey Unit 2: Final Status Surface Soil Sampling Locations and Ra-226 Concentrations



Survey Unit 3: Final Status Surface Soil Sampling Locations and Ra-226 Concentrations



Survey Unit 4: Final Status Surface Soil Sampling Locations and Ra-226 Concentrations



Survey Unit 5: Final Status Surface Soil Sampling Locations and Ra-226 Concentrations

# ATTACHMENT G

COMPASS OUTPUT RESULTS FOR MARSSIM ANALYSES



## Site Summary

Site Name: Davis Mill Site, Gateway, CO

Planner(s): Randy Whicker

#### **Contaminant Summary**

NOTE: Surface soil DCGLw units are pCi/g. Building surface DCGLw units are dpm/100 cm<sup>2</sup>.

Contaminant	Туре	DCGLw	Screening Value Used?	Area (m²)	Area Factor
Ra-226	Surface Soil	2.60	No	2	12.5
				10	4.6
				20	3.5
				30	3.1
				50	2.7
				100	2.3
				215	1.9
				299	1.8
				344	1.7
				381	1.6
				542	1.4
			`	10,000	1

COMPASS v1.0.0



## Survey Plan Summary

Site:	Davis Mill Site,	Gateway, CO						
Planner(s):	Randy Whicke	r .						
Survey Unit Name:	Survey Unit 1	Survey Unit 1						
Comments:	Hill area northe	east of mill building	ng					
Area (m²):	11,927		Classification:	1				
Selected Test:	WRS		Estimated Sigma (pCi/g):	1.3				
DCGL (pCi/g):	2.60		Sample Size (N/2):	22				
LBGR (pCi/g):	1.3		Estimated Conc. (pCi/g):	1.5				
Alpha:	0.050		Estimated Power:	0.85				
Beta:	0.150		EMC Sample Size (N):	22				
Scanning Instrumentat	ion:	2x2 Nal detecto	or I					

### **Prospective Power Curve**





# **Contaminant Summary**

Contaminant	DCGLw (pCi/g)	Inferred Contaminant	Ratio	Modified DCGLw (pCi/g)	Scan MDC (pCi/g)
Ra-226	2.60	N/A	N/A	N/A	2.6
Contaminant		Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g)		Reference Area Esti (Mean ± 1-Sigma (pCi/g)	mate a)
Ra-226		3.5 ± 1.3		2 ± 0.2	

COMPASS v1.0.0

9/14/2006

Page 2



### **Assessment Summary**

Site:	Davis Mill Site, Gateway, CO					
Planner(s):	Randy Whicker					
Survey Unit Name:	Survey Unit 1					
Report Number:	1					
Survey Unit Samples:	22					
Reference Area Samples:	24					
Test Performed:	WRS	Test Result:	Pass			
Judgmental Samples:	1	EMC Result:	Pass			
Assessment Conclusion:	Reject Null Hypothesis (S	Survev Unit PASSE	S)			

### Retrospective Power Curve



Page 1



# Survey Unit Data

NOTE: Type = "S" indicates survey unit sample. Type = "R" indicates reference area sample.

SU1-1       S       2.25         SU1-2       S       2.07         SU1-3       S       2.86         SU1-4       S       2.04         SU1-5       S       2.1         SU1-6       S       2.49         SU1-7       S       2.49         SU1-8       S       2.2         SU1-9       S       2.1         SU1-10       S       1.73         SU1-11       S       1.95         SU1-12       S       1.07	
SU1-2       S       2.07         SU1-3       S       2.86         SU1-4       S       2.04         SU1-5       S       2.1         SU1-6       S       2.49         SU1-7       S       2.49         SU1-8       S       2.2         SU1-8       S       2.1         SU1-9       S       2.1         SU1-10       S       1.73         SU1-11       S       1.95         SU1-12       S       4.07	
SU1-3     S     2.86       SU1-4     S     2.04       SU1-5     S     2.1       SU1-6     S     2.49       SU1-7     S     2.49       SU1-8     S     2.2       SU1-9     S     2.1       SU1-10     S     1.73       SU1-11     S     1.95       SU1-12     S     1.07	
SU1-4     S     2.04       SU1-5     S     2.1       SU1-6     S     2.49       SU1-7     S     2.49       SU1-8     S     2.2       SU1-9     S     2.1       SU1-10     S     1.73       SU1-11     S     1.95       SU1-12     S     1.07	
SU1-5     S     2.1       SU1-6     S     2.49       SU1-7     S     2.49       SU1-8     S     2.2       SU1-9     S     2.1       SU1-10     S     1.73       SU1-11     S     1.95       SU1.12     S     1.07	
SU1-6     S     2.49       SU1-7     S     2.49       SU1-8     S     2.2       SU1-9     S     2.1       SU1-10     S     1.73       SU1-11     S     1.95       SU1-12     S     1.07	
SU1-7     S     2.49       SU1-8     S     2.2       SU1-9     S     2.1       SU1-10     S     1.73       SU1-11     S     1.95       SU1-12     S     1.07	
SU1-8     S     2.2       SU1-9     S     2.1       SU1-10     S     1.73       SU1-11     S     1.95       SU1.12     S     1.07	
SU1-9         S         2.1           SU1-10         S         1.73           SU1-11         S         1.95           SU1-12         S         1.07	
SU1-10         S         1.73           SU1-11         S         1.95           SU1.12         S         1.97	
SU1-11 S 1.95	
SU1.12 C 1.07	
301-12 3 1.97	
SU1-13 S 3.45	
SU1-14 S 2.02	
SU1-15 S 2.17	
SU1-16 S 2.05	
SU1-17 S 9.1	
SU1-18 S 2.11	
SU1-19 S 203	
SU1-20 S 2.89	1
SUI-22 S 21	
GWB-6 B 192	
GWB-7 R 184	
GWB-9 P 177	
GWB-11 P 196	
WB-12 P 2.11	
SWB-13 P 2	
SWB-14 P 2.03	
3WB-15 D 0.05	
SWB-16 D 4 6	
WR-17 D 1.0	4
SW/8-18 P 2.04	
SWB-10 R 2,04 SWB-10 D 9.47	
SINE-27 D 2.10	
2WR-23 D 2.40	
2000-21 K 2.34	





## **Basic Statistical Quantities Summary**

Statistic	Survey Unit	Background	DQO Results
Sample Number	22	24	N/2=22
Mean (pCi/g)	2.56	2.06	1.5
Median (pCi/g)	2.10	2.04	N/A
Std Dev (pCi/g)	1.51	0.20	1.3
High Value (pCi/g)	9.10	2.65	N/A
Low Value (pCi/g)	1.73	1.77	N/A

### **Statistical Test Summary**

Sum of Ranks:		1081		
Sum of Reference Ranks:		804		
Critical Value:		639		
Resuit:		Pass		
Data	Туре	Adjusted Data	Rank	Reference Rank
1.77133963850069	R	4.37133963850069	22	22
1.79805311429921	R	4.39805311429921	23	23
1.84006436647869	R	4.44006436647869	24	24
1.84296635988417	R	4.44296635988417	25	25
1.8612314533171	R	4.4612314533171	- 26	26
1.88212586906523	R	4.48212586906523	27	27
1.91662598293582	R	4.51662598293582	28	28
1.93284946874048	R	4.53284946874048	29	29
1.95832252784789	R	4.55832252784789	30	30
2.0009789340342	R	4.6009789340342	31	31
2.03334570754897	R	4.63334570754897	32	32
2.04007816644093	R	4.64007816644093	33	33
2.04855643617589	R	4.64855643617589	34	34
2.05786128409954	R	4.65786128409954	35	35
2.07104127891348	R	4.67104127891348	36	36
2.0933084703521	R	4.6933084703521	37	37
2.11232241369155	R	4.71232241369155	38	38
2.16512796042125	R	4.76512796042125	39	39
2.18319450888067	R	4.78319450888067	.40	40
2.18435105418638	R	4.78435105418638	41	41
2.19648736553904	R	4.79648736553904	42	42
2.34076611666604	R	4.94076611666604	43	43
2.37427973064163	R	4.97427973064163	44	44
2.64847706260998	R	5.24847706260998		45
1.72974230575363	S	1.72974230575363	1	0

COMPASS v1.0.0

9/14/2006



### **Statistical Test Summary**

Data	Туре	Adjusted Data	Rank	Reference Rank
1.95285457343759	S	1.95285457343759	2	0
1.97124489089476	S	1,97124489089476	3	0
2.01651764047906	S	2.01651764047906	4	0
2.02781449311629	S	2.02781449311629	5	0
2.04144026422809	S	2.04144026422809	6	0
2.04639984069005	S	2.04639984069005	7	0
2.06575225925816	S	2.06575225925816	8	0
2.09185266145706	S	2.09185266145706	9	0
2.09563297461554	S	2.09563297461554	10	0 1
2.10091610225155	S	2,10091610225155	11	0
2.10120451123082	S	2.10120451123082	12	0
2.10723859321503	S	2,10723859321503	13	0
2.16723542267884	S	2.16723542267884	14	0
2.20018824992876	S	2,20018824992876	15	0
2.25286555112446	S	2,25286555112446	16	ō
2.48635328453815	S	2,48635328453815	17	0
2,49265004850043	S	2,49265004850043	18	0
2.85501347439814	S	2.85501347439814	19	0
2.88886042988156	ŝ	2.88886042988156	20	0
3,45267028335858	ŝ	3.45267028335858	21	0
9.0970464252565	Š	9.0970464252565	46	ō

## **Elevated Measurement Comparison (EMC)**

EMC Departmetion Area (	-21 0	-teizent Ceres	Average
EMC Result:	Pass		
Sum of All Contaminants:	0.29		

EMC Description	Area (m²)	Contaminant	Concentration (pCi/g)
SU1-HS1	6	Ra-226	4.7
Equation 8-2 Result for Ra-226: 0.29			



# Survey Plan Summary

Site:	Davis Mill Site	, Gateway, CO			
Planner(s):	Randy Whicke	r.			
Survey Unit Name:	Survey Unit 2				
Comments:	Northeast corner of site near Willis Trailer				
Area (m²):	4,732		Classification:		1
Selected Test:	WRS		Estimated Sigma (pCi/g):		1.3
DCGL (pCi/g):	2.60		Sample Size (N/2):		22
LBGR (pCi/g):	1.3		Estimated Conc. (pCi/g):		1.5
Alpha:	0.050		Estimated Power:		0.85
Beta:	0.150		EMC Sample Size (N):		22
Scanning Instrumental	tion <sup>.</sup>	2x2 Nal detect	or		

### **Prospective Power Curve**




## **Contaminant Summary**

Contaminant	DCGLw (pCi/g)	Inferred Contaminant	Ratio	Modified DCGLw (pCi/g)	Scan MDC (pCi/g)
Ra-226	2.60	N/A	N/A	N/A	2.6
Contaminant	:	Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g)		Reference Area Esti (Mean ± 1-Sigma (pCi/g)	mate 1)
Ra-226		3.5 ± 1.3	2 ± 0.2		



## **Assessment Summary**

Site:	Davis Mill Site, Gateway, CO				
Planner(s):	Randy Whicker				
Survey Unit Name:	Survey Unit 2				
Report Number:	1				
Survey Unit Samples:	22				
Reference Area Samples:	24				
Test Performed:	WRS	Test Result:	Pass		
Judgmental Samples:	2	EMC Result:	Pass		
Assessment Conclusion:	Reject Null Hypothesis (Survey Unit PASSES)				

#### **Retrospective Power Curve**





## Survey Unit Data

NOTE: Type = "S" indicates survey unit sample. Type = "R" indicates reference area sample.

Sample Number	Туре	Ra-226 (pCi/g)	
SU2-1	S	2.07	
SU2-2	S	3.34	
SU2-3	S	2.96	
SU2-4	S	16.72	
SU2-5	S	3.14	
SU2-6	S	2.63	
SU2-7	S	2.13	
SU2-8	S	2.87	
SU2-9	S	2.02	
SU2-10	ŝ	2.4	
SU2-11	ŝ	2.09	
SU2-12	S	2.33	
SU2-13	ŝ	3.92	
SU2-14	s	3.22	
SU2-15	s	4 66	
SU2-16	s	13.59	
SI 12-17	Š	2.63	
SU2-18	ŝ	2.00	,
SU2-10	5	2.24	
SU2-20	6	2.21	
SU2.21	с С	2.00	
SU2-21 SU2-22		3.0	
CIMP 5	0' D	2.4	
GWB-S	R	1.93	
GVVD-0	R	1.92	
GWD-7	R	1.84	
GVVB-8	R	2.06	
GVVB-9	R	1.77	
GWB-10	ĸ	1.88	
GWB-11 *	R	1.86	
GWB-12	R	2.11	
GWB-13	R	2	
GWB-14	R	2.03	
GWB-15	R	2.05	
GWB-16	R	1.8	
GWB-17	R	1.84	
GWB-18	R	2.04	
GWB-19	R	2.17	
GWB-20	R	2.65	
GWB-21	R	2.2	
GWB-22	R	2.18	
GWB-23	R	2.18	
GWB-24	R	2.37	
GWB-25	R	1.96	
GWB-26	R	2.07	
GWB-27	R	2.34	
GWB-28	R	2.09	

COMPASS v1.0.0

Page 2



## **Basic Statistical Quantities Summary**

Statistic	Survey Unit	Background	DQO Results
Sample Number	. 22	24	N/2=22
Mean (pCi/g)	3.92	2.06	1.5
Median (pCi/g)	2.74	2.04	N/A
Std Dev (pCi/g)	3.73	0.20	1.3
High Value (pCi/g)	16.72	2.65	N/A
Low Value (pCi/g)	2.02	1.77	N/A
	,		

#### **Statistical Test Summary**

Sum of Ranks:		1081		
Sum of Reference Ranks:		766		
Critical Value:	-	639		
Result:		Pass		
Data	Туре	Adjusted Data	Rank	Reference Rank
1.77133963850069	R	4.37133963850069	20	20
1.79805311429921	R	4.39805311429921	21	21
1.84006436647869	R	4.44006436647869	22	22
1.84296635988417	R	4.44296635988417	23	23
1.8612314533171	R	4.4612314533171	24	24
1.88212586906523	R	4.48212586906523	25	25
1.91662598293582	R	4.51662598293582	26	26
1.93284946874048	R	4.53284946874048	27	27
1.95832252784789	R	4.55832252784789	28	28
2.0009789340342	R	4.6009789340342	29	29
2.03334570754897	R	4.63334570754897	30	30
2.04007816644093	R	4.64007816644093	31	31
2.04855643617589	R	4.64855643617589	32	32
2.05786128409954	R	4.65786128409954	33	33
2.07104127891348	R	4.67104127891348	35	35
2.0933084703521	R	4.6933084703521	36	36
2.11232241369155	R	4.71232241369155	37	37
2.16512796042125	R	4.76512796042125	38	38
2.18319450888067	R	4.78319450888067	39	39
2.18435105418638	R	4.78435105418638	40	40
2.19648736553904	R	4.79648736553904	41	41
2.34076611666604	R	4.94076611666604	42	42
2.37427973064163	Ř	4.97427973064163	43	43
2.64847706260998	R	5.24847706260998		44
2.02190762630746	S	2.02190762630746	1	0



#### **Statistical Test Summary**

Data	Туре	Adjusted Data	Rank	Reference Rank
2.0679219255328	s	2.0679219255328	2	0
2.08897843290803	S	2.08897843290803	3	0
2.12940068298931	S	2.12940068298931	4	0
2.2055120400935	S	2.2055120400935	5	0
2.24035544656398	S	2.24035544656398	6	0
2.33072596974448	S	2.33072596974448	7	0
2.40244624339506	S	2.40244624339506	8	0
2.40455629079187	S	2.40455629079187	· 9	0
2.62582215824983	S	2.62582215824983	10	0
2.62857060090377	S	2.62857060090377	11	0
2.85977104513702	S	2.85977104513702	12	0
2.87038968128714	S	2.87038968128714	13	0
2.96234970821611	S	2.96234970821611	14	0
3.13958965917103	S	3.13958965917103	15	0
3.21629887571395	S	3.21629887571395	16	0
3.34204178889468	S	3.34204178889468	17	0
3.80352954297997	S	3.80352954297997	18	0
3.91980385250329	S	3.91980385250329	19	0
4.66186328494637	S	4.66186328494637	34	0
13.5867519827964	S	13.5867519827964	45	0
16.7207728536595	S	16.7207728536595	46	0

# **Elevated Measurement Comparison (EMC)**

Sum of All Contaminants:	0.9	
EMC Result:	Pass	

			Asciage
EMC Description	Area (m²)	Contaminant	Concentration (pCi/g)
SU2-HS1	5	Ra-226	3.6
SU2-HS2	16	Ra-226	5.9
Equation 8-2 Result for Ra-226:	0.9		



# Survey Plan Summary

Site:	Davis Mill Site,	Gateway, CO		
Planner(s):	Randy Whicker	r		
Survey Unit Name:	Survey Unit 3			
Comments:	Trailer court / s	ite access areas	NE of mill	
Area (m²):	7,574		Classification:	1
Selected Test:	WRS		Estimated Sigma (pCi/g):	1.3
DCGL (pCi/g):	2.60		Sample Size (N/2):	22
LBGR (pCi/g):	1.3		Estimated Conc. (pCi/g):	1.5
Alpha:	0.050		Estimated Power:	0.85
Beta:	0.150		EMC Sample Size (N):	22
Scanning Instrumentation	on:	2x2 Nal detecto	or	

## **Prospective Power Curve**



COMPASS v1.0.0

Page 1



## **Contaminant Summary**

Contaminant	DCGLw (pCi/g)	Inferred Contaminant	Ratio	Modified DCGLw (pCi/g)	Scan MDC (pCi/g)
Ra-226	2.60	N/A	N/A	N/A	2.6
Contaminant	Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g)			Reference Area Esti (Mean ± 1-Sigma (pCi/g)	imate a)
Ra-226		3.5 ± 1.3 2 ± 0.2			



#### **Assessment Summary**

Site:	Davis Mill Site, Gateway, CO			
Planner(s):	Randy Whicker			
Survey Unit Name:	Survey Unit 3			
Report Number:	1		-	
Survey Unit Samples:	24			
Reference Area Samples:	24			
Test Performed:	WRS	Test Result:	Pass	
Judgmental Samples:	3	EMC Result:	Fail	
Assessment Conclusion:	Do NOT Reject Null Hypo	thesis (Survey Unit	FAILS)	

#### **Retrospective Power Curve**



COMPASS v1.0.0

Page 1



## Survey Unit Data

NOTE: Type = "S" indicates survey unit sample. Type = "R" indicates reference area sample.

Sample Number	Туре	Ra-226 (pCi/g)		
SU3-1	S	2.3		
SU3-2	S	2.29		
SU3-3	S	1.99		
SU3-4	S	12.57		
SU3-5	ຮ່	2.98		
SU3-6	S	3.41		
SU3-7	S	2.47		
SU3-8	S	2.61		
SU3-9	S	1.9		
SU3-10	S	2.16		
SU3-11	S	1.88		
SU3-12	S	2.18		
SU3-13	S	2.38		
SU3-14	S	2.57		
SU3-15	S	9.86		
SU3-16	S	2.22		
SU3-17	S	2.07		
SU3-18	s	2.14		
SU3-19	ŝ	2.15		
SU3-20	s	2 79		
SU3-21	ŝ	2.56		
SU3-22	ŝ	3.76		
SU3-23	ŝ	3.04		
SU3-24	ŝ	2 14		
GWB-5	R	1 93		
GWB-6	R	1 92		
GWB-7	R	1 84		
GWB-8	R	2.06		
GWB-9	R	1 77		
GWB-10	R	1.88		
GWB-11	R	1.86		
GWB-12	R	2 11	•	
GWB-13	p	2		
GWR-14		2 03		
GWB-15	R	2.00		
GWB-16	p	1.9		
GWB-17	P	1.0		
GWR-18	P	2.04		
GW/B-10	P	2.04		
GWB-10	D	2.17		
GWB-20	0	2.00		
GWR-22	p	2.2	•	
GWR-23		∠.10 7.19		
GWB-23	r D	2.10		
CINE 25	r B	2.31 1 DC		
0110-20	κ ο	007		
G110-20 CIMB 77	R D	2.07		
GWD-Z/	ĸ	2.34		
GMAR-59	к	2.09		

COMPASS v1.0.0

9/14/2006



## **Basic Statistical Quantities Summary**

Statistic	Survey Unit	Background	DQO Results
Sample Number	24	24	N/2=22
Mean (pCi/g)	3.18	2.06	1.5
Median (pCi/g)	2.34	2.04	N/A
Std Dev (pCi/g)	2.55	0.20	1.3
High Value (pCi/g)	12.57	2.65	N/A
Low Value (pCi/g)	1.88	1.77	N/A

## Statistical Test Summary

Sum of Ranks:		1176		
Sum of Reference Ranks:		828		
Critical Value:		668		
Result:		Pass		
Data	Туре	Adjusted Data	Rank	Reference Rank
1.77133963850069	R	4.37133963850069	23	23
1.79805311429921	R	4.39805311429921	24	24
1.84006436647869	R	4.44006436647869	25	25
1.84296635988417	R	4.44296635988417	26	26
1.8612314533171	R	4.4612314533171	27	27
1.88212586906523	R	4.48212586906523	28	28
1.91662598293582	R	4.51662598293582	29	29
1.93284946874048	R	4.53284946874048	30	30
1.95832252784789	R	4.55832252784789	31	31
2.0009789340342	R	4.6009789340342	32	32 .
2.03334570754897	R	4.63334570754897	33	33
2.04007816644093	R	4.64007816644093	34	34
2.04855643617589	R	4.64855643617589	35	35
2.05786128409954	R	4.65786128409954	36	36
2.07104127891348	R	4.67104127891348	37	37
2.0933084703521	R	4.6933084703521	38	38
2.11232241369155	R	4.71232241369155	39 .	39
2.16512796042125	R	4.76512796042125	40	40
2.18319450888067	R	4.78319450888067	41	41
2.18435105418638	R	4.78435105418638	42	42
2.19648736553904	R	4.79648736553904	43	43
2.34076611666604	R	4.94076611666604	44	44
2.37427973064163	R	4.97427973064163	45	45
2.64847706260998	R	5.24847706260998		
1.87664817768651	s	1.87664817768651	1	0



## **Statistical Test Summary**

Data	Туре	Adjusted Data	Rank	Reference Rank
1.90025235481686	S	1.90025235481686	2	0
1.99168655003748	S	1.99168655003748	3	0
2.06786403106736	S	2.06786403106736	4	0
2.13666946444613	S	2.13666946444613	5	0
2.13690516166039	S	2.13690516166039	6	0
2.14547589630663	S	2.14547589630663	7	0
2.15559548524439	S	2.15559548524439	8	0
2.17734597862987	S	2.17734597862987	9	0
2.21665499227009	S	2.21665499227009	10	0
2.2924717608529	S	2.2924717608529	11	0
2.29876233023324	S	2.29876233023324	12	0
2.37780936351712	S	2.37780936351712	13	0
2.46944649875725	S	2.46944649875725	14	0
2.56042050683751	S	2.56042050683751	15	0
2.56655917709901	S	2.56655917709901	16	0
2.61042559483421	S	2.61042559483421	- 17	0
2.79343184531617	S	2.79343184531617	18	0
2.97600812665248	S	2.97600812665248	19	0
3.03662205976743	S	3.03662205976743	20	0
3.40817294383957	S	3.40817294383957	21	0
3.75808931830039	S	3,75808931830039	22	0
9.86321879782368	S	9.86321879782368	47	0
12.5672139377298	S	12.5672139377298	48	0

# **Elevated Measurement Comparison (EMC)**

	Average	
EMC Result: Fail		
Sum of All Contaminants: 1.8	•	

EMC Description	Area (m <sup>2</sup> )	Contaminant	Concentration (pCi/g)
SU3-HS1	6	Ra-226	5.3
SU3-HS2	20	Ra-226	10.2
SU3-HS3	9	Ra-226	10.5
Equation 8-2 Result for Ra-226	: 1.8		

COMPASS v1.0.0



21

#### Survey Plan Summary

Site:	Davis Mill Site,	Gateway, CO		
Planner(s):	Randy Whicker	r		
Survey Unit Name:	Survey Unit 4			
Comments:	Northwest botto	omlands area be	low mill	
Area (m²):	6,582		Classification:	1
Selected Test:	WRS		Estimated Sigma (pCi/g):	1.3
DCGL (pCi/g):	2.60		Sample Size (N/2):	22
LBGR (pCi/g):	1.3		Estimated Conc. (pCi/g):	1.5
Alpha:	0.050	•	Estimated Power:	0.85
Beta:	0.150		EMC Sample Size (N):	22
Scanning Instrumentati	on:	2x2 Nal detecto	or	

# **Prospective Power Curve**



COMPASS v1.0.0

9/14/2006



## **Contaminant Summary**

Contaminant	DCGL <del>w</del> (pCi/g)	Inferred Contaminant	Ratio	Modified DCGLw (pCi/g)	Scan MDC (pCi/g)
Ra-226	2.60	N/A	N/A	N/A	2.6
Contaminant	:	Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g)		Reference Area Esti (Mean ± 1-Sigma (pCi/g)	imate a)
Ra-226		3.5 ± 1.3		2 ± 0.2	

COMPASS v1.0.0

9/14/2005

Page 2



#### **Assessment Summary**

Site:	Davis Mill Site, Gateway, C	0	
Planner(s):	Randy Whicker		
Survey Unit Name:	Survey Unit 4		
Report Number:	1		
Survey Unit Samples:	23		
Reference Area Samples:	24		ĩ
Test Performed:	WRS	Test Result:	Not Performed
Judgmental Samples:	1	EMC Result:	Not Performed
Assessment Conclusion:	Do NOT Reject Null Hypo	thesis (Survey Unit	FAILS)

## **Retrospective Power Curve**



COMPASS v1.0.0

9/14/2006



#### Survey Unit Data

NOTE: Type = "S" indicates survey unit sample. Type = "R" indicates reference area sample.

Sample Number	Туре	Ra-226 (pCi/g)	
SU4-1	S	2.26	~
SU4-2	S	2.41	
SU4-3	S	2.53	
SU4-4	S	2.81	
SU4-5	S	3.19	
SU4-6	S	2.93	
SU4-7	S	14.3	
SU4-8	ŝ	2 19	
SU4-9	S	10.39	
SU4-10	ŝ	18 85	
SU4-11	ŝ	47 12	
SU4-12	Š	3 97	
SU4.13	ŝ	4 49	
SI 14-14	ŝ	11 47	
SU4-15	ě	220.77	
SU4-15	6	4.31	
SUA 17	5 ¢	4.51	
CI 14 19	5	31.73	
SU4-10	с С	3.35	
SU4-19 SUA 20	3	2.37	
504-20	5	1.65	
504-21	S	9.76	
SU4-22	S	1.74	
SU4-23	S	2.01	
GWB-5	R	1.93	
GWB-6	R	1.92	
GWB-7	R	1.84	
GWB-8	R	2.06	
GWB-9	R	1.77	
GWB-10	R	1.88	
GWB-11	R	1.86	
GWB-12	R	2.11	
GWB-13	R	2	
GWB-14	R	2.03	
GWB-15	R	2.05	
GWB-16	R	1.8	
GWB-17	R	1.84	
GWB-18	R	2.04	
GWB-19	R	2.17	
GWB-20	R	2.65	
GWB-21	R	22	
GWB-22	R	2.18	
GWB-23	R	2.18	
GMB-24	Þ	2.10	
GIA/B-25	Þ	2.37	
CMD 20	n n	1.30	
GVVD-20 CM/D-27	ĸ	2.07	
GVVD-21	ĸ	2.34	
GVVD-20	ĸ	2.09	





## **Basic Statistical Quantities Summary**

Statistic	Survey Unit	Background	DQO Results
Sample Number	23	24	N/2=22
Mean (pCi/g)	17.69	2.06	1.5
Median (pCi/g)	3.58	2.04	N/A
Std Dev (pCi/g)	45.62	0.20	1.3
High Value (pCi/g)	220.77	2.65	N/A
Low Value (pCi/g)	1.65	1.77	N/A

9/14/2006



#### **Survey Plan Summary**

Site:	Davis Mill Site,	Gateway, CO		
Planner(s):	Randy Whicke	r		
Survey Unit Name:	Survey Unit 5			
Comments:	Southwest bott	omlands area be	elow mill	
Area (m²):	8,375		Classification:	1
Selected Test:	WRS		Estimated Sigma (pCi/g):	1.3
DCGL (pCi/g):	2.60		Sample Size (N/2):	22
LBGR (pCi/g):	1.3		Estimated Conc. (pCi/g):	1.5
Alpha:	0.050		Estimated Power:	0.85
Beta:	0.150		EMC Sample Size (N):	22
Scanning Instrumentat	ion:	2x2 Nal detect	or	

## **Prospective Power Curve**





# **Contaminant Summary**

Contaminant	DCGLw (pCi/g)	Inferred Contaminant	, Ratio	Modified DCGLw (pCi/g)	Scan MDC (pCi/g)
Ra-226	2.60	N/A	N/A	N/A	2.6
Contaminant	:	Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g)		Reference Area Esti (Mean ± 1-Sigma (pCi/g)	mate a)
Ra-226		3.5 ± 1.3		2 ± 0.2	

9/14/2006



#### **Assessment Summary**

Site:	Davis Mill Site, Gateway, C	0	
Planner(s):	Randy Whicker		
Survey Unit Name:	Survey Unit 5		
Report Number:	1		
Survey Unit Samples:	25		
Reference Area Samples:	24		
Test Performed:	WRS	Test Result:	Not Performed
Judgmental Samples:	1	EMC Result:	Not Performed
Assessment Conclusion:	Do NOT Reject Null Hypo	thesis (Survey Unit	FAILS)

#### **Retrospective Power Curve**



COMPASS v1.0.0



## **Survey Unit Data**

NOTE: Type = "S" indicates survey unit sample. Type = "R" indicates reference area sample.

Sample Number	Туре	Ra-226 (pCl/g)			
SU5-1	, S	2.2		· · · · · · · · · · · · · · · · · · ·	 hanna ann an an ann ann an an an an an an
SU5-2	S	2.06			
SU5-3	S	2.07			
SU5-4	S	2.56			
SU5-5	S	11.02	•		
SU5-6	S	13.53	•		
SU5-7	ŝ	3.81	,		
SU5-8	S	3.39			
SU5-9	ŝ	14.31			
SU5-10	s	2.05			•
SU5-11	ŝ	2.19			
SU5-12	Ś	29.1			
SU5-13	ŝ	1 84			
SU5-14	Š	A 16			
SU5-15	<u>د</u>	10			
SU5-16	5	1.0			
SU5-17	3	2.10			
SH5.18		31.07			
SU5-18	S .	1.8			
SU5-19 CU5-20	5	2.81		•	
505-20	S	3.8			
SU5-21	S	10.35			1
SU5-22	S	3.15			
SU5-23	S	4.29			
SU5-24	S	2.01			
SU5-25	S	2.1			
GWB-5	R	1.93			
GWB-6	R	1.92			
GWB-7	R	1.84			
GWB-8	R	2.05			-
GWB-9	R	1.77		3	
GWB-10	R	1.88			
GWB-11	R	1.86			
GWB-12	R	2.11			
GWB-13	R	2			
GWB-14	R	2.03			
GWB-15	R	2.05			
GWB-16	R	1.8			
GWB-17	R	1 84			
GWB-18	R	2 04			,
GWB-19	R	2.07			
GWB-20	p	2.11 2 RE			
GWB-21	D	2.00			
GW/B-22	, r. a	2.4			
GM/R-23	r.	2.18			
GWD-20	r n	2.18			
GWB-25	ĸ	2.37			
CIVID-20	ĸ	. 1.96			
OWD-20	ĸ	2.07		1	
	ĸ	2.34	*	,	
GAAG-79	R	2.00			

COMPASS v1.0.0

9/14/2006

;



## **Basic Statistical Quantities Summary**

Statistic	Survey Unit	Background	DQO Results
Sample Number	25	24	N/2=22
Mean (pCi/g)	7.22	2.06	1.5
Median (pCi/g)	2.81	2.04	N/A
Std Dev (pCi/g)	11.17	0.20	1.3
High Value (pCi/g)	51.87	2.65	N/A
Low Value (pCi/g)	1.80	1.77	N/A



Page 3



This is to certify that

Randy D. Whicker

# has completed

A 40-HOUR COURSE ON IMPLEMENTING THE MARSSIM APPROACH FOR DESIGN AND CONDUCT OF RADIOLOGICAL SURVEYS conducted by Professional Training Programs of Oak Ridge Associated Universities

day of February, 2006 10th This. at Oak Ridge, Tennessee

# ATTACHMENT H

# PHOTOGRAPH DIAGRAMS: MARSSIM HOT SPOT DELINEATIONS







# ATTACHMENT I

## RESRAD OUTPUT RESULTS FOR POST-REMEDIATION DOSE ASSESSMENT

# ATTACHMENT J

# INSTRUMENTATION QUALITY CONTROL RECORDS

# GATEWAY PROJECT

Each survey instrument must be checked daily for reproducibility using the check source (mounted lantern mantle) according to the following procedure:

- 1. Turn the instrument on.
- 2. Record the date on the instrument log sheet.
- 3. Check and record the battery voltage on the appropriate instrument log sheet
- 4. The battery voltage must be 5 v or greater. If it is less than 5 v replace the batteries or notify the Radiation Safety Officer.
- 5. Set the meter to "scaler". Set the time switch to 0.5 minutes.
- 6. Remove the plastic cover from the detector face. Place the detector face down on the table.
- 7. Push the "count" button. The scaler will automatically record counts for 0.5 minutes.
- 8. Record the background count on the daily log sheet.
- 9. Open the check source cover.
- 10. Place the detector directly on the check source using the red plastic Pringles cover to support the detector handle so the detector is flat against the source.
- 11. Set the meter to "scaler". Make sure the time switch is on 0.5 minutes.
- 12. Push the count button. The scaler will record counts for 0.5 minutes.
- 13. Record the count on the log sheet. Check to make sure the count is within the control limits provided on the log sheet.

14. Add comments to the log sheet if necessary.

15. Initial the log sheet.

Type Alpha (43-5, 2221)

Meter Serial No. 97282 Probe Serial No. 093648

Instrument control limits (3 sigma) <u>135 - 197 905 m</u> Source

Date	Batt.	Count		Comments	lnit.
	Volt.	(0.5 mi	n)		
		Bkg.	Source		0.0
4/4/06	5.5.	0	174	na	Hat-
4/5/06	5.2	B	312_	Th-232	V.E.C.
4/6/16	55	E	148	11	BA
4/7/06	5.5	9	185	k	BJ
11/06	5.5		174	И	31
= 12/U.	5.5	1	155	11	BX
4/ Since	5.5	0	187	,1	BA
4/25/00	5.5	0	158		Cell.
5/4/06	5.4	<u> </u>	181	.1	1BS
5.4. ac	103	$\perp O$	178	/!	pra
5,5.06	64	0.	149	1/	133
5/8/06	6.3	0	149	]?	195
5/9/010	6.3	$\downarrow 0$	1154	11	15
5/10/06	62	0	168	Th-232	411-
5/11/00	6.1	0	156	Th-232	6.E.C.
5/12/06	6.t	0	152	Th-232	(. F.C.
5/15/00	6-1-	0	744=	-A-23-C	12824
5/19/06	6.1	0	136	14-232	alt
2/16/06	[ (g. ]	$\lfloor 0$	167	[ ].	$\downarrow \downarrow \downarrow \downarrow \downarrow$
5/17/16_	6.0	0	151	<u>it</u>	
5/18/06	6.0		164	. 11	T 187
1/1/06	<u>6</u> ,0	$\downarrow 0$	160	. 11	μ <u>μ</u>
5/21/06	5.9	Ļ Ļ	179	12-232 10	M.
5/23/66	59	<u>}</u>	163	<u>i</u>	W0
5/24/06	3.8	6	1185		1 mb m
<u> 3/24/06</u>	0.8		154	test middle of probe	VAJ
5/24/0p			144	test distalend of probe	1XAJ
5/24/06		ļ	169	test proximal sind of probe	
5/2006	3.8		103	Thi-232	128-6
>130/1020	25		160		112)
2/24/06-	5.7		1-201		+ 127- 1 AN
JUN UE	510	$\downarrow \underline{\mathcal{Q}}$	100	<i>ii</i>	HATE-
NUM UNE	LSig	<u> </u>	1 151	-11 . 721	Lift
JULKE 5/06	>. ₹	ſ	171	1 64 - 6 5 -	187
6/6/06	5.8	ł	180	Th - 232	1711
317/06	5.8.	0	154	Th- 3.2	75
rlalar	~ ~	1	15/1	TL-131	1 / 4 /2

QU/

Type A Dha (43-5,	2221)
Meter Serial No. 97282	Probe Serial No. <u>093648</u>
Instrument control limits (3 sigma)_	135-197 C/0.5m Source
	K3 bkg

Date	Batt.	Count		Comments	Init.
	Volt.	(0.5 mi	n)		
		Bkg.	Source	· .	A 4
15. LN 06	5.8	1	169	TH-232	AAF
30 JUNDE	5,8	1	182	£1	JULAF
05.10206	5,8	3	155	11 .	AFEN
36 JUL 06	5.8	Ð	180	li	HAF
07 JULCO	5.8	D	185	í (	AHF_
7/12/06	5.8	0	126	TL-232	103
24 Jul OL	5.7	$ $ $\Diamond$	185	TL-232	RS
25 54 06	5.6	3	168	74.232	132
26 Jul 66	63.		200	TK-232	182
27 Jul 06	6.1	1	133	Th-232	CTH
31 JULOG	6.4		153	Th-232	75
1 Aug 06	6.2	1	170	th-252	CZH
2 AJ 906	6.2	2	137	Th-232	TS
3 Aug 06	61	1	142	-Th-232	CIH
7 Auf de	5.9	<u> </u>	197	Th-232	678
8 Aug 06	5.8	0	161	Th-232	75
9 Aug 06	5.8	i	118	Th-232	CZA
/					
				······································	
	······································				
·····					

Type <u>Alpha</u> (43-5/2221) Prope <u>73680</u> Serial No. <u>043651</u> Prote Serial No. <u>74692</u> 15m Source

Instrument control limits (3 sigma) 141 - 23

Date	Batt. Volt.	Count (0.5 mi	n)	Comments	Init.
4/4/06	848	Bkg.	Source		- 7.
414/01	12	0	166	Th-232	Sha L
1174/06	10 2	(	149		1200
4125/04	17.	- <u>-</u>	153	1	- Children
24 Apr. 06	toi2	10	187	11	YTE
1/27/68	6.2	$\overrightarrow{O}$	7.03	11	- KAK
5/2/00	to.2	10	177	Th-232	1.5.0
5306	6.1	Ĩ	180	1/	TIME
5/4/06	6.1	I	193	11	BZ
55 ac	1e.1	<	+	- Counter not working -	
5/8/06	61		154	Th 232	RI
5/1/06	600		183		I KK
5/10/06	6.2	2	184	T4-232	arce.
5/11/00	6.1.	0	152	Th-232	CEC
5/12/06	6.1	0	131	Th-232	1. E. C.
, 340/06	6-1-	6	167-		tere S
5/15/16	6.1	Ø	154	Th-232	- Qul
5/16/06	6.1	· [	23	a ·	
1/17/00	6.1	ļ.	116X	` ((	
5/19/06	Lie-L	ι	1220	. <u>I</u> I	R
5/19/06	<u> </u>	$0$	173	5	N.
5/27/06	6.0	Z	194	1h-212 to	N
5123165	6.0	<u>   </u>	167	11	- NO
D/14/16	<u> </u>	<u>  Z</u>	1126	16.256 10	
51000	PP	<u> </u>	103	41 (L "	151
5/20/26	6.0		1208	IL LOC	<u>کم ا</u>
13/51/ou		<u> </u>	144	14-232 ·	
55	610	2	176 Tar	<u>Tu-232</u>	
> June Ob	9.0	+	197	12771	143
04/6/06	$\frac{\omega}{\omega}$		176	16-656	
1/2-7-0/2	6.0	<u> </u>	180	1h-626	
6-7-01	160		19911	16 232	1 4V X Y

43-5, 222 Type Appha Probe Serial No. 73 141 - 230 73 355 + 651 10.5Meter Serial No.  $\frac{09365}{09365}$ Instrument control limits (3 sigma)\_ 73586 0.5m Source < 3 bka

Date	Batt.	Count		Comments	Init.
	Volt.	(0.5 mir	ı)		
		Bkg.	Source		4.2
14 JUNCE	6.0	1	196	TH-232	LAF
15 JUN06	5,8	1	183	774-232	UNF-
16 JUNOG	5.9	1	163	-TH-23->	AF
19 Junich	519	0	178	774-232	WIFF
-20 Jun 06	5.8	0	198	<u>(</u> [	AF
21 JUN do	5.9	1	206	1	WAF
29 JUNO6	5,8	0	202	11	A The
24 Jul 06	6.4	2	187	TH-231	BS
27 Jul 06	6.4	2	215	μ	75
315106	6.1	0	216	11	75
8 31 06	6.1		67	(/	13
9					
				· · · · · · · · · · · · · · · · · · ·	
				, ,	
	·····				
	······································				
	· · · · · · · · · · · · · · · · · · ·				
				· · · · · · · · · · · · · · · · · · ·	
			······		
			·····		
				~	
			<u>`````````````````````````````````````</u>		
			-		

đ.

Type Beti/Gamma (44-9/2221

Meter Serial No. 67423 Probe Serial No. 67706

درده المعهدة

a)	990-1193	Source
	16-45	Bkg

Instrument	Instrument control limits (3 sigma) $990 - 1193$ 500 cce						
			16-45 Bkg	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
Date	Batt.	Count	Comments	Init.			
	Volt.	(0.5 min)	star in the second s	· · · · ·			
		Bkg. Sourc	e / w				
11-166	6.3	32 1114	na.	Ad Li			
1.506	54	1,4 2300	Sarra Th 232	FAC			
4.16-06	6.3	37 1101	11	- BK			
4/12/01	63	27 1152		- BA			
4/12/06	6.5	44 1121	/1	RS			
4/25/06	6.3	33 1185	Service Th 232	4011			
5/2/010	4.3	35 1000	2	CFC.			
=1410k	10.7	25 111	(1 1)	-mw			
5/5/06	6.3	28 1153	$\rho = P$	TRS			
5/8/06	6.2	34 1049	11 11	<u>B</u>			
5/9/06	6.7	35 1092	11 II	<u> </u>			
Stuld	6. 2	35 1091	14232	Q11			
5/11/06	6.2	33 1075	- 11	CEC			
5/12/06	6.2	35 1081	11 -	CEC Pall			
5/13/06	-G.t-	36 108%		- CIG- Clif-			
5/15/06	6.2	34 1101	TH232	C/14			
5/16/06	6.2	6 1131	111	$-\underline{}$			
5/17/26	6.7	25 1104	ic	<u> </u>			
5/18/06	6.Z	27 1122	ι	6			
5/19/26	67	36 1077	12	P A			
5/22/06	6.2	23 1074	TL - 232 10				
5/23/00	6.2	27 1039	- 11	V J			
5/24/06	6.2	37 1199	U	18			
5/24/06	6.2	34 107	9 test				
>130/06	6.2	3 + 1227	TL-232	<u>1Y }</u>			
6/1100							
5/8/06	- 6-2	29 1007	Th- 2 Sel	N 4 C			
6/13/00	10.2	35 1091	/ 1	<i>IV ℓ</i>			
	 	1					
	· · · · · · · · · · · · · · · · · · · ·			·			
	<u> </u>						
	ł						

## & Backpack Scanning System INSTRUMENT LOG SHEET

Type: Ludlum Model 44-10 Nal detector with Model 2350 meter (MFG-F)

术

Meter Serial No. 129438	Probe Serial No. <u>//</u>	12/033	XCDOT
Instrument Control limits (3 sigma) $(\mathcal{VR}/h\mathcal{L})$ Background:	19.8 - 24.1	6-22-06 * new 11mito: 1416-23.8	1-29-06 New Finito 13.2 · M.7
Source:	54,7 - 58.4	19.4 - 60.2	48.0-49.6

		20-count	20-count		
	Battery	Average	Average		
Date	Voltage	(Bkg)	(Source)	Comments	Initials
5-4-06	5.8	23.3	55,8		<u>M</u>
5-5-06	5.7	21,6	56,1	For Interim Scan SU- (Parking areas)	1hr
5-8-06	5,6	21.0	54,9	Apponded pre-cleanup scain South Medow	14UT
5-30-06	5:6	21.9	54.7	mesa top (post excovation)	100-
5-31-06	6.2	22,6	56,5	mesa side slopes + maros (Final)	To theme
6-1-06	6.1	<u>73,2</u>	56.5	MESSIRES & top (P-SCAR (FINAL)	RM
6-11-06	6.0	19.6	5,4,2	SUNRY UNIT 7 FINAL (PRE-backful)	1WI-
6-15-06	5,8	19.2	54.4	SU-1 Harson resizing SU-5 reaction	fins-
6-17-06	5.8	19,6	54.2	SU-3 Final (PIP-backFill	The
6-14-06	5.9	18.5	53,6	MOP-UD RESCORE OF dealed liptspots	Mar
6-21-06	6.3	19.4	53.4	50-4 Anal scan lainal (ne-backfill)	12
(-22-05)	6.2	190	53.4	SU-4 " 11 remainder	11
7-7-06	6.1	[] [] [] [] [] [] [] [] [] [] [] [] [] [	48.8	final scan Boltomballs (nost re-oradina)	M
R-9-16	5.8	13.1	47.3	Fimal SIMA WEST & NATH 33 COOT	AL
9-9-05	57	12.7	47.9	FINAL SCUN LEMANDER COOT	IN
				· · · · · · · · · · · · · · · · · · ·	
	,				
2					
				· · · · · · · · · · · · · · · · · · ·	
				·	
	······································				
· · · · · · · · · · · · · · · · · · ·					
			and the second		·····

\* note: ore rocks & other material removed behind trailer - Backgrouind apprava to have dropped a bit as of 6-11-06










(GW-7)









Upper Control Limit CDOT: background check (GW-7) control chart for MCA system Mean + 2o Mean + 1o Mean 20116 Mean - 1o Month / Year\_ Ala Mean - 2ơ Low er Control Limit

0.80

0.70

0.60

0.50

Mean Ra-226 Estimate (pCi/g)

0.40 6 . 0.30 0.20 5 52 N \$ 0.10 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 9 3 5 6 7 8 Rin Day of Month (enter data point)

M	Designer and t c Scientific an Instrum	vlanufacturer of d Industrial ients	M) CERTIFICATE	I-C-G OF CALIBRA	ATION	LUDLUM MEAS POST OFFICE BOX 501 OAK STREET SWEETWATER, TEXA	SUREMENTS, IN 810 PH. 325-235- FAX NO. 32 AS 79556, U.S.A. 2396/3/	<b>IC.</b> 5494 5-235-4672
CUSTOME	R MFG INC					ORDER NC	238783/2	93308
Mfg.	Ludium Measu	irements; inc.	Model	2350	)-1	Serial No.	152361	
Cal. Date	26	<u>Jul-05</u> Ca	Due Date	26-Jul-0	<u>6                                    </u>	terval <u>1 Year</u>	Meterface	N/A
heck mari	< 🗹 applies to ap	plicable Instr. and	or detector IAW	mfg. spec.	T73_ °F	RH47_	% Alt <u>699</u>	<u>.8</u> mm Hg
New Ir Mech F/S Re Audio Audio	nstrument Instr anical check isp. check check neter Linearity chi Log check ated in accordan	ument Received	Within Toler. + neck etting check ed Dose check d check .8 rev 12/05/89.	-10% □ 10-209 ♥ Windo ♥ Batte ♥ Recyo ♥ Scaler ♥ Calibro	6 Out of Tol. Ow Operation ry check (Min. ) cle Mode check r Readout check ated in accordame	Requiring Repo In Notty <u>4.4</u> VDC Thre Dial ce with LMI SOP 14.9	shold $\underline{////} = 2$ rev 02/07/97.	comments
	Peadout (2 noin	ts) Def /inst	500	- GA	> V Pef (in	t 2000	1 1997	- V
		13) KOL/#131.		(1) (		2000	/	······································
Gamma Calibral	1/C Firmwa Eclibrate	r = :37123N09 at $1 = :37'' call here perpendicular to source e$	C. R R R R R R R R R R R R R R R R R R R	leso ( ut i o r the front of probe faces s	n for Cs-	137 × 11%		
	Probe Model	Soriel #	High Voltege	Thrachaid	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Lineanity ±10%*
Detector # 1	LMI44-10	PR-121036	1050	100	7 / 1	1.490037E-05	1.000000E+00	
)etector # 2	LMI44-10	PR-121036	1050	100	4 / 2	1.490037E-05	5.171726E+10	$\overline{\checkmark}$
)etector # 3	PEAK	CS-137	811	642	7 / 1	0.000000E+00	1.000000E+00	
etector #								
etector #	·							
)etector #				·.		•		
Detector #					······			
Detector #					M	F11		
Detector #	····				/៕	10 0		
Detector #		1997						· ·
elector #			·				·····	
elector #								
etector #								
Detector #		<u></u>	······································			·		
Detector #								
Units: 0 -	rad, 1 - Gray, 2 - rem, 3	- Sv, 4 - H, 5 - C/Kg, 6 -	Disintegrations, 7 - Cour	nis, 8 Ci/cm sq., 9	- Ba/cm sq.			
ime Base: 0 -	REFERENCE	INSTRUMENT	INSTRU	IMENT	REFERENCE	INSTRUME	NT INSTRU	IMENT
Digital	CAL POINT	RECEIVED	METER	READING	CAL. POINT	RECEIVED	METER	READING*
Readout	400kcpm	<u>N/A</u>	<u></u> <u></u> <u>-</u> <u>-</u> <u>-</u> <u>-</u>	2999	4000		/ <u>/</u> /	<u>40</u>
	4kcpm			400		<u> </u>		
udium Measur ther Internation te calibration	rements, inc. certifies th anal Standards Organiza system conforms to the	at the above instrument i ation members, or have b requirements of ANSI/NC	cs been catbrated by een derived from acci SL 2540-1-1994 and At	v standards traceable epted values of natu ISI N323-1978.	e to the National Institu ral physical constants c	e of Standards and Techn r have been derived by th State of Texas	ology, or to the calibration ratio type of collibration Calibration License N	on lacilities of in techniques. Io. LO-1963
	Instruments an	d/or Sources: Cs-	37 Gamma S/N			· · · · · · · · · · · · · · · · · · ·		
leference	∐G112 ☐M565	5105 11008	1879 🗌 E552 🗍	_ E551 720	734 🗌 1616		Neutron Am-241 Be S/	'N T-304
	ba C/N		Beta S/N	a an	in in a substantiant and a substant	J Other Am	141 7 0.76	<u>uC1</u>
2eference 1162		60000		1 /		ultimeter S/N	83990502	100 per 1990 - 11 per 19
Ceference 1162 Alp	500 S/N	00000		11	•	1	106	
Calibrated	500 S/N	in the	les .	and	Date	-26 - Ju	160	
Reference 1162 Alp V m Calibrated Reviewed	500 S/N	Mini	les	aust	Date _ Date _	26 2/ 0		
2eference 1162 Alp 2 dibrated Reviewed	500 S/N By: By: 11/26/2003	This certificate shall	noi be reproduced exit	Cept in full, without th	Date Date	T6 14	<u> </u>	

	Scientific an Instrum	d Industrial Nents	CERTIFICATE	E OF CALIBR	ATION	Post office box 8 501 Oak Street Sweetwater, texa	310 PH. 325-235 FAX NO. 32 NS 79556, U.S.A.	-5494 25-235-4672
CUSTOMER	MFG INC					ORDER NO	238783/	293308
Mfg.	Ludium Measu	irements, Inc.	Model	235	0-1	Serial No	129438	
Cal. Date	25-,	<u>Jul-05</u> Ca	Due Date	25-Jul-0	16 Cal. Ir	nterval <u>I Year</u>	Meterface	N/A
heck mark	🗹 applies to ap	oplicable instr. and	/or detector IA\	N mfg. spec.	T. <u>73</u> °F	RH47_	% Alt <u>69</u>	2.8 mm Hg
New Ins Mechai F/S Rest Audio o Rateme Data Lo	trument Instr nical check o. check :heck eter Unearity ch og check ed in accordan	Reset cl Reset cl Alarm Si eck r Integrat Overloc	Within Toler. heck etfing check ed Dose check id check A rev 12/05/89	+-10% 10-20	% Out of Tol. ow Operation ery check (Min. cle Mode check er Readout check	Requiring Repa	ir $\underline{G}$ Other-See put Sens. Linearity shold $\underline{IOO} =$	comments
I ∩ HV I	Readout (2 poin	nts) Ref./Inst	500-	1	/V Ref./In	st. 2000	_1_2004	/v
COMMEN	TS: Firmwo I/OFirmwo Calibrat	are: 37122N21 are: 37123N05 by d ~ 39° cab	SIC_ YORN for M 44-9 in white	No as-fo Resolutio	n for Cs.	s of memor -137 712%	y)	
	Probe		High		Units/	Dead Time	Calibration	Lineanty
)elector # 1	Model Mi44-10	Serial # PB-121033	voltage	Threshold	Hime Base	Uprrection Factor	Constant	±10%"
)etector # 2	LMI44-10	PB-121033	1100	100	4/2	1.552968E-05	5.024622E+10	
)elector # 3	PEAK	CS-137	816	642	7 / 1	0.000000E+00	1.000000E+00	
)elector #								<u></u>
- Detector #								
- elector #		······	····				and a second	
etector #			**************************************			-		
Detector #								
Detector #	· · · · · · · · · · · · · · · · · · ·				MAGI	2		
Detector #	· .		••••••••••••••••••••••••••••••••••••••		MFG			
etector #						• -		
etector #						-	·····	
)etector #	****							
)etector #		- <u>-</u>						
)etector #				Wattabat				
)etector #		0. 1 b c 0#	Disinfaceration 7	·	Below a	· · · · · · · · · · · · · · · · · · ·		
Units: U – ra fíme Base: 0 – Se	u, i – Gray, 2 – rem, 3 econds, 1 – Minutes, 1	- əv, 4 - H, 5 - Wr.g, 6 - 2 - Hours	usmiegrations, / - Co	unus, o ~ U/CITI \$Q., 9	bq/cm sq.	* See a	ittached detector document	ation, il applicable.
	REFERENCE	INSTRUMENT	INSTR	UMENT	REFERENCE	INSTRUMEN	NT INSTR	UMENT
Digital Readout	CAL POINT	KECEIVED	- METE - 4つ	R READING* $\gamma 3 (10)$	CAL POINT	nn KECEIVED	A METER	R READING*
	40kcpm			799 Z	40c	om		45
	4kcpm		ti winata na pananga di sika na sa	400 (				۰.
udium Measurer	nents, Inc. certifies th 31 Standards Organiza	at the above instrument f ation members, or have b	as been calibrated een derived from ac	by standards traceab cepted values of nati	le to the National Institu Jrai physical constants (	te of Standards and Technic or have been derived by th	ology, or to the calibrat ie ratio type of calibrati	ion facilities of on techniques.
ne colloration sy	stern conforms to the	a requirements of ANSI/NC	SL 2540-1-1994 and .	ANSI N323-1978.		State of Texas	Calibration License I	No. LO-1963
	G112 M565	5105 T1008	I I Gamma S/N ▼ 1879 □ E552	E551 720	734 1616		Neutron Am-241 Be S	/N T-304
	⊃ S/N		Beta S/N			Ofher Am	L41 20	2 land 1
₩ m 50	0 \$/N	50800	- 1	1	2. / IM	uitimeter S/N	83990502	
		1 har	lan	and the second second	12 Data	26	110	5
dibrated B	Y:	The Key	S Concenter				lul la	

M	Designer and Scientific a Instru	í Manufacturer of ind Industrial iments	N CERTIFICATE	11°6° 3 E OF CALIBR/	ATION	LUDLUM MEA POST OFFICE BOX 501 OAK STREET	SUREMENTS, 11 810 PH. 325-235 FAX NO. 3	<b>NC.</b> -5494 25-235-4672
						SWEETWATER, TEX	AS 79556, U.S.A.	NI/B-
CUSTOME	R MFG INC		116-11-11-11-11-11-11-11-11-11-11-11-11-			ORDER NO	D. <u>242752/</u>	295372
Mfg.	Ludium Mea	surements, Inc.	Model	235	0-1	Serial No	134759	
Cal. Date	21-	<u>Sep-05</u> C	al Due Date	21-Sep-(	06 Cal. 1	nterval <u>1 Year</u>	_ Meterface	N/A
Check mar	k 🗹 applies to c	applicable instr. an	d/or detector IAV	V mfg. spec,	T75 °F	RH45_	% Alt. 697	<u>.8</u> mm Hg
New I	instrument ins	trument Received	Within Toter.	+-10% 10-20	& Out of Tol.	Requiring Rep	oalr 🗍 Other-See	comments
	anical check	Docot	obaali	Mand.	Nu Oporation		nput Sens. Linearity	
Audic	) check	Alarm	Setting check	Batte	ry check (Min.	Volt) 4.4 VDC		
Rater	neter Linearity cl	neck 🗹 Integra	ated Dose check	Recyc	cle Mode check	Thre	shold 100 -	10-
	ated in accorda	nce with LMI SOP 1	4.8 rev 12/05/89.		ated in accordan	ce with LMI SOP 14.4	9 rev 02/07/97.	
CZ LA	(Pagdout (2 pol	intr) Dof (Inst	500	, 499	V Dat In	et 2000	1 1996	δ V
<u>Y</u> IV				. /	v keran	<u></u>	/{	· · · · · ·
COMME	TID Firmu	are: 3/122N28	5					
	<u></u>							
Resol	ution fo	, Cs-13;	7= 10%		•			
			~		•		. •	
							۰.	
				•				
Gamma Calibra	tion: GM detectors positi	aned perpendicular to source	except for M 44-9 in which	the front of probe faces s	OURCE.	-		
	Probe	Cariol <sup>2</sup>	High	Thereford	Units/	Dead Time	Calibration	Linearity
Detector # 1	LMI44-10	PR139483	950	100	4 / 2	1.368264E-05	5.545344E+10	±10%
Detector # 2	LMI44-10	PR139483	950	100	.7 / 1	1.368264E-05	1.000000E+00	
Detector # 3	PK/CS-137	PR139483	646	642	7 / 1	0.000000E+00	1.000000E+00	
Detector #		······						
Detector #	<u> </u>				``````````````````````````````````````			
Detector #		<sup>~</sup>						
Detector #				·		<u></u>		,
Detector #				*			************	·
Defector #			. موجود مرجوع وروم روم وروم روم مرجوع مرجوع مرجوع وروم وروم وروم مرجوع مرجوع مرجوع مرجوع مرجوع مرجوع مرجوع مرجو		181.000 ver and 1.0 for 1.0 for 2.0 for an and			
Detector #			- Disintegrations, 7 - Cou	ints, 8 - Ci/cm sq., 9 -	Bq/cm sq.			
Detector # Units: 0-	rad, 1 Gray, 2 rem,	3 - Sv, 4 - R, 5 - C/Kg, 6	·····					ion, if applicable.
Detector # Units: 0 - Time Base: 0 -	rad, 1 Gray, 2 rem, 1 Seconds, 1 Minutes,	3 - Sv. 4 - R. 5 - C/Kg. 6 2 - Hours				* See a	tlached delector documenta	5 JT" 5 1"
Detector # Units: 0 - Time Base: 0 -	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT	3 - Sv. 4 - R. 5 - C/Kg, 6 2 - Hours INSTRUMEN RECEIVED	JT INSTRU METER	UMENT ? READING."	REFERENCE CAL. POINT	See a INSTRUMEN RECEIVED	Itached delector documenta IT INSTRU METER	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digital Readout	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm	3-SV, 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED	IT INSTRI METER	UMENT READING	REFERENCE CAL. POINT 400cc	See a INSTRUMEN RECEIVED	ttached delactor documenta NT INSTRU METER	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digital Réadout	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT <u>400kcpm</u> <u>40kcpm</u>	3-SV, 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 1. <u>39972</u> 1. <u>39972</u>	$\frac{1}{2} \begin{pmatrix} 0 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ $	UMENT READING 225 (07 29 Z S	REFERENCE CAL POINT 400cp	instrumen RECEIVED m m	Itaches detector documenta IT INSTRU METER 2 (0) 4 (0) 	MENT READING* 2
Detector # Units: 0 - Time Base: 0 - Digital Readout	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL POINT 400kcpm 40kcpm 4kcpm ements, inc. certifies th	3-Sv, 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 39977 L 39977 L 4000 Dat the above instrument	VT INSTRI	UMENT READING 7775 077 120 I standards traceable t	REFERENCE CAL. POINT 400cp 400cp	instrumen RECEIVED Im 4/C	ttached detector documenta NT INSTRU DC C ALL METER ALL C ALL C AL	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digifal Readout uolum Measur uolum Measur uolum Measur her internatio	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm amonts, inc. certifies th nois Standards Organia system conforms to the	3-Sv. 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 39972 39972 1 39972 1 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	JT INSTRI METER 2 2 39 2 39 2 39 2 39 2 39 2 39 2 39 2	UMENT READING <u>775</u> <u>777</u> <u>7977</u> ystandards fraceable t gold visues of natural vst N323-1978.	REFERENCE CAL. POINT 400cp 40cp	see a INSTRUMEN RECEIVED IM 4/ of Standards and Technick state of Texas ( State of Texas (	ttaches detector documenta NT INSTRU METER 2007 400 2007 200	MENT READING* 2 5 facilities of echniques. 2 LO-1963
Detector # Units: 0 - Time Base: 0 - Digital Readout Ludium Measur Sther internatio (he calibration <b>Reference</b>	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm 4kcpm ements, inc. certifies th not Standards Organiz system contorms to th Instruments ar	3-Sv, 4-R, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 39972 39972 19972	NT INSTRI METER 2 (2) 39 2 30 2 30 2 30 2 30 2 30 2 30 2 30 2 30	UMENT READING 975 977 100 y standards traceable to epted values of natural vsl N323-1978.	REFERENCE CAL. POINT 400cp 400cp to the National Institute Il physical constants or I	* See a INSTRUMEN RECEIVED IM4/C IM4/C of Standards and Technick have been derived by the State of Texas C	taches detector documenta NT INSTRU METER 4( 2) 2) 2) 2) 2) 2) 2) 2) 4) 4) 2) 2) 4) 2) 2) 2) 2) 2) 2) 2) 2) 2) 2	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digital Readout Uniter internatio the catoration Reference	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 400kcpm 40kcpm aments, inc. certifies th nois Standards Organic system contorms to th Instruments ar	3-Sv. 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 39972 39972 19972 100 100 cover ostrument ation members, or hove a requirements of ANS/N 10/or Sources: co 5106 T1008	NT INSTRI METER 2 0 39 2 34 2 34 2 34 2 34 2 34 2 34 2 34 2 34	UMENT READING 97507 12507 1207	REFERENCE CAL. POINT 400cp 40cp	* See a INSTRUMEN RECEIVED IM 4/C of Standards and Technick State of Texas C	taches detector documenta IT INSTRU METER 2007 40 2007 40 2007 40 10 10 10 10 10 10 10 10 10 1	MENT READING*
Detector # Units: 0- Time Base: 0 - Digital Readout Undurn Measur Undurn Measur Undurn Measur Che calibration Reference 1162 [ Chip]	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm 40kcpm amonths, inc. certifies th and Standards Organiz system contorms to th Instruments ar G112 M565 hor S/N	3-Sv, 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 39972 39972 4/22 Not the above instrument ation members, or hove is requirements of ANS/h id/or Sources: Ca 5105 11008	NT INSTRI METER 2 (2) 39 2 39 2 39 2 39 2 39 2 39 2 39 2 39 2	UMENT READING 925 (0) 1977 100 y standards fraceable 1 epted values of natural vsl N323-1978. E551 720	REFERENCE CAL POINT 400cp 40cp to the National Institute I physical constants or I	See a     INSTRUMEN     RECEIVED     M     M     M     definition     Standards and Technick     ave been derived by the     State of Texas C     Neutron Arm     Other	taches detector documenta NT INSTRU METER 2007 A to the collocation ratio type of collocation to Calibration License No 241 Be S/N T-304 Am241=0.76p/C	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digital Readout Lucium Measur ather internatio the caterration Reference Di162 [ Content of the caterration Reference Di162 [ Content of the caterration Reference Di162 [ Content of the caterration Reference Di162 [ Content of the caterration Reference Di 162 [ Content of the caterration Reference Di 163 [	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm 40kcpm amonts, inc. certifies th nai Standards Organiz system contorms to th <b>Instruments ar</b> G112 M565 hor S/N	3-Sv, 4-F, 5-C/Kg, 6 2-Hours INSTRUME! RECEIVED 39977 39977 400 100 members of ANSI/N id/or Sources: Ca 5105 11008	NT INSTRI METER 3.97 3.4 3.4 3.4 3.4 3.4 3.4 5.40-1-1994 and At (SL 2540-1-1994 and At (SL 2540-1994 at (SL 2540-1994 at (SL 2540-1994 at (SL 2540-1994 at (SL	UMENT READING 9797 9797 120 2917 120 2917 2017	REFERENCE CAL POINT 400cr 400cr 10 the National Institute 1 physical constants or I	See a     INSTRUMEN     RECEIVED     M	taches detector documenta NT INSTRU METER 2007, or to the calibration calibration License Ne 241 Be S/N T-304 Am241-0.76b/C 83990502	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digital Readout Uolum Measur ther internatio the calibration Reference 1162 [ Alph V m 5 Calibrated	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm advantables 40kcpm actionation 40kcpm actionation 40kcpm generation actionation system contorns to the instruments ar G112 M565 hor S/N 500 S/N By:	3-SV, 4-F, 5-C/Kg, 6 2-Hours INSTRUME! RECEIVED 39972 39972 442 39972 100 members of ANS//h id/or Sources: Ca 5106 11008	NT INSTRI METER 3.97 has been collipcide b been derived from acc ICSL 2540-1-1994 and At H37 Gamma S/N T 1879 E552	UMENT R READING 975 (0) 1977 100 100 100 100 100 100 100 1	REFERENCE CAL POINT 400cp 400cp 10 the National Institute 1 physical constants of 1 734 1616 Mu Date	see a INSTRUMEN RECEIVED IM INSTRUMEN RECEIVED IM INSTRUMEN IM INSTRUMEN INSTRUMEN INSTRUMEN INSTRUMENTIAL INSTRUMENTIALINAL INSTRUMENTIALINALINALINALINALINALINALINALINALINALI	taches detector documenta NT INSTRU METER 2007 40 2007 40 200	MENT READING*
Detector # Units: 0- Time Base: 0 - Digital Readout Undurn Measur Unter internation Reference Dita2 [ Calibrated Reviewed	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm amonts, inc. certifies th indistandards organiz system conforms to th instruments ar G112 M565 har S/N 500 S/N By:	3-SV, 4-F, 5-C/Kg, 6 2-Hours INSTRUMEN RECEIVED 39972 472 1000 10	NT INSTRI METEL 2 ( 2 39 2 30 2 30 2 30 2 30 2 30 2 30 2 30 2 30	UMENT R READING 975 977 120 y standards traceable 1 epted volues of natura NSI N323-1978. E551 720	REFERENCE CAL POINT 400cr 400cr 10 the National Institute 1 physical constants or 1 734 1616	See a INSTRUMEN RECEIVED IM Of Standards and Technick of Standards and Technick of Standards and Technick State of Texas C INSULTION Arm Other Itimeter S/N Itim	taches detector documenta NT INSTRU METER 2007 Artist the collocation ratio type of calibration Calibration License No 241 Be S/N T-304 Arm241=0.76//C 83990502 2005	MENT READING*
Detector # Units: 0 - Time Base: 0 - Digital Readout Undurn Measur Undurn Measur Displication Reference 1162 [ Calibratea Reviewed FORM C44C	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 400kcpm 40kcpm amonts, inc. certifies the and Standards Organic system contourns to the Instruments ar G112 M565 hor S/N 500 S/N By: 11/26/2003	3-Sv. 4-F, S-C/Kg, 6 2-Hours INSTRUME! RECEIVED 39972 39972 444 39972 1000 1000 members of ANS// 1000 50800 1000	NT INSTRI METEL 3.97 has been collibrated from do- been derived from do- been derived from do- licsL 2540-1-1994 and Al -137 Gamma S/N 1879 E552 Beta S/N	UMENT R READING 975 (0) 1977 100 100 100 100 100 100 100 1	REFERENCE CAL POINT 400cp 10 the National Institute 1 physical constants of 1 734 1616 734 Mu Date Date bate	See a INSTRUMEN RECEIVED IM R	ttaches detector documenta NT INSTRU METER 2007 4/0 2017 10 the colloration ratio type of calibration Calibration License Nr 241 5e S/N 7-304 Am241=0.76µC 83990502 2005	MENT READING*
Detector # Units: 0- Time Base: 0 - Digital Readout Unite categorianon Readout Calibratea Reviewed FORM C44C	rad, 1 - Gray, 2 - rem, Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm amonts, inc. certifies th indistandards Organiz system conforms to th Instruments ar G112 M565 hor S/N 500 S/N By: By:	3-SV, 4-F, 5-C/Kg, 6 2-Hours INSTRUME! RECEIVED 39972 4000 1000 members of ANSPA 10/or Sources: Co 5105 T1008 50800 This certificate shall	NT INSTRI METEL 3.97 	UMENT READING DESCRIPTION READING DESCRIPTION READING DESCRIPTION READING DESCRIPTION READING	REFERENCE CAL POINT 400cp 40cp to the National Institute If physical constants or I 734 1616 Mu Date Date Date U	See a INSTRUMEN RECEIVED IM CI Standards and Technick of Standards and Technick State of Texas INSTRUMENT Other Itimeter S/N Itimeter	taches detector documenta NT INSTRU METER 2007, or to the colibration ratio type of colibration Colibration License No 241 Be S/N T-304 Am241=0.76z/C 83990502 C	MENT READING*

M	Designer o Scientific Ins	and Manufacturer of C and Industrial struments	MFU CERTIFICATE	5-9 E OF CALIBR	ATION	LUDLUM MEA POST OFFICE BOX 501 OAK STREET SWEETWATER, TEX	ASUREMENTS, I K 810 PH. 325-235 FAX NO. 3 KAS 79556, U.S.A.	<b>NC.</b> 5-5494 925-235-4672
CUSTOM	ER MEG IN	<u>c</u>				ORDER N	0. 242259 /	295159
Mfg.	Ludium Me	asurements, Inc.	Model	23	60-1	Seriai No	129403	·
Cal. Date	)	20-Sep-05	Cal Due Date	20-Sep-	<u>06</u> Cal.	Interval <u>Year</u>	Meterface	<u>N/A</u>
Check mai	k 🗹 applies to Instrument nanical check esp. check	0 applicable Instr. ( Instrument Receive i√ Rese	and/or detector IAV ad GWIthin Toler. at check	V mfg. spec. +-10% 10-20	T. <u>74</u> °F Cut of To	RH47 I. [] Requiring Rej [] I	_ % Alt70; pair [] Other-See Input Sens, Linearth	<u>2.8   mm Hg</u> comments y
Audio Ratei Data Calibr	o check meter Linearity Log check ated in accorr	Check Alari Check I integ Ove dance with LMI SOI	m Setting check grated Dose check rload check 2 14.8 rev 12/05/89.	<ul> <li>✓ Both</li> <li>✓ Recy</li> <li>✓ &amp;cal</li> <li>✓ Callb</li> </ul>	ery check (Min cle Mode check er Readout chec ated In accorda	. Volt) 4.4 VDC Three k Did nce with LMI SOP 14	C eshold <u>100 =</u> 11 Ratio <u>100 =</u> .9 rev 02/07/97.	<b>10</b> mV
Щ н'	V Readout (2 p	oolnts) Ref./Inst.	500	1 499	V Ref./I	nst <u>2000</u>	// <u>995</u>	· · · · · ·
COMME I/O Firm	NTS: Firr ware: 371231	nware: 37122N21 105					MF6-	-9.
Resoluti	on for Cs137	7 ≈ 10.57 %						
Gamma Calibri	ation: GM detectors p Probe	ositioned perpendicular to so	urce except for M 44-9 in which High	n the front of probe faces	source.	Dead Time	Calibration	Linearity
Detector # 1	Model LMI44-10	Serial # PR-135858	Voltage 950	Threshold 100	Time Base 4 / 2	Correction Factor 1.587509E-05	Constant 5.666091E+10	±10%*
Detector # 2	LM144-10	PR-135858	950	100	7 / 1	1.587509E-05	1.000000E+00	
Detector # 3	CS-137	PEAK	692	642	7 / 1	0.000000E+00	1.000000E+00	

Detector #						
Detector #				-		
Detector #		· · · · · · · · · · · · · · · · · · ·				,
Detector #			······································		· · · · · · · · · · · · · · · · · · ·	
Delector #	Au &					
					<u></u>	
Detector #		<del></del>		· ····································		
Detector #						
Units: 0 - r	ad, 1 - Gray, 2 - rem, 3 - Sv	, 4 - R, 5 - C/Kg, 6 - Disintegra	tions, 7 - Counts, 8 - Ci/cm sq., 9	Ba/cm sq.		
Time Base: 0 5	seconds, 1 Minutes, 2 H	ours			<ul> <li>See atlached delec</li> </ul>	tor documentation, If applicable
	REFERENCE	INSTRUMENT	INSTRUMENT	REFERENCE	INSTRUMENT	INSTRUMENT.
Dialtal	CAL. POINT	RECEIVED	METER READING*	CAL. POINT	RECEIVED	METER READING
				100	(12 (0)	11.1.2
Readout	400kcpm	39917(0)	39917(0)	400cpm_	40 (0)	40(0)
Readout	400kcpm 40kcpm	39917(0)	3989)	<u>40cpm</u>	40(0)	<u>40(8)</u> <u>4</u>
Readout	<u>400kcpm</u> <u>40kcpm</u> 4kcpm	<u> </u>	<u>399(17(0)</u> <u>3939</u> <u>399</u>	40cpm40cpm	40(0)	40(6) 4 j
Readout	400kcpm 40kcpm 4kcpm ments Inc. certifies that the	399(7(6) 3199 319 319 319 5 obove instrument has been	399 17 (o) 3986 369 J colibrated by standards traceable	400cpm 40cpm	and Technology, or to th	e calibration facilifies of
Readout Lucium Measure other Internation The calibrations	400kcpm 40kcpm 4kcpm ments, Inc. certifies that the val Standards Organization vaters conforms to the read	39917 (o) 3199 319 311 (c) e above instrument has been rrembers, or have been deriv idements of ANS/NCS 7540-	Calibrated by standards traceable ed from accepted values of nature 1994 and ANS N320-1978	400cpm 40cpm to the National Instituties of Stanc of physical constants or Pave be	and and Technology, or to the and derived by the ratio type of State of Lexas Calibration	e calibration facilities of 1 calibration tecnniques. 1 license No. LO-1963
Readout	400kcpm 40kcpm 4kcpm when is inc. certifies that the ad Standards Organization ystem conforms to the required locate imports and for	39917 (o) 3199 319 319 o above instrument has been rrembers, or have been detu- uirements of ANSI/NCSL 7540-	colibrated by standards traceable red from accepted values of nature -1994 and ANSI N323-1978.	400cpm 40cpm to the National Instituties at Stanc of physical constants or have be	and Technology, or to the an derived by the ratio type o State of Texas Collibration	e calibration facilities of ( calibration tecnniques. ) License No. LO-1963
Readout	400kcpm 40kcpm 4kcpm iments, Inc. certifies that the inf Standards Organization ystem conforms to the required instruments and/co	39917 (6) 3139 3139 314 6 e obove instrument has been rrembers, or have been deriv uiroments of ANSI/NCSL 2540- of Sources: Cs-137 Gar	Collbrated by standards traceable and form accepted values of nature -1994 and ANS N323-1978.	to the National Institutie at Stanc physical constants or have be	and Technology, or to the and technology, or to the and technology, or to the and the type of State of Texas Collibration	e calibration facilities of ( calibration facilities of License No. LO-1963
Readout	400kcpm 40kcpm 4kcpm when is inc. certifies that the of Standards Organization stern conforms to the requirements instruments and/c	39917 (6) 3139 3149 314 6 e obove instrument has been rrembers, or have been deriv uirements of ANS/NCSL 2540- of Sources: Cs-137 Gor 5105 [] T1008 [] 1879]	399177(0)           3979           3979           collibrated by standards traceable           red from accepted values of nature           -1994 and ANSI N323-1978.           rima S/N           E552         E551           720	to the Notional Institute of Stand of physical constants or have be	Iards and Technology, or to the en derived by the ratio type o State of Texas Calibration	e cultoration facilities of f cultoration facilities of license No. LO-1963

Alpha S/N \_\_\_\_\_ Beta S/N \_\_\_\_ Y Other Am 241 20.83 m Ci Multimeter S/N\_\_\_\_\_78401030 📝 m 500 S/N 81084 Callbrated By: Sebast Cit. Um Date 20-Sep-05 Date 20 Suprov Reviewed By:

FORM C44C 11/25/2003

This certificate shall not be reproduced except in full, without the written approval of Lucium Measurements, Inc.

CUSTOMER Mfg Cal. Date heck mark Mecha Mecha F/S Rest Audio c	MFG INC Lucium Measu 8-4 Di applies to ap	urements, loc.						
Mfg Cal. Date _ heck mark New Int Mecha Mecha F/S Resp Z Audio c	Ludium Meas 8-4 C applies to a	urements, inc.		·			D240345	/294147
Cal. Date heck mark New Ins Mecha F/S Res Audio c	8-A		_ Model	23	50-1	Serial No	134764	•••••••••••••••••••••••••••••••••••••••
heck mark New Ins Mecha F/S Ress Audio c	applies to a	<u>VIA-05</u> Co	al Due Date	8-Aug	-06 Cal.	Interval <u>I Year</u>	_ Meterface	N/A
New In: Mecha F/S Resi Audio c		pplicable instr. and	d/or detector IA	Wimitg, spec.	T73_ "F	RH54	% Alt 70	0.8_mm Hg
<ul> <li>✓ Mecha</li> <li>✓ F/S Resi</li> <li>✓ Audio c</li> </ul>	strument inst	rument Received	Within Toler	. + 10% 🗍 10-21	N [] Out of Tol	. 📋 Requiring Rep	atr 💭 Öther-See	commente
Audio c	mical check	· ·		-	۴	1 In	iput Sens. Linearit	y
	p. cneck check	V Reset C	heck letting check	Wind Wind	tow Operation	14-11 A UDO	1	
Roteme	eter Linearity ch	eck 🗹 Integra	ted Dose check	Recy	ery check (wan. Icle Mode check	VORI) <u>4.4</u> VDC	the act at	
J Data ro	og check	Overloo	nd check	Scal	er Readout check	Did	Ratio <u>100 =</u>	<u>10</u> n
Calibrati	ied in accordan	ce with LMI SOP 14	1.8 rev 12/05/89.	Callo	rated in accordar	nce with LMI SOP 14.9	7 rev 02/07/97.	
N HV R	Readout (2 poin	ts) Ref./inst	500	1 500	V Ref./In	st2000	1 1996	v
OMMENT	TS: Firmwo	xe: 37122N21						
/O Firmwa	ret 37123n05.			-				
	-					-		
tsolution	i for Cs-137 i	13 94.					,	-
AS FOU	NDS" due to n	no memory./ NO	case.					
				×				
			•					
enna Calibration	n: GM delectors position	ed perpendicular to eource a	occept for M 44-8 in whic	h the front of probe faces	ROLICE.			
•	Brohe			•	11-1-2	A. 197	A. 17	
	Model	Serini #	rugn Voltana	Threehold	Unda/ Time Rese	Dead Time Corraction Factor	Calibration	Linearity
tector # 1 L	_MI44-10	PR139484	900 -	100	4 / 2	1.298141E-05	5.585449E+10	±10A
lector # 2 U	Mi44-10	PR139494	900	100	7/1	t populate of		
ector#3 P	%/CS-137	600 WELL				1.2901416-00	1.000000E+00	
		DOZ ACY	248	642	7 / 1	0.000000E+00	1.000000E+00 1.000000E+00	
lector #		DOZ ACY	548	642	7 / 1	0.000000E+00	1.000000E+00	· · · · · · · · · · · · · · · · · · ·
lector #		ODZ REV		642	7 / 1	0.000000E+03	1.000000E+00	·
lector # lector # lector #				<u> </u>	7 / 1	0.000000E+00	1.00000E+00	·
lactor # lactor # lactor #				<u>942</u>	7 / 1	0.000000E+00	1.000000E+00 1.000000E+00	·
lector #				<u></u>	7 / 1	0.000000E+00	1.000000E+00 1.000000E+00	· · · · · · · · · · · · · · · · · · ·
lector #				<u>842</u>	7 / 1	0.000000E+00	1.000000E+00 1.000000E+00	
lector # lector # lector # lector # lector #				<u>842</u>	7 / 1	0.000000E+00	1.000000E+00 1.000000E+00	
ector # ector # ector # ector # ector # betor # Units: 0 - rad,	, 1 - Grey, 2 - rem, 3	By, 4 - R, 5 - C/Kg, 8 - 1			7 / 1	0.000000E+00	1.000000E+00 1.000000E+00	
lector # lactor # lector # lector # lector # betor # Uells: 0 - red, # Sease: 0 - Sea	, 1 - Gray, 2 - rem, 3 marte, 1 - Minutes, 2 -	од леу 	Disintegrations, 7 - Co.		7 / 1	1.2991412-05 0.000000E+00	1.000000E+00 1.000000E+00 	
ector # Botor # Botor # Botor # Botor # Dellor # Units: 0 - aut, s Seas: 0 - Sea	, 1 - Grey, 2 - rem, 3 anda, 1 Minutes, 2 REFERENCE	од ле у Ву, 4 – R, 5 – СКд, 8 – 1 НЭЛТВ INSTRUMENT	Detrogrations, 7 - Coa	842	7 / 1 Boytom sq.	1.2991412-05 0.000000E+003	1.000000E+00 1.000000E+00 	ion, Wapplicable.
ector # sctor # sctor # sctor # sctor # sctor # usits: 0 - raid, stass: 0 - Scc for lightch	, 1 - Gray, 2 - rem, 3 - anda, 1 - Minutas, 2 REFERENCE CAL POINT	By, 4 - R, 5 - CKg, 8 - 1 Hours INSTRUMENT RECEIVED	Distintegrations, 7 - Coa INSTRI METEF	842 	7 / 1	1.299141E-US 0.000000E+00 	1.000000E+00 1.000000E+00 	ion, II applicable.
lector # lector # sotor # sotor # sotor # units: 0 - rad, sear: 0 - Sea (gital C sociout	1 - Grey, 2 - rem, 3 - antic, 1 - Minutes, 2 REFERENCE CAL POINT 400kcpm 40kcpm	BV, 4 - R, 5 - CAG, 8 - 1 HDUTS INSTRUMENT RECEIVED	Distintagrations, 7 - Con INSTRA	842 	7 / 1	1.299141E-US 0.000000E+00 	1.000000E+00 1.000000E+00 	Ment Reading

•

Contraction of the local division of the loc

I

ł

	Designer and	Manufacturer	Mete	27-10		LUDLUM MEA POST OFFICE BOX	SUREMENTS, I 810 PH. 325-235	NC. 5-5494
	Scientific ar Instrur	nd Industrial ments	CERIIFICATI	E OF CALIBR,	ATION	501 OAK STREET SWEETWATER, TEX	FAX NO. 3 AS 79556, U.S.A.	25-235-4672
CUSTOME	R MFG INC			······			242595 /	295298
Mfg.	Ludium Meas	urements, Inc.	Model	235	0-1	Serial No	134771	
Cal. Date	27-	Sep-05 Cal	Due Date	27-Sep-	06 Cal. I	nterval <u>I Year</u>	_Meterface	N/A
Check marl	applies to a	pplicable instr. and	/or detector IAI	W mfg. spec.	T77 ⁰F	RH38_	% Alt70	3.8_ mm Hg
🗌 New II 🗹 Mech	nstrument Inst anical check	rument Received	Within Toler.	+10% [] 10-20	% [] Out of Tol.		air 🔲 Other-See nput Sens. Linearity	comments Y
<ul> <li>✓ F/S Re</li> <li>✓ Audio</li> <li>✓ Raten</li> <li>✓ Data</li> <li>✓ Calibra</li> </ul>	sp. check check neter Linearity ch Log check ated in accordar	Reset ch    Alarm Se    Integrate    Integrate    Overloa	neck atting check ed Dose check d check .8 rev 12/05/89.	<ul> <li>✓ Wind</li> <li>✓ Batte</li> <li>✓ Recy</li> <li>✓ Scale</li> <li>✓ Calibr</li> </ul>	ow Operation ery check (Min. cle Mode check ør Readout check ated in accordar	Volt) <u>4.4</u> VDC Thre Dial	shold Ratio <u>100 =</u> 9 rev 02/07/97.	<b>]o</b> m\
N HV	' Readout (2 poir	nts) Ref./Inst	500	1500	V Ref./In	st2000		<u>∠</u> ∨
COMME	NTS: Firmw	are: 37122N28						
1/0 Firm	are: 37123N05							
Calibrate	d using 39" C	-cable.						
Resolutio	on for Cs137 $\approx$	9.97%			,			
Gamma Calibrat	ion: GM detectors positio Probe Model	ned perpendicular to source e Serial #	xcept for M 44-9 in whic High Voltage	th the front of probe laces	source. Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
		Ph135850	900	100	4/2	1.280074E-05	1.0000005+00	<u> </u>
Detector # 3	LIMI44-10	CS137/PK	576	642	7/1	0.000006+00	1.0000002+00	
Detector #						0.000002400		
Detector #							······	
Detector #								
Detector #					<b></b>	······································		
Detector #		1999 - 19						-
Detector #		***************************************						
Detector #								
Units: 0 - i	ad, 1 Gray, 2 rem, 3	- Sv, 4 - R, 5 - C/Kg, 6 -	Disintegrations, 7 - Co	unts, 8 - Ci/cm sq., 9 -	- Bq/cm sq.	. 0		
lime Base: 0-	DEEEDENICE	INICTOLINAENIT	INICTO		DECEDENCE	INISTOLIMEN	IT INSTRI	
Digital Readout	CAL POINT 400kcpm	RECEIVED	METE	R READING	CAL. POINT 400cr 40cr	RECEIVED	METER	READING 40/0) 4
instantion kenner	<u>4kcpm</u>	of the physics between the		>71 (	in the statement to the state	of Change of and Yash	any ne to the policet-	n locilities of
other Internation	voi Standards Organiza		en derived from act	ny manadalas naceada cepted volues of natur INSI N323, 1678	al physical constants or	have been derived by the have been derived by the have to state	ratio type of calibration Calibration Linence N	techniques,
Reference	Instruments an	d/or Sources: Cest	37 Gamma SM	9				
[]1162 [	G112 M565	☐ 5105 ☐ T1008 [	] T879 E552	] E551 [] 720 [	734 1616		-241 Be S/N T-304	
	a S/N	-	Beta S/N			Other Am2	41 80.33 10	
	00 S/N	81084	_		ML	ultimeter S/N	78401030	
Calibrated	By: Sibash	Catalla			Dote _	27- Sep-05		
Reviewed I	3Y:A	141.	· ·		Date	1- Dept of		
FORM C44C	11/26/2003	This certificate shall n	ot be reproduced e	xcept in full, without th	e written approval of Lu	dium Measurements. Inc.		

	Deviceous and	Manufacturer	٨Л	16-11				
M	Scientific a Instru	of nd Industrial ments	CERTIFICATE	E OF CALIBR	ATION	POST OFFICE BOX 501 OAK STREET SWEETWATER, TEX,	50REIVIENTS, II 810 PH. 325-235- FAX NO. 32 AS 79556, U.S.A.	NC. 5494 25-235-4672
CUSTOME						ORDER NO	257272/30	)3277-A
۸fg	Ludium Meas	iurements, Inc.	Model	235	0-1	Serial No	120635	
Cal. Date	22-	-Jun-06C	al Due Date	22-Jun-{	)7 Cal. Ir	terval 1. Year	Meterface	N/A
eck mar	k 🗹 applies to c	applicable instr. ar	nd/or detector IAV	V mfg. spec.	T. <u>72</u> °F	RH48_	% Ait <u>697</u>	8 mm Hg
] New I	nstrument Ins	frument Received	Within Toler.	+-10% 🗌 10-20	% 🗍 Out of Tol.	🗌 Requiring Rep	air 🗌 Other-See	comments
( Mech	ianical check	/					nput Sens. Linearity	r
F/S Re	esp. check	Reset	check Sotting check	Wind	ow Operation			
Rater	neter Linearity cl	neck 🗹 Integr	ated Dose check		cle Mode check	V0() <u>4.4</u> VDC	rhold	
Data	Log check		bad check	Scole	r Readout check	Dial	Ratic $100 =$	<u>10 m</u>
Callbro	ated in accorda	nce with LMI SOP	14.8 rev 12/05/89,	Calibr	ated in accordan	ce with LMI SOP 14.	9 rev 02/07/97.	
K HV	/ Readout (2 poi	nts) Ref./Inst	500	1 498	V Ref./In	it. 2000	1	V
OMME	NTS: Firmw	rare: 37122N28	**************************************					*****
/O Firm	ware: 37123N05	5						
					ME(-1)			,
librat	ed using 39" C	C-cable.		:. <b>/</b>	VIG 1			
soluti	on for Cs137 *	9.82%		r				
• •				West and starting the feature				
mma Calibra	ition: GM delectors positi	oned perpendicular to source	e except for M 44-9 in which	the front of probe faces	SOUICE.			- <u></u>
nma Calibra	ition: GM delectors positil Probe	oned perpendicular to source	e except for M 44-9 in which High	the front of probe faces	source. Units/	Dead Time	Calibration	Linearity
nma Calibra	Probe Model LMI44-10	oned perpendicular to source Serial # PR102507	e except for M 44-9 in which High Voltage 1150	n the front of probe faces Threshold 100	source. Units/ Time Base 4 / 2	Dead Time Correction Factor 1.589964E-05	Calibration Constant 5.372660E+10	Linearity ±10%*
nma Calibra ctor # 1 ctor # 2	Ition: GM delectors positi Probe Model LMI44-10 LMI44-10	oned perpendicular to source Serial # PR102507 PR102507	e except for M 44-9 in which High Voltage 1150 1150	the front of probe faces Threshold 100 100	source. Units/ Time Base 4 / 2 7 / 1	Dead Time Correction Factor 1.589964E-05 1.589964E-05	Calibration Constant 5.372660E+10 1.000000E+00	Linearity ±10%*
nma Calibra actor # 1 actor # 2 actor # 3	Probe Model LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage <u>1150</u> 1150 796	Threshold 100 100 642	source. Units/ Time Base 4 / 2 7 / 1 7 / 1	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra actor # 1 actor # 2 actor # 3 actor #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage 1150 1150 796	Threshold 100 642	source. Units/ Time Base 4 / 2 7 / 1 7 / 1	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra actor # 1 actor # 2 actor # 3 actor # actor #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage 1150 1150 796	Threshold 100 100 642	source. Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra actor # 1 actor # 2 actor # 3 actor # actor # actor #	Probe Model LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage <u>1150</u> 1150 796	Threshold 100 642	source. Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra ector # 1 ector # 2 ector # 3 ector # ector # ector # ector #	Ition: GM delectors positi Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage 1150 1150 796	Threshold 100 642	source. Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # actor # actor # actor #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage <u>1150</u> <u>1150</u> <u>796</u>	Threshold         100           100         642	Source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra actor # 1 actor # 2 actor # 3 actor # actor # actor # actor # actor # actor #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage 1150 1150 796	the front of probe faces Threshold 100 642	source. Units/ Time Base <u>4</u> / 2 7 / 1 7 / 1	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra ector # 1 ector # 2 ector # 3 ector # ector # ector # ector # ector # ector # ector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR102507 PR102507 662KEV	e except for M 44-9 in which High Voltage <u>1150</u> <u>1150</u> <u>796</u> 	Threshold           100           642	source. Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
ector # 1 ector # 2 ector # 3 ector # ector # ector # ector # ector # ector # ector # units: 0 ~	Probe Model LMI44-10 LMI44-10 CS137PK CS137PK	Serial #           PR102507           PR102507           662KEV           3-Sv, 4-R, 5-C/Kg, 6	e except for M 44-9 in which High Voltage <u>1150</u> <u>1150</u> <u>796</u>     	n the front of probe faces Threshold 100 100 642 	source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u>	Dead Time Correction Factor 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
mma Calibra actor # 1 actor # 2 actor # 3 actor # actor # 0 ~ e Base: 0 ~	tion: GM delectors positi Probe Model LMI44-10 CS137PK CS137PK rad, 1 – Gray, 2 – rem, Seconds, 1 – Minutes,	oned perpendicular to source Serial # PR102507 662KEV 	e except for M 44-9 in which High Voltage <u>1150</u> <u>150</u> <u>796</u>    	n the front of probe faces Threshold 100 642 	source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq.	Dead Time Correction Factor 1.589964E-05 0.000000E+00	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
nma Calibra ector # 1 ector # 2 ector # 3 ector # ector # ector # ector # ector # ector # units: 0 ~	rad, 1 – Gray, 2 – rem, Seconds, 1 – Minutes, REFERENCE	Serial #           PR102507           PR102507           662KEV           3 - Sv, 4 - R, 5 - C/Kg, 6           2 - Hours           INSTRUMEP	e except for M 44-9 in which High Voltage 1150 796 	Threshold 100 100 642 mis, 8 - Circm sq., 9 -	Source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL POINT	Dead Time Correction Factor 1.589964E-05 0.000000E+00	Calibration           Constant           5.372660E+10           1.000000E+00           1.000000E+00           1.000000E+00           attached detector document           NT         INSTR           METEL	Linearity ±10%*
nma Calibra ector # 1 ector # 2 ector # 3 ector # ector #	tion: GM delectors positi Probe Model LMI44-10 LMI44-10 CS137PK CS137PK cad, 1 – Gray, 2 – rem, Seconds, 1 – Minutes, REFERENCE CAL, POINT 	Serial #           PR102507           PR102507           662KEV           3-Sv, 4-R, 5-C/Kg, 6           2-Hours           INSTRUMEN           RECEIVED           3 4 145	e except for M 44-9 in which High Voltage 1150 1150 796 	n the front of probe faces Threshold 100 100 642 	Source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>4</u> QQCI	Dead Time Correction Factor 1.589964E-05 0.000000E+00 	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 attached detector document NT INSTR METEL o (o)	Linearity ±10%* 
mma Calibra actor # 1 actor # 2 actor # 3 actor # actor actor # actor actor # actor actor # actor actor ac	tion: GM delectors positive probe Model LMI44-10 LMI44-10 CS137PK CS137PK CS137PK CS137PK Seconds, 1 – Gray, 2 – rem, Seconds, 1 – Minutes, REFERENCE CAL, POINT 400kcptr 40kcptr 40kcptr	Serial #           PR102507           PR102507           662KEV           3 - Sv, 4 - R, 5 - C/Kg, 6           2 - Hours           INSTRUME!           RECEIVED           3 - 31 - 31 - 31 - 31 - 31 - 31 - 31 -	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold 100 100 642 mis, $\theta$ - Circm sq., $\theta$ - UMENT READING* $ \theta + i \leq (b)$	Source: Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400cr</u> <u>40cr</u>	Dead Time Correction Factor 1.589964E-05 0.000000E+00	Calibration           Constant           5.372660E+10           1.000000E+00           1.000000E+00           1.000000E+00           attached defector document           NT         INSTR           METEL           c.col	Linearity ±10%* 
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # acto	tion: GM delectors positi Probe Model LMI44-10 CS137PK CS137P	Serial #           PR102507           PR102507           662KEV           3-Sv, 4-R, 5-C/Kg, 6           2-Hours           INSTRUMEN           RECEIVED           3 - 3192	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold 100 100 642 mis, 8 - Circm sq., 9 - UMENT READING: 9	Source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> EFERENCE CAL. POINT <u>400c</u> <u>40c</u>	Dead Time Correction Factor 1.589964E-05 0.000000E+00 	Calibration           Constant           5.372660E+10           1.000000E+00           1.000000E+00           1.000000E+00           attached detector document           NT         INSTR           METEL           c) (o)	Linearity ±10%* 
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # actor # actor # actor # actor # actor # bactor # bactor # bactor # bactor # actor # actor # bactor	tion: GM delectors positive Model Model LMI44-10 LMI44-10 CS137PK CS137PK CS137PK CS137PK CS137PK REFERENCE CAL.POINI 400kcptr 400kcptr ferments, inc. certifies to provide the second s	Serial #           PR102507           PR102507           662KEV           3-Sv, 4-R, 5-C/Kg, 6           2-Hours           INSTRUMEN           RECEIVED           3 4 145           3 7 92           Hours	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold 100 100 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 642 100 100 642 100 100 642 100 100 100 642 100 100 100 642 100 100 100 100 100 100 100 10	Source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400c</u> ; <u>40c</u> ; to the National Institute of physical constants or	Dead Time Correction Factor 1.589964E-05 0.000000E+00 0.000000E+00 See INSTRUME RECEIVED 201.41 201.	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 attached delector document NT INSTR METEL 5 (c)	Linearity ±10%* 
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # acto	tion: GM delectors positive probe Model LMI44-10 LMI44-10 CS137PK CS137PK CS137PK CS137PK CS137PK CS2500, 1 – Minutes, REFERENCE CAL, POINT 400kcptr 400kcptr 400kcptr 40kcptr 40kcptr strements, inc. certifies to prof Stondords Orgona system conforms to in a langet uncodent of the store of t	Serial #           PR102507           PR102507           662KEV           3 - Sv, 4 - R, 5 - C/Kg, 6           2 - Hours           INSTRUMEN           RECEIVED           3 - Sv, 4 - R, 5 - C/Kg, 6           2 - Hours           INSTRUMEN           RECEIVED           3 - Sv, 4 - R, 5 - C/Kg, 6           2 - Hours           INSTRUMEN           RECEIVED           3 - 9 - 45           J	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold 100 100 642 mills, $\theta$ – Circm sq., $\theta$ – UMENT READING* 1942 1942 1942 1942 1942 1942 1942 1958 1942 1958 195	Source: Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400cr</u> <u>400cr</u> <u>40cr</u>	Dead Time Correction Factor 1.589964E-05 0.000000E+00 	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 	Linearity ±10%* ±10%* ====================================
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # acto	Ition: GM delectors positive Probe Model LMI44-10 CS137PK CS137PK CS137PK CS137PK CS137PK REFERENCE CAL POINT 400kcptr 400kcptr 400kcptr 400kcptr 1 system conforms to the pinstruments cr	Serial # PR102507 PR102507 662KEV 3-Sv, 4-R, 5-C/Kg, 6 2-Hours INSTRUMEL RECEIVED 3 9 945 3 9 45 3 9 45 1 3 9 45 1 400 Mod the above instrument at the above instrument of ANSI/F	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold 100 100 642 mits, 8 - Circm sq., 9 - UMENT READING* 9 + 5 (b) 1912 4 0 0 120 120 120 120 120 120 120 12	Source. Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> Eq/cm sq. REFERENCE CAL. POINT <u>400cr</u> <u>400cr</u> <u>40cr</u> <u>40cr</u> <u>40cr</u> <u>40cr</u> <u>40cr</u> <u>40cr</u>	Dead Time Correction Factor 1.589964E-05 0.000000E+00 	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 1.000000E+00 attached detector document NT INSTR METEL c. (c) f J	Linearity ±10% ±10% ation, if applicable ument READING 4 o (o) 4 J
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # acto	tion: GM delectors positive Probe Model LMI44-10 LMI44-10 CS137PK CS	Serial #           PR102507           PR102507           662KEV	e except for M 44-9 in which High Voltage 1150 1150 796 	The front of probe faces         Threshold         100         100         642	Source: Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Ba/cm sq. REFERENCE CAL POINT <u>400c</u> ; <u>40c</u> ; to the National Institute of physical constants or 734 1616	Dead Time Correction Factor 1.589964E-05 0.000000E+00 0.000000E+00 See INSTRUME RECEIVED DM. 4 DM. 5 of Stongards and Techno have been derived by the State of Texas	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 	Linearity ±10% ±10% ation, if applicable ument READING 4 o (o) 4 j m focelithes of techniques. No. LO-1963
nma Calibra actor # 1 actor # 2 actor # 3 actor # actor # acto	tion: GM delectors positive of the second se	Serial #           PR102507           PR102507           662KEV           3-Sv, 4-R, 5-C/Kg, 6           2-Hours           INSTRUMEN           RECEIVED           39.           49.45           1.39.4           1.39.4           1.50.5           1.008	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold         100         100         642	Source: Units/ Time Base 4 / 2 7 / 1 7 / 1 7 / 1 Ba/cm sq. REFERENCE CAL POINT 400c; 400c; 40c; 10 the National Institute 10 the National Inst	Dead Time Correction Factor 1.589964E-05 0.000000E+00 	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 attached defector document NT INSTR METEL or (c) to (c	Linearity ±10% ±10% ation, if applicable UMENT READING 4 o (o) 4 J sechniques. No. LO-1963
mma Calibra actor # 1 actor # 2 actor # 3 actor # actor # acto	Ition: GM delectors positive for the second	Serial #           PR102507           PR102507           662KEV	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold         100         100         642	Source. Units/ Time Base 4 / 2 7 / 1 7 / 1 7 / 1 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Dead Time Correction Factor 1.589964E-05 1.589964E-05 0.000000E+00 	Calibration Constant 5.372660E+10 1.000000E+00 1.000000E+00 	Linearity ±10%* 
mma Calibra ector # 1 ector # 2 ector # 3 ector # ector # ecto	Probe Model LMI44-10 LMI44-10 CS137PK CS13	Serial #           PR102507           PR102507           662KEV           3-SV, 4-R, 5-C/Kg, 6           2-Hours           INSTRUMEN           RECEIVED           399, 4-Y           1000, 500, 500, 500, 500, 500, 500, 500,	e except for M 44-9 in which High Voltage 1150 1150 796 	Threshold         100         100         642	Source: Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Ba/cm sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u> 10 the National Institute of physical constants or <u>734</u> 1616	Dead Time         Correction Factor         1.589964E-05         1.589964E-05         0.000000E+00	Calibration         Constant         5.372660E+10         1.000000E+00         1.000000E+00         1.000000E+00         attached detector document         NT       INSTR         METEL         c/o>	Linearity ±10%* ====================================

ECORM C	100	13	12412003

This certificate shall not be reproduced except in full, without the written approval of Ludium Measurements, inc.

M	Designer and Scientific ar Instrur	Manufacturer of nd Industrial nents	CERTIFICAT	E OF CALIBRA	ATION	POST OFFICE BOX 501 OAK STREET	ASUREIVIEN IS, 1 (810 PH. 325-23) FAX NO. 3	INC. 5-5494 325-235-4672
					-	SWEETWATER, 16	(AS 79000, U.S.A.	
JUSIOMER	MFG INC					ORDER N	10. 257272/3	303277-A
vlfg.	Ludlum Meas	urements, Inc.	Model	235	0-1	Serial No.	129434	
Cal. Date	22-	<u>Jun-06</u> C	al Due Date	22-Jun-(	07 Cal. Ir	nterval <u>1 Year</u>	Meterface	<u>N/A</u>
ieck mark	$\mathbf{V}$ applies to a	pplicable instr. an	id/or detector IA	W mfg. spec.	T. <u>72</u> °F	RH48	1 % Alt <u>69</u>	27.8 mm Hg
New In Mecha F/S Res Audio Ratem Data L Calibra	istrument Inst anical check sp. check check leter Linearity ch log check ted in accordar	rument Received Reset Alarm Alarm Noverla Coverla Coverla	LY Within Toler check Setting check ated Dose check bad check 14.8 rev 12/05/89.	+10% 10-20 Windo Botte M Recyo Scale Callbro	% Out of Tol. ow Operation ery check (Min. cle Mode check er Readout check ated in accordan	Requiring Re Volt) <u>4.4</u> VD Thr Dic ce with LMI SOP 14	pair Other-See Input Sens. Uneari C eshold J Ratio <u>100</u> 1.9 rev 02/07/97.	e comments ty ≘ ' 10 л
IS HV	Readout (2 poir	its) Ref./Inst.	500	1 499	V Ref/In	st 2000	1 199	<b>8</b> v
		27102101						······································
lesolutio: Samma Calibrati	n for Cs137 ≈ ion:GM detectors posible	10.27%	e excent (or M 44-9 in white	sh the front of nimbe laces	/ V LI	6 (2		
7 PT 1 1 1 1 PT 1 1 2 PT 1 1 PT 2 PT 1	un. Cam uciesions pusini	aleu perpendicinal to source	e except for with the strain with	in the none of proble races	300106.			
	Braha		Lliah		t inite /	Dond Time	O-libration -	t in an other
	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
elector # 1	Probe Model LMI44-10	Serial # PR135854 PB135854	High Voltage 1050	Threshold 100	Units/ Time Base <u>4 / 2</u> 7 / 1	Dead Time Correction Factor 1.616440E-05	Calibration Constant 5.534491E+10	Linearity ±10%*
elector # 1 elector # 2 elector # 3	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voltage 1050 1050 715	Threshold 100 100 642	Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> 7 / 1	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voltage 1050 1050 715	Threshold 100 100 642	Units/ Time Base 4 / 2 7 / 1 7 / 1	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 elector # 2 elector # 3 elector # elector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voltage 1050 1050 715	Threshold 100 100 642	Units/ Time Base 4 / 2 7 / 1 7 / 1	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voltage 1050 1050 715	Threshold 100 100 642	Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voltage 1050 1050 715	Threshold 100 100 642	Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voitage 1050 1050 715	Threshold 100 642	Units/ Time Base <u>4 / 2</u> 7 / 1 7 / 1	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector # etector #	Probe Model LMI44-10 LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voltage 1050 715	Threshold 100 100 642	Units/ Time Base 4 / 2 7 / 1 7 / 1	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector # etector # etector #	Probe Model LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV	High Voitage 1050 715 715	Threshold 100 642	Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u> <u>7 / 1</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector # etector # etector # etector # etector #	Probe Model LMI44-10 CS137PK   ad, 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes.	Serial # PR135854 PR135854 662KEV 	High Voltage 1050 715 	Threshold 100 100 642 	Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u> <u>7 / 1</u> <u>8q/cm sq.</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector # etector # etector # etector # etector # etector #	Probe Model LMI44-10 CS137PK 	Serial # PR135854 PR135854 662KEV 662KEV 	High Voitage 1050 715 715 	Threshold 100 642 	Units/ Time Base <u>4 / 2</u> <u>7 / 1</u> <u>7 / 1</u> <u>7 / 1</u> <u>8</u> - Bq/cm sq.	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector #	Probe Model LMI44-10 CS137PK	Serial # PR135854 PR135854 662KEV 	High Voltage 1050 715 	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> REFERENCE CAL. POINT	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00	Linearity ±10%*
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector # etector # Units: 0 - n ime Base: 0 - 5	Probe Model LMI44-10 CS137PK CS137PK ad, 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm	Serial # PR135854 PR135854 662KEV 	High Voitage 1050 1050 715 	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.000000E+00 1.000000E+00 	Linearity ±10%*
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector # elector # Digital Reaclout	Probe Model LMI44-10 CS137PK CS137PK Add 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm	Serial # PR135854 PR135854 662KEV 	High Voltage 1050 1050 715 	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.00000E+00 1.00000E+00 	Linearity $\pm 10\%^{\circ}$ entation, if applicate TRUMENT TER READING 4 = (o) 4 = 1
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector # elector # Units: 0 - n ime Base: 0 - 5 Digital Readout	Probe Model LMI44-10 CS137PK CS137PK ad, 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm dkcpm	Serial #           PR135854           PR135854           662KEV	High Voltage 1050 1050 715 	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u>	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant           5.534491E+10           1.000000E+00           1.00000E+00           1.0000E+00           1.0000E+00           1.0000E+00	Linearity ±10%*
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector # elector # elector # Digital Reactout Reactout	Probe Model LMI44-10 CS137PK CS137PK Add - 10 CS137PK Add	Serial #           PR135854           PR135854           662KEV           662KEV           Serial #           PR135854           662KEV           Serial #           PR135854           662KEV           Serial #           Instruments of ANS/P           Serial #           PR135854           99 77           399 L           399 79           399 10           Serial #           Serial #           Serial #	High           Voltage           1050           1050           715	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/em sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u> 0 to the Nalional Institut rol physical constants of	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.00000E+00 1.00000E+00 1.00000E+00 	Linearity ±10%* = = = = = = = = = = = = = = = = = = =
elector # 1 etector # 2 etector # 3 etector # etector # etector # etector # etector # etector # etector # units: 0 - n ime Base: 0 - S Digital Readout Eternition s editorition s eference	Probe Model LMI44-10 CS137PK CS137PK ad, 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes, REFERENCE CAL, POINT 	Serial #           PR135854           9R135854           662KEV           662KEV           3-SV, 4-R, 5-C/Kg, 6           2-Hours           INSTRUMEN           RECEIVED           399.1           399.2           399.4           399.5           INSTRUMENT           RECEIVED           399.4           399.5           INSTRUMENT           Second ANSI/N	High         Voltage         1050         1050         715	Threshold 100 100 642 	Units/ Time Base 4 / 2 7 / 1 7 / 1 7 / 1 8 - Bq/cm sq. REFERENCE CAL. POINT 400c 40c 40c	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.00000E+00 1.00000E+00 1.00000E+00 	Linearity ±10%* 
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector # elector # elector # elector # Digital Reaclout Clum Measure ine Base: 0 - 5 Digital Reaclout softerence	Probe Model LMI44-10 CS137PK CS137PK CS137PK Add 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm 40kcpm 105 Stondards Organiz system conforms to in Instruments ar G112 M555 bg S/N	Serial #           PR135854           PR135854           662KEV           662KEV           Serial #           PR135854           662KEV           Serial #           PR135854           662KEV           Serial #           Serial #           PR135854           662KEV           Serial #           PR135854           Serial #           Serial #	High         Voltage         1050         1050         715	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u> 10 the National Institut rol physical constants of	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00 2.2000E+000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+00 2.2000E+000E+000E+000E+000E+000E+000E+00	Linearity $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ entation, if applications in techniques. $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ $\pm$
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector # elector # Units: 0 - n ime Base: 0 - 5 Digital Readout clum Measure iner Internation to calibration s <b>electoris</b> of the formation to calibration s <b>electoris</b> of the formation <b>electoris</b> of the formation s <b>electoris</b> of the format	Probe Model LMI44-10 CS137PK CS137PK ad, 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 400kcpm 40kcpm adot contributes or 10 Stondards Organiz system contorns to in Instruments ar G 112 M M565 for S/N 00 S/N	Serial #           PR135854           9R135854           662KEV           662KEV	High         Voltage         1050         1050         715	Threshold         100         100         642	Units/ Time Base 4 / 2 7 / 1 7 / 1 7 / 1 8 - Bq/cm sq. REFERENCE CAL. POINT 400c 400c 400c 400c 400c	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.00000E+00 1.00000E+00 1.00000E+00 	Linearity ±10%* ====================================
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector # elector # elector # Digital Reaclout Citum Measure ine Base: 0 - 5 Digital Reaclout Seference Alph m 5	Probe Model LMI44-10 CS137PK CS137PK ad, 1 - Gray, 2 - rem, 1 Seconds, 1 - Minutes, REFERENCE CAL, POINT 400kcpm 40kcpm 40kcpm 1nstruments ar G112 M555 ha S/N 00 S/N	Serial #         PR135854         PR135854         662KEV         662KEV         S-SV, 4-R, 5-C/Kg, 6         2-Hours         INSTRUMEN         RECEIVED         3997         3994         3995         1084	High         Voltage         1050         1050         715	Threshold 100 100 642 	Units/ Time Base <u>4</u> / 2 <u>7</u> / 1 <u>7</u> / 1 <u>7</u> / 1 <u>8</u> - Bq/cm sq. REFERENCE CAL. POINT <u>400c</u> <u>40c</u> 10 the Nationol Institut rol physical constants of <u>734</u> 1616.	Dead Time Correction Factor 1.616440E-05 1.616440E-05 0.000000E+00 	Calibration Constant 5.534491E+10 1.00000E+00 1.00000E+00 1.00000E+00 1.00000E+00 	Linearity $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ $\pm 10\%^{\circ}$ entation, if applicat remaining the set of th

	Scientific Inst	nd Manufacturer of : and Industrial Iruments	() CERTIFICA	TE OF CALIBR	RATION	LUDLUM MEA POST OFFICE BOD 501 OAK STREET SWEETWATER, TE	ASUREMENTS, X 810 PHL 325-23 FAX NO. KAS 79556, U.S.A.	INC. 35-5494 325-235-4672
CUSTOME		2			·	ORDER N	0237348	3/292580
Míg.	Luđum Me	asurements, inc.	Model	23	50-1	Serial No	134768	
Cal. Date	1	19-Jun-05 C	al Due Date	19-Jun	<u>-06</u> Cal.	Interval <u>I Year</u>	Metertace	<u>n/a</u>
New Mech F/S Re Audio Caliba Caliba Caliba Caliba Caliba Caliba	k 🗹 applies to instrument in anical check esp. check o check bo check Log check Log check check de check to check to check log check to c	applicable instr. an instrument Received Reset Reset Alarm check I Coverto ance with LMI SOP 1 olnits) Ref./inst ware: 37122N21 05 7 15 10%.	nd/or detector IA Within Tole check Setting check arted Dose check ad check 4.8 rev 12/05/89 500	AW mfg. spec. r. +-10% □ 10-21 P Bath k P Recy P Scale / 500	T. <u>73</u> °F Other During of To dow Operation eny check (Min yote Mode check er Readout check rated in accordar V Ref./ir	RH 46 I. □ Requiring Rep Vott)4.4VDC Vott)4.4VDC Three Notes with LMI SOP 14. Inst2000	_ % Att pair [] Other-Sei input Sens. Lineart 2 ashold 9 rev 02/07/97. / <b>292</b>	<u>98.6</u> mm Hg e comments ty <u>= 10 m</u> !V
šeruna Cašbrai	ion: GM detectors poel Probe Model	itioned perpendicular to source Serial #	e except for M 44-B in what High Vottage	ch the front of probe laces	tounce. Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%°
	1 Midd. 10	PR139491	1000	100	A 1 2	1 4094435-05	5 00000E. 10	
elector # 1	F101.44.10					174004402-00	3.200030C+10	
alector # 1 alector # 2	LMI44-10	PR139491	1000	100	7/1	1,498443E-05	1.000000E+00	
elector # 1 stector # 2 elector # 3	LMI44-10 PK/CS-137	PR139491 662 KEV	1000 747	100 642	<u>7 / 1</u> 7 / 1	1,498443E-05 0.000000E+00	1.000000E+00 1.000000E+00	
elector # 1 elector # 2 elector # 3 elector #	LMi44-10 PK/CS-137	PR139491 662 KEV	1000 747	100 642	<u>7 / 1</u> 7 / 1	1.498443E-05 0.000000E+00	1.000000E+00 1.000000E+00	
elector # 1 elector # 2 elector # 3 elector # elector #	LMi44-10 PK/CS-137	PR139491 662 KEV	1000 747	103 642		1.498443E-05 0.000000E+00	1.000000E+00	
elector # 1 elector # 2 elector # 3 elector # elector #	LMI44-10 PK/CS-137	PR139491 662 KEV	1000 747	100 642		1.498443E-05 0.000000E+00	1.00000E+00	
elector # 1 atector # 2 atector # 3 atector # atector # atector # atector #	LMi44-10 PK/CS-137	PR139491 662 KEV	1000 747	<u>100</u> <u>642</u>		1.498443E-05 0.000000E+00	1.000000E+00	
elector # 1 elector # 2 elector # 3 elector # elector # elector # elector # elector # elector #	LIM:44-10 PK/CS-137	PR139491 662 KEV	<u>1000</u> 747	<u>100</u> <u>842</u>		1.498443E-05 0.000000E+00	1.00000E+00	
elector # 1 Blector # 2 Stactor # 3 Stactor # Stactor # Stactor # Stactor # Stactor # Stactor # Stactor # Stactor #	LIM 44-10 PK/CS-137	PR139491 662 KEV	1000 747	<u>100</u> <u>642</u>		1.408443E-05 0.000000E+00	1.00000E+00	
alactor # 1 alactor # 2 alactor # 3 alactor # alactor # alact	LM-44-10 PK/CS-137 	PR139491 662 KEV 	1000 747	100 100 642 	7 / 1 7 / 1	1.498443E-05 0.000000E+00	1.00000E+00	
stector # 1 stector # 2 stector # 3 stector # stector # stect	LIMW 10 PK/CS-137 	PR139491 662 KEV 	1000 747 	100 100 642 		1.408443E-05 0.000000E+00 	1.00000E+00     1.00000E+00     1.00000E+00	
alector # 1 alector # 2 alector # 3 alector # alector # alect	All POINT_ AUX PO	PR139491 662 KEV 	1000 747 	100 100 642 	7         /         1           7         /         1           7         /         1	1.498443E-05 0.000000E+000 	3.200000E+00     1.000000E+00     1.00000E+00     1.00000E+00     1.000000E+00     1.00000E+00     1.0000     1.0000     1.000     1.0000     1.000	zión, il appicable.
stector # 1 stector # 2 stector # 3 stector # stector # stector # stector # stector # Units: 0 - 6 me Base: 0 - 5 Digital Reactourf	ad, 1 - Gray, 2 - rem, ad, 1 - Gray, 2 - rem, add, 1 -	PR139491 662 KEV 	1000 747 	100 100 642 	7         /         1           7         /         1	1.408443E-05 0.000000E+00 0.000000E+00 See a INSTRUMEN RECEIVED 201 47 4 9 1	1.00000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.000000E+00     1.00000E+00     1.0000     1.0000     1.	
stector # 1 stector # 2 stector # 3 atoctor # stector # stector # stector # tector # Units: 0 - r me Base: 0 - S Digital Reactourf Burn Measure per Internation caloration s	All A Contractions of the contract of the cont	PR139491 662 KEV 	1000 747 747 	100 100 642 	7     /       7     /       1     7       7     /       1     7       7     /       1     7       7     /       1     7       7     /       1     7       7     /       7 <td>1.498443E-05           0.000000E+000          </td> <td>1.00000E+00     1.00000E+00     1.0000     1.0000     1.0000     1.0000     1.0000     1.0000     1.000     1</td> <td>2</td>	1.498443E-05           0.000000E+000	1.00000E+00     1.0000     1.0000     1.0000     1.0000     1.0000     1.0000     1.000     1	2
alector # 1 alector # 2 alector # 3 alector # alector # alector # alector # alector # alector # alector # alector # bector # Units: 0 - f me Base: 0 - 5 Digital Recubout Burn Measure or internation alector #	LIMA 10 PK/CS-137 PK/CS-137 ALL 1-Gray, 2 - rem, ac, 1 - Gray, 2 - rem, accords, 1 - Minutes, REFERENCE CAL, POINTL 400 kCPDT 400 kCPD	PR139491 662 KEV 	1000 747 	100 100 642 	7     /       7     /       1     7       7     /       1     7       7     /       1     7       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       7     /       8     8       8     8       8     8       9     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10       10     10 </td <td>1.498443E-05           0.000000E+00           0.000000E+00           Instrument           Instrument           RECEIVED           Off           9           9           1 Standards and Technology for Standards and Technology for State of Texas of Technology for</td> <td>1.00000E+00     1.00000E+00     1.00000E+0     1.00000E+0     1.00000E+0     1.00000E+0     1.00000E+0     1.0000E+0     1.00000E+0     1.0000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.00E+0     1.00E+0</td> <td></td>	1.498443E-05           0.000000E+00           0.000000E+00           Instrument           Instrument           RECEIVED           Off           9           9           1 Standards and Technology for Standards and Technology for State of Texas of Technology for	1.00000E+00     1.00000E+0     1.00000E+0     1.00000E+0     1.00000E+0     1.00000E+0     1.0000E+0     1.00000E+0     1.0000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.00E+0     1.00E+0	
alector # 1 alector # 2 alector # 3 alector # 3 alect	ALL IN IC IN ICE INTI ICE IN I	PR139491 662 KEV 	1000 747 	100 100 642 	7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           800         C         400           400         C         400           400         C         400           9         To the National Institute         400           9         734         1616	I 408443E-05 I 408443E-05 I 408443E-05 I 400000E+00 I INSTRUMEN RECEIVED INSTRUMEN RECEIVED INSTRUMEN RECEIVED INSTRUMEN INST	3.20000E+00           1.00000E+00           1.0000E	2000 200 2000 2
alector # 1 alector # 2 alector # 3 alector # alector # alect	al, 1 - Gray, 2 - tem, ieconds, 1 - Minutes, REFERENCE CAL POINTL 400 kcpn 40 kcpn 40 kcpn 10 k	PR139491 662 KEV 	1000 747 747 	100 642 	7         /         1           7         /         1	1.498443E-05           0.000000E+000	1.00000E+00     1.0000E+00     1.00000E+00     1.00000E+00     1.0000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.00000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.000E+00     1.000E+00     1.000E+00     1.000E+00     1.000E+00     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.00E+0     1.000E+0     1.000E+0     1.	
alector # 1 alector # 2 alector # 3 alector # alector # alect	L.M. 44 10 PK/CS-137 	PR139491 662 KEV 	1000 747 0eintagastions, 7 - Co II INSTR METE (3( b) 3 4 ( c c) 3 4 ( c c) 3 4 ( c c) 3 1 ( c c) 3	100 642 	7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           8         Point aq         400 cs           400 cs         400 cs           400 cs         400 cs           734         1616	1.498443E-05           0.000000E+00	3.20000E+00           1.000000E+00           1.00000E+00           1.0000E+00	afon, if applicable.
alactor # 1 alactor # 2 alactor # 3 alactor # alactor # alact	ALL POINT_ ALL ALL ALL ALL ALL ALL ALL ALL ALL ALL	PR139491 662 KEV 	1000 747 	100 642 	7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           9         former Nothonol Heathur         400 cpt           400 cpt         40 cpt         40 cpt           9         former Nothonol Heathur         40 cpt           9         734         1616           9         ML         Date	I 498443E-05 0.000000E+00 	1.00000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.000E+00     1.000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+0      1.	
elector # 1 elector # 2 elector # 3 elector # elector # elect	LIMIAA 10 PK/CS-137 LMIAA 10 PK/CS-137 AL 1 - Gray, 2 - rem, accords, 1 - Minutes, REFERENCE CAL POINTL 400 kCPDT 40 kCPDT 40 kCPDT 40 kCPDT 10 kCPT 10	PR139491 662 KEV 	1000 747 747 	100 642 	7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           7         /         1           9         for the Notional Institution of Institution of the statution of the statu	1.498443E-05         0.000000E+00         0.000000E+00         INSTRUMEN         RECEIVED         0m       4         9       4         20m       9         9       4         1       9         9       1         1       1 <tr td="">        1      <t< td=""><td>1.00000E+00     1.00000E+00     1.0000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.0000E+0     1.000E+0     1.0000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+</td><td>ation, if applicable.</td></t<></tr>	1.00000E+00     1.0000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.0000E+0     1.000E+0     1.0000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+	ation, if applicable.
1.00000E+00     1.0000E+00     1.0000E+00     1.00000E+00     1.0000E+00     1.0000E+0     1.000E+0     1.0000E+0     1.000E+0     1.000E+0     1.000E+0     1.000E+	ation, if applicable.							

.-

. . .

• • •

.

M	Designer and i G Scientific ar Instrur	Manufacture of na Industrial ments	CERTIFICAT	VIETER - EOFCALIBR	- 19 ation	LUDLUM MEA Post office box 501 oak street Sweetwater, tex	SUREMENTS, II 810 PH. 325-235 FAX NO. 3 AS 79556, U.S.A.	NC. -5494 25-235-4672
CUSTOMER	MFG INC						D. <u>249547/</u>	299054
Mfg	Ludium Meas	urements, inc.	Node	235	50-1	Serial No	120580	
Cal. Date	7-F	Feb-06 Ca	I Due Date	7-Feb-	07 Cal. Ir	nterval 1 Year	Meterlace	N/A
heck mark	applies to a	pplicable instr. and	l/or detector IA	W mfa. spec.	τ, 72 °F	RH 31	% Alt 70x	5.8 mm Ha
New Ir Mecho F/S Res Audio	nstrument Inst anical check sp. check check weter Unearity ch	Irument Received	Within Toler heck etting check red Dose check	y +-10% ☐ 10-20 V Winc Batte k V Recy	0% Out of Tol. dow Operation ery check (Min. vcle Mode check	Requiring Rep	air 70 Other-See nput Sens. Linearity	comments
Data L	og check	Verloo	id check	Scale	er Readout check	Dia	Ratio $100 =$	10 m
Calibra	ted in accordar	nce with LMI SOP 14	l.8 rev 12/05/89	. Calibi	rated in accordan	ce with LMI SOP 14.	.9 rev 02/07/97.	
<b>⊠</b> H∧	Readout (2 poir	nts) Ref./Inst	500	_1500	V Ref./In:	st. 2000		5v
COMMEN Gamma Calibrati	ITS: Firmwo I/O Firmwo	care: 37122N27 are: 37123N05 med perpendicular to source e	Resoluti No a except for M 44-8 in whi	ion for Cs- s-founds ich the front of probe laces	- 137≈ 12% (Hemory los source.	~s>		
	Model	Serial #	Vottage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration	±10%*
letector # 1	LMI44-10	PR-138177	950	100	7 / 1	1.466405E-05	1.000000E+00	2.0.0
etector # 2	LMI44-10	PR-138177	950	100	4 / 2	1,466405E-05	5.542768E+10	
elector # 3	PEAK	CS-137	688	642	7 / 1	0.000000E+00	1.000000E+00	
etector #								
etector #					. <u></u>			
etector #					<u></u>	· <u>·······</u>	·	
etector #					······································			
etector #								
etector #				<del></del>		<u></u>		
etector #				·····		· ·		
etector #		· · ·						
etector #			······································	·····	<b></b>		,	***
etector #				Anna an				
etector #			······································			· <u>····································</u>		
etector #					······································	·		
elector #					······		w	
Units: 0 - 1 ime Base: 0 - 1	ad, 1 - Gray, 2 - rem, 3 Seconds, 1 - Minutes,	3 - Sv, 4 - R, 5 - C/Kg, 6 - 2 - Hours	Disintegrations, 7 - C	ounts, 8 - Ci/cm sq., 9	- Bq/cm sq.	· See	attached detector document	ation, It applicable.
	REFERENCE		í INST		REFERENCE	INSTRUME	INSTR	
Digital Readout	400kcpm	NUCCIVED N/	4 4	adyle 107	CAL POINT	m KECEIVEL	I/A .	AD (D)
	40kcpm	6		1006 L	40ct	200	2	4 5
	4kcpm			400 G		•		يسبط منظر بالمرجع
dum Measure her Internation e calibration t	iments, inc. certifies th tai Slandards Organizi lystem conforms to the	at the above instrument h ation members, or have be a requirements of ANSI/NC	os been colbrated een derived from oc SL 2540-1-1994 and	by standards traceable cepted values of notu ANSI N323-1978.	e to the National Institute ral physical constants or	of Slandards and Techno have been derived by the State of Texas	ology, or to the colloration e ratio type of colloration is Califoration License I	n locilities of techniques. No. LO-1963
	G112 M565		137 Gornma S/N 1879 E552	E551 720	0 734 1616		Neutron Am-241 Be S	/N T-304
		n241=0.704C1				Other		
🖌 m 5	00 S/N	50800	<del></del>	12 - 17	Mi	ultimeter S/N	83990502	
لعتسا		14 11		$\mathcal{A}$ . $\mathcal{D}$		7E	LAC	
alibrated i	Вү:	hands	dram la	and a	Date _	12	Della	

.

LUDUM MEASUREMENTS, INC.     POID OF LOG BOX BID PH 352 325-564     SUBLICATE OF CALIBRATION     DOAS TREE     TAX NO. 323 2324     SUBLICATE OF CALIBRATION     DOAS TREE     TAX NO. 323 2324     SUBLICATE, TEAS 27355, U.S.     OORDER NO. (7) 14723     Undum Measurements, Inc.     Model     Lobarded     Lobarded     Lobarded     Col. Intervol     Vector Metal College     Collegee     College						
California in analysis     CERTIFICATE OF CALIBRATION     Constructions     CERTIFICATE OF CALIBRATION     Constructions     Constructions     CERTIFICATE OF CALIBRATION     Constructions     CERTIFICATE OF CALIBRATION     Constructions     Constructions     CERTIFICATE OF CALIBRATION     Constructions     CERTIFICATE OF CALIBRATION     CONSTRUCTION      CONSTRUCTION     C	.สกเ	Jacturer	,			MENTS INC
and inclution         CERTIFICATE OF CALIBRATION         Still Constraint         Add Constraint           DAWN MIKING CO         DAWN MIKING CO         23724/29233           Luckam Measurements, Inc.         Model         2221         Serial No.         23724/29233           Luckam Measurements, Inc.         Model         2221         Serial No.         23724/29233           Luckam Measurements, Inc.         Model         2221         Serial No.         23724/29233           Construction         Measurements, Inc.         Model         2221         Serial No.         23724/29233           Luckam Measurements, Inc.         Model         2221         Serial No.         23724/29233           Instrument         Instrument Received         Within Toler, +10%         IO-20%         Col. Interval         1Y24         Received         2032, mark         Collabored Instruments Noticocit         Instruments Noticocit         Instruments Noticocit         2000, Noticocit         2000, Noticocit         2000, Noticocit         2020, Noticocit         2000, Noticocit	of	•			POST OFFICE BOX 810	PH. 325-235-5494
DAWN Miking CO       ORDER NO       2221       Serial No       CH123         Ludium Measurements, Inc.       Model       442       Serial No       CA1423         Colling       H4, MODS       Call Interval       Year       New York       Serial No       CASC TO Colling         One in Maximum Instrument Received       Within Toler, +10%       10.20%       Coll Interval       Year       New York       Serial No       AS28, mm1         New Instrument Instrument Received       Within Toler, +10%       10.20%       Coll Interval       AS28, mm1         New Instrument Instrument Received       Within Toler, +10%       10.20%       Coll Interval       AS28, mm1         New Instrument Instrument Received       Within Toler, +10%       10.20%       Coll New York       Coll New York         Calkadded in accordance with LM SO II AS Prov 20,0779, Within York       Collocated in accordance with LM SO II AS Prov 20,0797, Within York       Collocated in accordance with LM SO II AS Prov 20,0797, Within York         Within Toler, H10%       Source York       Not Receive York       Not Receive York       Not Receive York         Collocated in accordance with LM SO II AS Prov 20,0797, Within York       Collocated in accordance with LM SO II AS Prov 20,0797, Within York       Not Receive York       Not Receive York         Maxima Sourdance York       Sourdance York </td <td>, and Inc.</td> <td>ustrial CERTIFIC</td> <td>CATE OF CALIBR</td> <td>ATION</td> <td>501 OAK STREET SWEETWATER, TEXAS 79</td> <td>FAX NO. 325-235-46 556, U.S.A.</td>	, and Inc.	ustrial CERTIFIC	CATE OF CALIBR	ATION	501 OAK STREET SWEETWATER, TEXAS 79	FAX NO. 325-235-46 556, U.S.A.
Ludum Mecukements, Inc.       Model       2221       Serial No.       C/2/1473         Ludum Mecukements, Inc.       Model       442       Serial No.       C/2/1473         Lobum Mecukements, Inc.       Model       442       Serial No.       C/2/1473         Lobum Mecukements, Inc.       Coll to Early Lands       Coll Interval 1142       Serial No.       C/2/1473         New Instrument Instrument Received       Within Toler, +10%       IO 200 of Tol.       Requiring Report       Otherwise comments         New Instrument Instrument Received       Within Toler, +10%       Deckground Subforce       If null Str. Linectry       If null Str. Linectry         Mado C.       Meter Zerode       Deckground Subforce       If null Str. Linectry       If null Str. Linectry         Collocated in accordance with UNISOF 14 Str. Str. Mark Str. Mar	DAWN MININ	3 CO			ORDER NO.	237276/292528
Luckern Marszergregis, Inc.       Model       449       Sender No. PCOG 1062	Ludium Measure	ments, Inc. Model	2	21	Serial No 107	423
Date	Ludium Measure	ments Inc Model	44	_0	Serial No PKOL	07706
Lotie         Total and the second of the lot of the lo						orfogo 200 160
CK mork (g opplies to opplicable hair, onlog/or deflector (AV mig. spec.       Image: Charlen (Strummer)       Aug. 2026 mm/         I web instrument (Strument)       Instrument (Strument)       Image: Charlen (Strument)       Image: Charlen (Strument)         I Mechanical CL       Image: Charlen (Strument)       Image: Charlen (Strument)       Image: Charlen (Strument)         I Mechanical CL       Image: Charlen (Strument)       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated in accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated in accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated in accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated In accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated In accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated In accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated In accordance with LMI SOP 14.8 rev 12/05/89.       Image: Charlen (Strument)       Image: Charlen (Strument)         I Caliborated In accordance with LMI SOP 14.8 rev 12/05/89.       Imag			e14-50(+			endce <u>202-15v</u>
New Kerthment       Instrument       Instrumen	eck mark [v] applies to app	licable instr. and/or detec	for IAW mig. spec.	1. <u>72</u> °F	RH48_%	Alt693.8_ mm H
Mechanical ct.	] New Instrument Instrur	nent Received [] Within	Toler. +-10% 10-20	0% 🗌 Out of Tol.	🗌 Requiring Repair 🔲 🤇	Other-See comments
If Steps ck       Mitting ck.       Window Operation       Window Operation         Vadio ck.       Autor Setting ck.       Setti ck. (Miv Not)       ALVDC         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accordance with LMI SOP 148 rev 02/07/97.       Threadold         Collicated in accord	Mechanical ck.	Meter Zeroed	Baci	ground Subtract	Input S	ens. Linearity
NUMBER         Calibrated With UM SOP 14.9 rev 02/07/97.           Lument Volt Set         900         V input Sens         500         mV Del Coler.         900         V et         500         mV Del Roto         1.0         =         1.0           Calibrated in accordance with LM SOP 14.9 rev 02/07/97.         Sop         mV Del Coler.         900         V et         500         mV Del Roto         1.0         =         1.0           Calibrated Valt Set         900         V et         500         mV Del Roto         1.0         =         1.0           Calibrated Valt Set         900         V et         500         mV Del Roto         1.0         =         1.0           Calibrated Valt Set         500         MEGO         V Rel./Indl.         2000         1.2000         V         V         NSTRUMENT         NSTRUMENT <t< td=""><td>f F/S Resp. ck</td><td>Alorm Setting ck</td><td>Wind Wind</td><td>low Operation</td><td>Geotro</td><td>pism</td></t<>	f F/S Resp. ck	Alorm Setting ck	Wind Wind	low Operation	Geotro	pism
Contraction of Control of Michael Notice Transform       Control of Control of Michael Notice Transform       Control of Control of Michael Notice Transform         Control Notice Transform       State of Transform       State of Transform       Control of Michael Notice Transform         MARENTS:       Strument Control Notice Transform       Strument Control Notice Transform       Strument Control Notice Transform       Notice Transform         And Charles       Strument Control Notice Transform       Strument Control Notice Transform       Michael Notice Transform       Notice Transform         And Charles       Strument Control Notice Transform       Strument Control Notice Transform       Michael Notice Transform       Notice Transform         And Charles       Strument Control Notice Transform       Strument Control Notice Transform       Michael Notice Transform       Michael Notice Transform         And Charles       Strument Control Notice Transform       Strument Control Notice Transform       Michael Notice Transform       Michael Notice Transform         All       1000       Strument Control Notice Transform       Michael Notice Transform       Michael Notice Transform       Michael Notice Transform         Strument Control Notice Transform       Michael Notice Transform       Michael Notice Transform       Michael Notice Transform       Michael Notice Transform         All       Strument Transform       Michael Notice Tr	) Audio Ck. Calibrated in accordance	with LMI SOP 14 8 rev 12/	15/89 🖸 Calib	ck. (Min. Von)	A4 VUC	<u> </u>
ument voi set       viiii viiiii viiiiii					Threshold	
Image: Structure in the second	ument Volt Set900	_ V Input Sens 50	mv_Det. Oper	<u>900</u> V at	_50mV Dial Ratio	<u>    1.0    =   10                       </u>
DMMENTS:       Strument calibrated with D <sup>1//</sup> CtoC cable         Immate: 26/010       MF6 - 2.5         Immate: 26/010       MF6 - 2.5         Immate: 26/010       INSTRUMENT REC'D         RANGE/MULTIPLIER       CAL, POINT         XIA       1000cpm         XIO       400cpm         XIO       500cpm <tr< td=""><td>🔀 HV Readout (2 points)</td><td>Ref./inst500</td><td><u></u></td><td>V Ret./Ins</td><td>st1_</td><td><u>2000    v</u></td></tr<>	🔀 HV Readout (2 points)	Ref./inst500	<u></u>	V Ret./Ins	st1_	<u>2000    v</u>
strument calibrated with STC/dS cable         na Cabrate: CM detects positional periodicals to some strang for M 449 in Mich file fond for the base some.         RANGE/MULTIPLIER       REFERENCE         NIX       INSTRUMENT RECD         NIX       METER READING*         METER CAL, POINT       'AS FOUND RECD         XIA       1000         XIO       400cpm         XIO       400cpm         XIO       100         XIO       100         XIO       100         XIO       100cpm         ADACopm       200cpm         Solepm	OMMENTS:	· ~ 11				
MERCE 2000         NSTRUMENT RECD         INSTRUMENT RECD         INSTRUMENT RECD         NSTRUMENT RECE         NSTRUMENT RECENCE         NSTRU	strument calibrated	with <u>37 CtoC</u> cal	ble			,
An Clifforder: Of detects posterios (presented b to some secret to M49 to which to ford group face secrets.         RANGE/MULTIPLIER       CAL. POINT         *AS FOUND READING"       METER READING*         x1k       400kcpm         400       4000         x100       400cpm         x100       100cpm         x100 <td>rmware: 261010</td> <td></td> <td>· .</td> <td></td> <td></td> <td></td>	rmware: 261010		· .			
MFG - 2.5         MFG - 2.5         RANGE/MULTIPLIER       REFERENCE       INSTRUMENT RECO       INSTRUMENT         XIL       4000         XIL       1000       ALC       ALC         XIL       1000       ALC       ALC         XIL       1000       ALC       ALC         XIL       1000       ALC       ALL       REFERENCE         XIL       ALL       Range(s) Calibrated Electronical         XIL       1000         XIL       ALL       Range(s) Calibrated Electronical         XIL       ALL       Range(s) Calibrated Elect			-			•
MTG - W         Not colspan="2">Colspan="2">MTG - W         REFERENCE         INSTRUMENT RECD       INSTRUMENT         ALC         ALL Range(s) Collbrated Bicchanicalli         ALC         ALL Range(s) Collbrated Bicchanical				LAF	51-79	
ne Cabrator: OM detectos positional papendicular la sonze accest for M43 he which the final of prote faces source.   RANGE/MULTIPLIER REFERENCE INSTRUMENT MEER READING"   x1k 100kcpm 4000   x100 400cpm 4000   x100 400cpm 4000   x100 400cpm 4000   x100 100kcpm 4000   x100 400cpm 4000   x100 100kcpm 4000   x100 100kcpm 4000   x100 100cpm 4000   x101 100cpm 4000   x102 1000cpm 4000   x11 4000cpm 5000   4000cpm 5000   4000cpm 5000   4000cpm 500				MI	0-61	
Actionation: GM detectors positioned perpendicular bisource services.       REFERENCE       INSTRUMENT REC'D       INSTRUMENT         XIA       400kcpm       4000       4000       4000       4000         XID0       40kcpm       4000       4000       4000       4000         XID0       40kcpm       4000       400				<u> </u>	-	*
REFERENCE       INSTRUMENT RECD         RANGE/MULTIPLIER       CAL. POINT       "AS FOUND READING"       METER READING*         x1k       400kcpm       400       400         x1k       100       40kcpm       400         x10       400cpm       400       400         x10       40cp       400       400         x10       40cp       400       400         x10       40cp       400       400         x10       4kcpm       400       400         x11       400cpm       400       400         x11       100ccpm       400       400         x11       400cpm       400       400         x11       100ccpm       500       500         20u1       400cpm       5128       500       500         30u1       400cpm       5128       500       500						·
na Calcrator: CM detectors positioned perpendicular is source except for M 44 3is which the feed of prote faces source.       INSTRUMENT RECD       INSTRUMENT RECD         RANGE/MULTIPLIER       CAL. POINT       "AS FOUND READING"       METER READING*         x1k       100kcpm       1000       1000         x1k       100kcpm       1000       1000         x100       10kcpm       1000       1000         x100       10kcpm       1000       1000         x100       10kcpm       1000       1000         x10       10kcpm       1000       1000         x10       10kcpm       1000       1000         x11       1000cpm       1000       1000       1000         x11       1000cpm       1000       1000       1000       1000         x11       1000cpm       1000       1000       1000       1000         x11       1000cpm       1000       1000       1000       1000       1000		~				
REFERENCE       INSTRUMENT RECD       INSTRUMENT         x1k       400cpm       400         x1k       100kcpm       400         x100       40kcpm       400         x100       40kcpm       400         x100       40kcpm       400         x100       40kcpm       400         x100       4kcpm       400         x10       4kcpm       400         x110       4kcpm       400         x110       4kcpm       400         x11       100cpm       100         x11       100cpm       100         x11       100cpm       100         x11       100cpm       100         x11	na Calibration: GM detectors positioned p	erpendicular to source except for M 44-9	in which the front of probe faces	IOUTCE.		
RANGE/MULTIPLIER       CAL. POINT       "AS FOUND READING"       METER READING"         x1k       400kcpm       400       400         x100       400kcpm       400       400         x100       10kcpm       400       400         x100       10kcpm       400       400         x100       10kcpm       400       400         x10       10kcpm       4000       400         x10       10kcpm       4000       400         x11       400cpm       4000       400         x11       100cpm       100       800       600         x11       100cpm       100       800       600       500         y100       400kcpm       3127       3128       500       500       500         y100       3127       3128       500       50		REFEREN	NCE	INSTRUMENT RE	EC'D INSTRUM	NENT
x1k       400kcpm       400       400         x100       40kcpm       400       400         x100       10kcpm       400       400         x10       10kcpm       400       400         x10       10kcpm       400       400         x10       1kcpm       400       400         x10       1kcpm       1000       400         x11       400cpm       400       400         x1       100cpm       500       100       500         30u1       400kcpm       37271       378       500       500kcpm       500         400cpm       37271       378       378       500cpm       500       500         400cpm       3727       378       378       500       500cpm       500       500         400cpm       3727 <td>RANGE/MULTIPI</td> <td>LIER CAL. PC</td> <td>DINT</td> <td>"AS FOUND REA</td> <td>ADING" METER R</td> <td>EADING*</td>	RANGE/MULTIPI	LIER CAL. PC	DINT	"AS FOUND REA	ADING" METER R	EADING*
x1k       100cpm       100         x100       10kcpm       400         x10       10kcpm       400         x10       1kcpm       400         x11       400cpm       400         x1       400cpm       400         x1       400cpm       400         x1       400cpm       400         x1       100cpm       100         x1       100cpm       1100         x1       100cpm       1100         y100       400kcpm       31721         y121       y1221       y1221         y1221       y122       y123         y122       y123       y123         y122       y123       y123         y120       y120       y120 </td <td>xlk</td> <td>400kcpm</td> <td></td> <td>400</td> <td>4</td> <td>20</td>	xlk	400kcpm		400	4	20
x100     40x2     44x3       x100     10kcpm     40x2       x10     4kcpm     402       x10     1kcpm     102       x11     100cpm     402       x1     400cpm     402       x1     100cpm     102       400kcpm     3923     3122       400kcpm     3923     3122       400cpm     3923     3122       400cpm     3923     3122       40cpr     3923     3122       400cpm     3923     3122       400cpm     3923     3122       400cpm     3923     3122       40cpr     392     322       40cpr     392     322       40cpr     392     322       40cpr     392	x1k	<u>100kcpm</u> _		100		<u>~</u>
ALD       Ukcpm       U	<u>x100</u>		· · · · · · · · · · · · · · · · · · ·			<u>405</u>
All       Note         x10       Ikcpm         x1       400cpm         x1       100cpm         400cpm       400cpm         x1       100cpm         400cpm       400cpm         400cpm       400cpm         400cpm       400cpm         400cpm       400cpm         100cpm       100         2001       400kcpm         400cpm       378.7         378.7       378.7         400cpm       372.1         378.7       378.7         400cpm       372.1         378.7       378.7         400cpm       372.1         378.7       378.7         500cpm       500cpm         400cpm       372.7         400cpm       372.7         400cpm       372.7         400cpm       400cpm         400cpm       400cpm         400cpm       400cpm         400cpm       400cpm         502.7       500cpm         5000cpm       500         5000cpm       500         5000cpm       500         5000cpm       500	x100	0kcpm		400		4000 1000
x1       400cpm       400c         x1       100cpm       100c         *Uncertainly within ± 10%       C.F. within ± 20%       ALL         REFERENCE       INSTRUMENT       INSTRUMENT         CAL. POINT       RECEIVED       METER READING*         Solut       400cpm       372.37         CAL. POINT       RECEIVED       METER READING*         Macumments, Inc. cartifisting the above instrument has been calborated by standards facacable to the calborated in technology       500cpm         Macumments, Inc. cartifisting the above instrument has been calborated by standards facacable to	x10	1kcpm		100		100
	<u>x1</u>	400cpm		4003		400
ALL Range(s) Calibrated Electronicali         REFERENCE       ALL Range(s) Calibrated Electronicali         REFERENCE       INSTRUMENT       INSTRUMENT       INSTRUMENT         CAL POINT       REFERENCE       INSTRUMENT       INSTRUMENT       INSTRUMENT         Colspan="2">COL       SCOK       SCOK         GOV       SCOK       SCOK         400kcpm       37.271       37.87       57.87       500kcpm       500kcpm       500k       500kcpm       500kc	<u>X1</u>	100cpm_			· · · · · · · · · · · · · · · · · · ·	100
ALL Range(s) Calibrated Electronicali         REFERENCE       INSTRUMENT         al       400kcpm       37.87       37.87       500kcpm       500kcpm       500k       500kcpm       500k       37.8       37.8       500kcpm       500kcpm       500k       37.8       37.8       500kcpm       500kcpm       500kcpm       500kcpm       500kcpm       500kcpm       500kcpm       500kcpm       500kcpm       500cpm	· · · · · · · · · · · · · · · · · · ·					
"Uncertainty within ± 10%; C.F. within ± 20%;       All Range(s) Calibrated Electronical         REFERENCE       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT         CAL. POINT       RECEIVED       METER READING*       CAL. POINT       RECEIVED       METER READING*         old       400kcpm       37.27       37.87.27       500kcpm       500kcpm       500kcpm       500kcpm         40kcpm       37.87       37.87       37.87       57.87       500kcpm       500kcpm       500kcpm         400cpm       37.87       37.87       57.87       500kcpm       500kcpm       500kcpm       500kcpm         400cpm       37.87       37.87       57.87       500kcpm       500kcpm       500kcpm       500kcpm         400cpm       37.87       57.87       57.87       500kcpm       500kcpm       500kcpm       500kcpm         400cpm       400cpm       400kcpm       57.87       57.87       500kcpm       500kcpm       500kcpm       500kcpm         40kcpm       37.87       57.87       57.87       500kcpm       500kcpm       500kcpm       500kcpm       500kcpm         10enditiod Standards ford thore thow been calibrated trait and case addres of notural p	<u></u>			<u></u>		
REFERENCE       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT       INSTRUMENT         al       al       3978787       3778787       cal	*Uncertainty within ± 109	. C.F. within ± 20%			ALL Range(s) C	alibrated Electronically
CAL. POINT       RECEIVED       METER READING       CAL. POINT       RECEIVED       METER READING         1       400kcpm       3727       378787       Scale       500kcpm       500k       Scale       500kcpm       500k         400cpm       377       3787       3787       5787       Scale       500kcpm       500k	REFERENCE	INSTRUMENT IN	ISTRUMENT.	REFERENCE	INSTRUMENT	INSTRUMENT
Sout       400kcpm       312212       3182727       Scale       500kcpm       500k_pm         40kcpm       3122       3182       3182       5182       50kcpm       50kpm       50kpm         400cpm       3122       3182       3182       5182       500cpm       500pm       500pm <td< td=""><td>CAL POINT</td><td>RECEIVED</td><td>ETER READING</td><td>CAL POINT</td><td>RECEIVED</td><td>METER READING</td></td<>	CAL POINT	RECEIVED	ETER READING	CAL POINT	RECEIVED	METER READING
40kcpm       33 27       37 881       50 kcpm       50 kcpm         4kcpm       33 27       57 8       50 kcpm       50 kcpm       50 kcpm         400cpm       37 7       57 8       500 cpm       500 500       500 500         1 Measurements. Inc. cartifies trad the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities and intervent instruments of ANS/NCS1 2540-1-1994 and ANSI N323-1978       State of Texas Calibration Technology, or to the calibration toching and the tequirements of ANS/NCS1 2540-1-1994 and ANSI N323-1978         state of Texas Calibration License No. LO-19       State of Texas Calibration License No. LO-19         state of Texas Calibration License No. LO-19       State of Texas Calibration License No. LO-19         state of Texas Calibration License No. LO-19       State of Texas Calibration License No. LO-19         state of Standards and Jor Sources:       37 Gammo S/N       1162       G112       MS65       S105       T1008       T879       E552       E551       720       734       1616       Neutron Am-241 Be S/N         Alpha S/N       121025       Oscilloscope S/N       Multimeter S/N       78846185       Texas Calibration License       Texas Calibration License	dout <u>400kcpm</u>	348787 3	51878 Sco	e <u>500kcpn</u>	n = 500k	5001
4kcpm       512.8       57.8       58cpm       500       500         400cpm       40       500       500       500       500       500         1 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 networks of natural physical constants or have been derived by the rote to type of calibration facilities of the natural physical constants or have been derived by standards traceable to the values of natural physical constants or have been derived by the rote to type of calibration facilities of the natural physical constants or have been derived by the rote to type of calibration technology.         Iterational Standards Togenaziation members, or have been derived by standards traceable to the values of natural physical constants or have been derived by the rote tope of calibration technology.         Iterational Standards Togenaziation members, or have been derived by and ANSI N323-1578         State of Texas Calibration License No. LO-19         state of Texas Calibration License	40kcpm		27881	50kcpn	n <u>50%</u>	505
400cpm       500       500cpm       500       500         1 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 in an immibers, or hove been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted values of natural physical constants or have been derived form accepted value of the value o	<u>4kcpm</u>	3188 -	5788	5kcpn	n <u>sh</u>	51
			578	<u>500cpn</u>	$n - \frac{500}{2}$	<u> 500</u>
1 Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable for the National Institute of Slandards and Technology, or to the calibration facilities in iterational constants or have been derived by the tailor type of calibration facilities in iteration is the requirements of ANSI/NCSI IS40-1-1994 and ANSI N323-1978         State of Texas Calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants or have been derived by the tailor type of calibration facebed values of natural physical constants.         Alpha S/N       If a facebed value of tain tailor tain tailor tailor tailor tain tailor tailor t	<u>40cpm</u>	<u> </u>		50cpn	<u>n 20</u>	<u></u>
Hibrationsystem conforms to the requirements of ANSI/NCSI 2340-1-1994 and ANSI N323-1978       State of Texas Calibration License No. LO-19         Prence Instruments and/or Sources:       37 Gammo S/N       1162       G112       M565       5105       T1008       T879       E552       E551       720       734       1616       Neutron Arn-241 Be S/N T-         Alpha S/N	n Measurements, Inc. certifies that t International Standards Organizatio	n members, or have been derived	braied by standards traceab from accepted values of nat	le fo the National Instituti ural physical constants o	e of Standards and Technology, a r have been derived by the ratio	r to the calibration facilities o type of calibration technique
arence instruments and/or sources:         37 Gammo S/N         1162       G112       M565       S105       T1008       T879       E552       E551       T20       T734       1616       Neutron Am-241 Be S/N T         Alpha S/N	moration system conforms to the re-	Joremenis of ANSI/NCSL 2540-1-199	4 and ANSI N323-1978		State of Texas Calil	pration License No. LO-19
Alpha S/N       Beta S/N       Other         500 S/N       121025       Oscilloscope S/N       Multimeter S/N       78846185         brated By:       Date       14-Juno 5         iewed By:       Date       14-Juno 5         ofter       Date       14-Suport         ertificate shall not be reproduced except in full, without the written approval of Ludium Measurements, Inc.       AC Inst.       Passed Dielectric (Hi-Pot) and Continuity Test	=rence instruments and	DISOULCES:	1000 7070 7070			Inches Am 043 P- FALT C
Alpha S/N       Beta S/N       Other         500 S/N       121025       Oscilloscope S/N       Multimeter S/N       78846185         brated By:       Multimeter S/N       78846185       Date       14-Jun -05         iewed By:       Multimeter s/N       Date       14-Jun -05         iewed By:       Date       Multimeter s/N       AC Inst.       Passed Dielectric (Hi-Pot) and Continuity Test	37 Gamma S/N []1162 [2]	لے 105 کے 100m کے 112	1000 L 1877 L E552	a <u>∠</u> :±551 <u>1</u> 720	LI/34 LI 1616 LI	veuron Am-241 Be S/N I-3
500 S/N       121025       Oscilloscope S/N       If Multimeter S/N       78846185         brated By:       Date       14-Jun 05         iewed By:       Date       14-Jun 05         ertificate shall not be reproduced except in full, without the written approval of Ludium Measurements, Inc.       AC Inst.       Passed Dielectric (Hi-Pot) and Continuity Test	Alpha S/N		S/N		Other	
brated By: Date Date Date Date	500 S/N 121	025 <u>A</u> 🗆 Osci	lloscope S/N		Multimeter S/N	78846185
brated By: Date Date Date Date	· ayaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	I TA A.				45
iewed By: Date Date Date	brated By:	KANAM IN	1	Date	14-Jun	<u>-05</u>
ertificate shall not be reproduced except in full, without the written approval of Ludium Measurements, Inc.		212		ν.	1. 1 7	-
ertificate shall not be reproduced except in full, without the written approval of Ludium Measurements, Inc. AC Inst. Passed Dielectric (Hi-Pot) and Continuity Test	lewed By:	C-61-		Date	14 hor	
	ertilicale shall not be reproduced	except in full, without the written a:	oproval of Ludium Measurem	ents, Inc. AC I	nst. Possed Dialactric 14	i-Potl and Continuity Test
	, i		/			/ · · · · · · · · · · · · · · · · · · ·
	н. С			,	-	

_:R		itrial CER	TIFICATE OF CAI	LIBRATION	POST 501 C SWEE	OFFICE BOX 810 P AK STREET I WATER, TEXAS 7955	AENIS, INC. H. 325-235-5494 FAX NO. 325-235-4672 6, U.S.A.
j ———	DAWN MINING	<u>co</u>				ORDER NO.	237280 / 292530
Į.	Ludium Measurem	ients, inc. Mor	dəl	2221	Se	rial No. <u>97292</u>	L
· · · · · · · · · · · · · · · · · · ·	Ludium Measurem	ients, inc. Mo	del	43-5	Se	rial No. <u>PR 9936</u>	48
al. Date _	27-Jun-(	)5 Cal Due	Date 27	-Jun-06	Cal. interval	<u> </u>	tace202-159
ck mark 6	applies to applic	able instr. and/or di	etector IAW mfg. spe	c. T	<u>73</u> °F RH	<u>38</u> % AI	t700.8_mm Hg
New Inst	rument Instrume	ant Received	Íithin Toler. +-10%	10-20% 🗌 O	ut of Tol. 🗌 Reg	uiring Repair 🔲 Otl	ner-See comments
Mechani F/S Resp	ical ck. . ck	Meter Zeroec		Background S Window Ope	Subtract ration	Geotrop	ns. Linearity ism
	~ d in accordance v	vith LMI SOP 14.8 rev	/12/05/89. □(	Calibra ted in a	accordance with	LMI SOP 14.9 rev 02	/07/97.
mont Vol	t Sat 750	V Input Sens	35 mV Det One	7 750	Vat 35	Threshold mV Dial Ratio	mV =
	eadout (2 points)	Ref./Inst.	<u></u>	2 <b>2</b>			199.5 V
MMENT	S:				- 57		······································
	~	. 011010	·	M	11-28		
	tirmwore	: 201010		/ / /	10-		
	cald wit	ha 37" C.	-cable:				
		/					
			v				· ·
		4 <b>4 1 1 1 1 1 1 1 1 1 1</b>					
a Calibration:	GM detectors positioned per	rendicular to source except for	M 44-9 in which the front of prob	e faces source.			- L 19 <sup>4</sup>
-		REFI	ERENCE	INSTRU	IMENI REC'D		
j R	ANGE/MULIIPLI	EK CAL	POINT	AS FC		S MEIEK KE	AUING*
	<u>X 1000</u>	400 Kcr	<u></u>		376		<u>00</u>
	<u>X 1000</u>	100 Kcr	<u>2m</u>		100	<u></u>	20
	<u>X 100</u>	40 KCr	<u>m</u>		<u> </u>		<u>00</u>
	<u>X 100</u>		<u>om</u>		340		00
·	<u>X 10</u>		<u></u>		100		100
	X 1	400 ci	om		320	ų	00
	X 1	100 ci	pm		100		00
_		• • • • • • • • • • • • • • • • • • •					
*Und	certainty within ± 10%	C.F. within ± 20%				<u>ALL</u> Range(s) Ca	librated Electronically
RE	FERENCE	INSTRUMENT	INSTRUMENT	REF	ERENCE	INSTRUMENT	INSTRUMENT
· ~ ~ (	AL. POINT	RECEIVED	METER READING*		L. POINT	RECEIVED	METER READING*
. U	100 K com	39262 /01	37762 11	Log	500 K com	Soole	Soat
tal Idout	A 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	3172	3972		50 K com	50k	.50k
tal idout	AOK com	307	397		5 K cpm	5k	5k
tal dout	40 K cpm 4 K cpm				500 com		5
al dout	40 K cpm 4 K cpm 400 cpm	31	37 (	1		500	000
al dout	40 K cpm 4 K cpm 400 cpm 40 cpm	$\frac{31}{4}$	<u> </u>		<u>50 cpm</u>	<u> </u>	<u> </u>
al dout	40 K cpm 4 K cpm 400 cpm 40 cpm vents, Inc. certifies that the	$\frac{\frac{31}{4}}{\frac{9}{4}}$	n collorated by standards tr	raceable to the Na	50 cpm 50 cpm	<u>506</u> <u>50</u> dards and Technology, or	50 50
n Measurem International	40 K cpm 4 K cpm 400 cpm 40 cpm wents, Inc. certilies that the d Standards Organization	above instrument has been the more instrument has been the more than the been the more instrument of AMERDA'S 1564	9 en colibrated by standards in rived from accepted values 0.1999 and ANS 1823 1923	raceable to the No	50 cpm 50 cpm alional Institute of Stan	506 50 dards and Technology, or ren derived by the ratio ty State of Territ Calif	50 50 to the colibration locifies of pe of colibration techniques.
al dout	40 K cpm 4 K cpm 400 cpm 400 cpm 40 cpm hents, Inc. certilies that the istandards Organization to the request	above instrument has been de terments of ANSI/NCSL 2544	an colibrated by standards to stived from accepted values 0-1-1994 and ANSI N323-1971	raceable to the No s of natural physics 8	50 CDM 50 CDM ational Institute of Stan	dards and Technology, or ben derived by the ratio hy State of Texas Calib	to the colibration locitities of pe of colibration techniques. ration License No. LO-1963
m Measurem International ference I	40 K cpm 40 K cpm 40 cpm 40 cpm 40 cpm ents, Inc. certifies that the 1 standards Organization item conforms to the requ instruments and/c	31 y above instrument has been members, or have been de irements of ANSI/NCSL 2544 or Sources:	en colibrated by standards th srived from accepted values 0-1-1994 and ANSI N323-1971	rocective to the No	50 cpm 50 cpm bliorid Institute of Stan	dards and Technology, or hen derived by the ratio ty State of Texas Calib	50 50 to the colibration locifies of pe of colibration techniques. tration License No. LO-1963
m Measurem m Measurem soforational soforation sys	40 K cpm 4 K cpm 40 cpm 40 cpm 40 cpm 40 cpm 15 randords Organization it 15 randords Organization it instruments and/organization it instruments and/organization it 05 /N 1162 G	31       above instrument has been derements. or have been der sernents of ANSI/NCSL ZS44       or Sources:       112     M565	37     4	roceable to the No a of notural physica 8 E552 E552	Job Cpm       50 Cpm       ationical Institute of Stan       at constants or have be       51     720	derds and Technology, or ben derived by the ratio ly State of Texas Calib 4 1616 N	50 50 to the colibration locifies of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be S/N T-304
al dout m Measurem international olibration sys ference 1 137 Gamm Z Alpha	40 K cpm           4 K cpm           40 cpm           40 cpm           istandords Organization in the requirements in conforms to the requirements and/organization in the requirements and/organization in the system of the sys	31           31           above instrument has been members, or have been de sements of ANSI/NCSL 2544           or Sources:           112         M565         510           2,600cpm         0	37           Y           en colibrated by standards ti stived from accepted value: 0-1-1994 and ANSI N323-1971           0-1-1994 and ANSI N323-1971           15         T1008           T879         [           Beta S/N	roceable to the No s of natural physics 8 E552 E5.	51 720 73	dards and Technology, or sen derived by the ratio by State of Texas Calib 4 1616 N	to the colibration locifies of pe of colibration techniques. pration License No. LO-1963 Neutron Am-241 Be \$/N T-304
al dout m Measurem international offbrafian sys ierence I 137 Gamm Z Alpha	40 K Cpm 4 K Cpm 40	31 31 y above instrument has been members, or have been de itements of ANSI/NCSL ZS4 or Sources: 112 M565 510 2,600cpm	37           Y           en collibrated by standards to srived from accepted value:           0-1-1994 and ANSI N323-197           IS         T1008           T879         Beta S/N	roceable to the No s of natural physics B E552 E5	50 cpm 50 cpm bilorial institute of Stan al constants or have be 51 720 73 	Soc.	to the colibration locilities of pe of colibration techniques. trafion License No. LO-1963 leutron Am-241 Be S/N T-304
m Measurem m Measurem m Measurem ference I 137 Gamm Z Alpha m 500	40 K cpm           40 K cpm           40 cpm           40 cpm           40 cpm           istandards Organization i           istandards Organi           istandards Org	31           y           31           y           sobove instrument has been members, or have been de itements of ANSI/NCSL 254           of Sources:           112         M565           510           2,600cpm         09	37         4           Y	E552 E5	50 cpm 50 cpm bilorial institute of Stan al constants or have be 51 720 73 	dards and Technology, or sen derived by the ratio by State of Texas Calib 4 1616 N Dther	to the colibration locities of pe of colibration techniques. trafion License No. LO-1963 Neutron Am-241 Be S/N T-304 86250390
m Measurem m Measurem hiternationa atbrationa stibrationa ference I 137 Gamm Z Alpha n 500	40 K cpm 4 K cpm 40 cpm 400 cpm 40 cpm 40 cpm 40 cpm istem conforms to the required instruments and/or o S/N 1162 G S/N PU-239 1: S/N 1347 By:	31 	37       9	E552 E5	50 cpm 50 cpm bilorical Institute of Stan al constants or have be 51 720 73 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Sog     Sog     Sog     derds and Technology, or     sen derived by the ratio by     State of Texas Calib     A 1616 N      Dther     Multimeter S/N      Type 05	50 50 to the colibration locilities of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be S/N T-304 86250390
m Measurem hiternationa alibration sys ference 1 137 Gamm Z Alpha n 500 alibrated 1	$\begin{array}{c} 40 \text{ K cpm} \\ 40 \text{ K cpm} \\ 4 \text{ K cpm} \\ 400 \text{ cpm} \\ 400 \text{ cpm} \\ 400 \text{ cpm} \\ 1000 \text{ cpm} \\ 100$	31 	37         4           Y	E552 E5	50 cpm 50 cpm bilorial institute of Stan al constants or have be 51 720 73 	derds and Technology, or sen derived by the ratio by state of Texas Calib 4 1616 N Other Multimeter S/N 7 Suc. 65	50 50 to the colibration locilities of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be \$/N T-304 86250390
Ital Idout Im Measurer Internationa Sterence I -137 Gamm Alpha n 500 alibrated I eviewed F	40 K cpm     40 K cpm     40 cpm     40 cpm     40 cpm     40 cpm     40 cpm     13tandards Organization     1stem conforms to the requ instruments and/o     s/N □1162 □ G     S/N □1162 □ G     S/N □ 1347     By:	31 	<u>Y</u> an collorated by standards the stived from accepted value: 0-1-1994 and ANSI N323-1971 IS T1008 T879 [ Beta S/N Oscilloscope S/N	E552 E5	50 cpm 50 cpm billond Institute of Stan at constants or have be 51 720 73 51 73 51 720 73 51 73 51 720 73 51 74 51 74 517 51 74 51 74	dards and Technology, or sen derived by the ratio by State of Texas Calib 4 1616 N Other 7 June 5 7 June 5	50 50 to the colibration locifies of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be \$/N T-304 86250390
um Measurem um Measurem internationa colibration sys iference -137 Gamm ☑ Alpha m 500 alibrated 1 eviewed 8 sis certificated DRM C22A 1	40 K cpm.         40 K cpm.         40 cpm.         131 conderstores that the requirements and/or or S/N [1162 ] G         S/N	31 	37       Y       en collbrated by standards to stived from accepted value:       0-1-1994 and ANSI N323-1971       15     T1008       15     T1008       Beta S/N       Oscilloscope S/N	Easurements, Inc.	50 cpm 50 cpm bilorial institute of Stan al constants or have be 51 720 73 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Soc. Soc. Soc. Soc. Soc. Soc. Soc. State of Texas Calib State of Texas Calib In 1616 N Other Nultimeter S/N  Control Soc. Soc. Soc. Soc. Soc. Soc. Soc. Soc.	50 50 to the colibration locifies of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be \$/N T-304 86250390
tal idout m Measurem r Measurem	40 K cpm         40 K cpm         40 cpm         131 condensity of the requirements and/or or s/N         1162         G         S/N         1162         G         S/N         1262         G         S/N         1347         By:         41 not be reproduced e 1/26/2003	31 	37       Y       en collbrated by standards to stived from accepted value:       0-1-1994 and ANSI N323-1971       15     T1008       15     T1008       Beta S/N       Oscilloscope S/N	Easurements, Inc.	50 cpm 50 cpm bilond Institute of Stan al constants or have be 51 720 73 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Soc. Soc. Soc. Soc. Soc. Soc. Soc. State of Texas Calib State of Texas Calib In 1616 N Other Nultimeter S/N Passed Dielectric (F Failed:	50 50 to the colibration locifies of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be \$/N T-304 86250390
m Measurem m Measurem m Measurem m Measurem m Measurem m Measurem m Measurem m Measurem ference 137 Gamm 7 Alpha m 500 alibrated 1 s certificated iRm C22A 1	40 K cpm         40 K cpm         40 cpm         item conforms to the requirements and/or or s/N         1162       G         S/N       1162         S/N       1347         By: <u>felency</u> Got not be reproduced e 1/26/2003	31 31 31 31 31 31 31 31 31 31	37       9	Easurements, Inc.	50 cpm 50 cpm bilond Institute of Stan at constants or have be 51 720 73 51 73 51 720 73 51 73 51 720 73 51 74 51 74		50 50 to the colibration locifies of pe of colibration techniques. ration License No. LO-1963 leutron Am-241 Be \$/N T-304 86250390

JME	Jesigner and Man of Scientific and In Instrument	ufacturer dustrial Cl	ERTIFICATE OF CA	LIBRATION	LUDLUM MEASU POST OFFICE BOX 81 501 OAK STREET SWEETWATER, TEXAS ORDER NO.	REMENTS, INC. 0 PH. 325-235-5494 FAX NO. 325-235-4672 79556, U.S.A. 237280 / 292530
	Ludium Measure	ements, Inc. N	Nodel	· 222 1	Serial No. 73	680
.g	Ludium Measure	ements, Inc.	Aodel	43-5	Serial No. PRC	93651
Jal. Date	<u>27-Ju</u>	<u>n-05</u> Cal D	ue Date2	7-Jun-06	Cal. Interval <u>1 Year</u> N	Aeterface 202-159
Check marl	k 🗹 applies to app	licable instr. and/or	detector IAW mfg. spe	ec. T. <u>73</u>		Alt mm Hg
New I	nstrument Instru	ment Received	Within Toler. +-10%	] 10-20% 🗌 Out or	f Tol. 🗌 Requiring Repair [	] Other-See comments
Mech F/S Re Audio	anical ck. sp. ck o ck.	Meter Zero	ed 🗍 🕅	Background Subt Window Operatio Batt. ck. (Min. Vol	ract	ut Sens. Linearity ptropism
		3 WITT LMI SOF 14.8 I	ev 12/05/89.	Calibra lea in acco	Thresh	old mV
nstrument v	voit set/50	v input sens.	my Det. Ope	ar. <u>750</u> ∨	at 35 mV Dial Ro	
M HV	Readout (2 points	) Ref./inst	500 / 47,	<u>&gt;</u> ∨ R	ef./Inst2000	./ <u>1766</u> v
COMMEN	NTS:					
	Firmword	:: 261010				
	1				.f. c	
	Cal'd w	ith a 39 <sup>n</sup>	C-c-ble		MF6-29	-
		•				
Samma Calibratio	. Old dometors profilered a		for \$1.4.0 in which the free of any			
	n. GM delectors positioned (	RE	FERENCE	INSTRUME	NT REC'D INSTR	UMENT
	RANGE/MULTIP	LIER C.	AL. POINT	"AS FOUN	D READING" METE	R READING*
	<u>X 1000</u>	400 K			<u> o</u>	400
	<u> </u>	100 K	com	37	0	400
	X 100	10 K	cpm	100	<u>&gt; .</u>	100
	<u>X 10</u>	<u> </u>			<u> </u>	400
	X 1	400	cpm	390	>	400
	<u> </u>	100	com	100		100
				······································		
•(	Incertainty within ± 10				ALL Range(s	) Calibrated Electronically
	REFERENCE CAL: POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFEREN CAL. PC	NCE INSTRUMENT DINT RECEIVED	INSTRUMENT METER READING*
Readout	400 K cpm	37731 (0)	39751 (6)	Scale 500	K cpm 500k	500k
	40 K cpm	399	398	50	<u>к срт Бок</u> К сот 54	<u>50k</u>
	400 cpm	40	40	50	0 cpm <u>50a</u>	500
•	<u>40 cpm</u>	<u> </u>	41	5	0 cpm <u>50</u>	5e
udium Measuri other Internatio	ements, Inc. contilies that i not Standards Organizatio watem conforms to the m	the above instrument has b in members, or have been in internents of ANSUNCS1 7	een colibrated by standards t derived from accepted volue 540-1-1994 and ANSI N373-197	raceable to the Nationa s of natural physical con: R	l institute of Standards and Technolog stants of have been derived by the ri State of Texas	ay, or to the calibration lacitities of alio type of calibration techniques.
The second se	e Instruments and		105 T1008 T1779	E552 E551		Neutron Am-241 R= 5/N T.374
Reference		12.600com	7 Beta S/N	L.		
Reference Cs-137 Gam	0 S/N - PU-230					· »
Reference Cs-137 Gam	o S/N Pu-239	200			Multimeter S/N_	86250370
Reference Cs-137 Gam	o S/N <u>Pu-239</u> IO S/N <u>134</u>	1709 F		,	~	
Reference Cs-137 Gam Alph m 50 Calibrated	0 S/N <u>PU-239</u> 10 S/N <u>134</u> 13 By: <u>Cleanne</u> t	1709 Mayner			Date 27 Jun 0	5
Reference Cs-137 Gam Alph m 50 Calibrated	0 S/N <u>PU-239</u> 10 S/N <u>134</u> 13 By: <u>Creany</u> 1 By: <u>150</u>	Mayner			Date 27 June	5
Reference Cs-137 Gam Alph m 50 Calibrated Reviewed	0 S/N PU-239 10 S/N 134 d By: ferenny 1 By: for for the former	1709 E Maxwel			Date 27 July	5

		CI	HAIN REÇ	OF COUEST	CUS [ FO	roi r A	DY NNA	REC LYS	ORD IS				Page of MFG, Inc. 3801 Automation Way #100 Fort Collins, CO 80525 (970) 223-9600 Fax (970) 223-717
Client/Project Name: consulting incientists and MFG, INC. / DAVIS MIII Syle angineers (Galculay, G	stenerchathers >>	MFG, inc. Con Rainti	ilact / Pho Y Wh	ne Number: ICKN	1	170-	150	;-/]7	14			A CON	Analysis Requested
Project Number: PO: Number: 181716	3-16	Delivery Meth	od / Shipp	ing Docume	int Numt	xer:				/	<u>/0``</u>		N ON CONTRACTOR
Send Results / Report To:		Sampler (Print	t.Name / A	ffiliation):					A CONTRACT	AN A		N P	6 19 00 Million
3801 Automation Way, Suite 10	Ø	Randy 1	ahicri					/		7	/		Preservativo
16 (11)115, 10 50255		Signature:	Repo	l	10.5		л. 5/	$\overline{\mathbf{x}}$		15	7		Container Type and Size
Field Sample No./ Identification	Date	Time	Sample Matrix	Total No. of Cont.	Filt. Y-siti	N Y	Filtero Colon	Filter V I N	no na Filt.		Filt.	and Filt.	N
GWB-8	9-11-06		5		X			X	X				Gamma-speci seal date lister on
GWB-20	5-4-06		1955- 1969-		×								caming tins allow I days for
501-12	6-14-08		5		X								Rn-222 equilibration before preh
501 - 17	6-14-06		5		X			$\mathbf{x}$	$\mathbf{X}$				Cambrid Sine analysis
502-4	6-14-06		5		X			13.13 (1) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2					
502-15	114-06		5		X	X	5	X	×				Wet Kadlochem :
503-1	6-18-06		5		X								Unseal counting tins after gamma
503-9	2-18-06		5		X		<b>(</b>	X	$ \mathbf{X} $				Justiss tracess sample by the
503-22	6-18-06		5		X	X	$\zeta$	X	X				Wet majochem netherts for
504-1	6-21-0%		5										Ro-226 H-not and Kines Alphal
													ananyses
Relinquished by: (Print Name/Affiliation) RANJY UMICK H	Date:	Received by:	(Print Nam	e/Affillation	}				Date:			Analyti E.1	ical Laboratory (Destination): 1893 - Laborat Nits, Inc
Relinquished by: (Print Name/Affiliation)	Date:	Received by:	(Print Narr	e/Affiliation	)				Date:				isper, wy s2601
Signature:	Date:	Beceived by:	(Print Nam	e/Affiliation	·····			<u></u>	Date:		<u></u>	Condit	tion/Temperature of Samples when Received: Serial No.:

a an an she

1 A

turn to MFG, Inc. Yellow: Laboratory Pink: Field Team

Matrix Codes: SW=Surface Water GW=Gmund Water S=Soli Sediment

.

White States

			C	HAIN REQ	OF ( UESI	CUST FO	'OD R A	Y F NAI	EC LYS	OR IS	D					N 3 F ((	MFG, Inc. 1801 Autor Fort Collins 1970) 223-9	Pac mation \ s, CO 8( )600 Fa	ge of Nay #100 0525 px (970) 223-7	<u>Z.</u> 7171
Client/Project Name: consulting clientists and ngineers	us Mill Site Saltway ;	(6) <sup>1</sup>	MFG, Inc. Cor	itact / Phon	e Number:			•						AN A	A ANOR	stril men	Analysis F	Requested		7
Project Number: 191316	P.O. Number: 191316-6-*	23-06	Delivery Meth	od / Shippir	ng Docume	nt Numbe	ਸ਼			•. •		/v .		and ide	et (2)		oter			
Send Results / Fleport To:	'		Sampler (Prin	Name / Aff	iliation):				, <del>-</del>	13°	(All I		,214	o right	6165	m.,				
	·.	· .	Second for the			·	:					}/		¥ /	/	/r				
			Signature:			A.S. C.	MALLE				/_		~			Contair and	ner Type Size			
Field Sample No./ Identification		Date	Tîmə	Sample Matrix	Total No. of Cont.	<sup>™</sup> ∽"Filt.∽ Ÿ~- ~N	airtean F airteanγa	ilt. Need	∾File °Y*}*N	and and I the desay	Filt.		11. ->N	ooraffilt:** ∾Y*i[-4N++			Roma	rks	•	
504-7-		6-21-06		5	· · · · · · · · · · · · · · · · · · ·	54 <u>×</u>				· .					*5.50	5081	ial in-	stint	MS OD	
51)5 - 1		12-14-06		5		X	<b>1</b>		X	1,			·		173.02	- <del>1</del> -	010			 ,
5/15 - 5		1.11.11		5	;	$\overline{\mathbf{v}}$	$\frac{1}{x}$		X						1 54 55	<u>L</u>	03.2	·		
<u> </u>		10-10-000		- ····								· · ·					······································			
ala ang ng n					······		- <del> </del>		<u>.</u>		-	+							1	
· · · · · · · · · · · · · · · · · · ·							-				-	•						·		
	:									<u> </u>			<u> </u>			:	······			
									·											
							1.18		54 		¥.,									
		1					^	·	14		<u></u>									
					<b>.</b>							1								
	-	- <u> </u>	<u> </u>	+				+				·			+					
	·····														<u>L</u>		<u></u>	<b></b>	······································	
Relinquished by: (Print Name/Alfillation)	land.	Date: 6-25-06	Received by:	(Print Name	/Affiliation)					Da	ate:			Analytica	J Laboratory (	Destination)	e			
Signature:	مىيى <sup>مى</sup> تا لارم زىرى مىيىيىيى مىيا لارم زارى	Time:	Signature:	(D.i., 1.*)						Ti	me:					*			1	
Helinquished by: (Print Namé/Affiliation)	۰.	Date:	Heceived by:	(Print Name	·Amilation)	L				D	ne:						·			
Signature:		Time:	Signature:							Ti	me;							·		
Relinquished by: (Print Name/Affiliation)		Date:	Received by:	(Print Name	VAffiliation					D	ate:			Condition	/Temperature	of Samples	when Receive	sd: Serial	No.:	
		l																<b>₩</b> ₽	00566	U
Signature:		Time:	Sionatura:							111	me:			ł				.1	1	

H

White: Return to MFG, Inc. Yellow: Laboratory Pink: Field Team.

.

Company Name:		Project Name	, PWS #	Permi	#, El	c.:								
ALEC THE		Davis	KA: JI	510	Po	MAN	1 al	( second	1	l es	1.2.1	MACI	(P) (	
Report Mail Address:	· · · · ·	Contact Nam	e, Phon	e, Fax,	E-ma	ail:	1741	<u> 17 # 1</u>	1	<u>- 70</u>	1.11	Samp	ler Name if other than Contact:	1
MF6, INC. 3801 Automation Way, suite FF; Collins, CO 9052.5	lao ,	Randy 970 556 Tandy, u	Which 177	cer 4 17/0	mf.	qei	W.C	CAT	<u>,</u>					
Invoice Address: MF6, Inc. 3801 Automation Way, Suite 10 51 Colliges Inc. Soc. 52		Randy 4, 970 23	hicke 3 960	0ne #: 0								IS/	316-6-20-06	≥ <b>#:</b>
Report Required For: POTW/WWTP		<b>6 6</b>	AN	ALY	SI	S.R	FC		-5	тн	n	÷	Notify ELI prior to RUSH	Shipped by:
Other	- · · ·	ers B O etati					Ī	<u> </u>			_	5	ample submittal for additional	
Special Report Formats - ELI must be n sample submittal for the following: NELAC A2LA Level I <sup>N</sup> Other EDD/EDT Format	otified prior to	Number of Contain Sample Type: A w S v Water Soils/Solids <u>V</u> eg <u>B</u> ioassay <u>O</u> ther	hatwal	226 5 Maha	5 Reta		ale a series	216	ite and a second	210	ATTACHED	Iumaround (TAT)	charges and scheduling Comments:	Cooler ID(s) Receipt Temp ° C Custody Seal Y Intact Y
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Collection Date Time	a MATRIX	-0-	1.22 - (5105	Gub	Hd.	63101	Witz	Will	SUN.	SEE	RUSH T		Şignature Y Match Lab ID
well 1	6-20-06 11 am	AN ST	XX	Č 🖌	X	X	Ż	X	X	×				2
11011 2	6-20-06 11 20	W	XX	X	x X	X	X	x	X	X				Z
CODT Well	6-20-06 11 am	14/	XX	$\mathbf{x}$	X	X	2	. se	×	$\mathbf{x}$			· · ·	<b>0</b>
Onnd Dand	1-20-06 11 mm	IA/	XX		X	X	V.	X	ź.	x				S S
S A STATE AND A ST	2 20 00 11 am				<u>7</u>		<u>~</u>	-					· · · · · · · · · · · · · · · · · · ·	2
) )	· · · · ·	· · · · ·				· · ·			 :					R
			<u> </u>  -	-									· · · · · · · · · · · · · · · · · · ·	E
		*				· · ·						-		R
}				- <u> </u>										0 M
10		1	╞╼╌┠╼						<u> </u>					4
Custody Record	Date/Time	<u>    12:00 pp</u>		Signature	1 1: 1/////////////////////////////		r Re	ceived	by (pr	int):	i	L	Date/Time:	Signature:
MUST be	Date inte		. é	, J. g. 10 (4) 6					- <b>- )</b> (p)				LZBLEZ TIMOG.	- បាណ្ណារតាណាង.
Signed							+						LADODATODY LICE ONLY	

· · · · · ·

This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at www.energylab.com for additionation, downloadable fee schedule, forms, & links.



I Inear Regres	sion Analysis	General Area	Air Samoler	T	Celibrated By:	m Vitte		1	(SLPM Flow	Rate * F = LP	M Flow Rate)	1	1	
Sampler ID #		F&J #00321	8	-					- <u>13</u>	······································		1		
Callbration Da	ite:	03/13/2008		Calibrator F&J	CD-802 #312	DUE FOR C	ALIBRATION	1/27/2007	Ave. Amb. Te	mp.	60	289	K	
Callbration D	ue Date:	09/13/2008	f						Ave, Ambent	BP		24.46		
*******					Repression Out	but:	1		Std. Temp.			298	K	
CALIBRATIO	N DATA			Constant		T	2,355	(b)	Std. BP	******		29.92		
Ind, Flow			[	Std Err of Y E	at		0.321	1-1-1	1-1-1-		2	1		
Reading	SLPM	LPM		R Squared	f	+	0 999			F=(P2)(T3)	F=	1.09		
20.0	17.6	19 18		No of Observa	tions		6.000			(P3)(T2)		†		
25.0	218	23.76		Degrees of Fr	adom	<u> </u>				<u></u>		÷		
30.0	25.5	27.80		Dograda Ur i re	icuciii	<u> </u>								
36.0	20.0	27.00		V Canthalant/a		0.050	(m)		D2 - Aun Day	omatria Droad				
40.0	30.0	32.10		A Coeringenitie	¥	0.002	1000		PO - Cid Dra	Uneuro Press				
40.0	33.4	30.41		Sta Err of Coe	<u>.</u>	0.015			P2 = Sid. Pre	SUIG(29.92 II	<u>i. rig)</u>			
40.0	3/,1	40.44		Coefficient of C	orr.	0.888			12 = Sta. 1en	p(298 Keivin)				
						1			13 = Avg. Am	pent remp in	Kelvin			
·····			As found usi	ng pre set point	32.5 = 30 lpm	1	·							
				New set point	32.5= 30 (30.04	s) (pm						1		
				L								·		
INEAR REG	RESSION:	Predicted LPN	M = Ind. Read	Ing(X) * Coeffic	lent(m) + Const	ant(b)			Y = mX + b				-	
			1	-										
X	Y	X	Y	X	Y	X	Y	X	Y			ŀ	1	
Ind.Flow	Predicted	Ind Flow	Predicted	Ind,Flow	Predicted	Ind.Flov	Predicted	Ind.Flov	v Predicted				1	
Reading	LPM	Reading	LPM	Reading	LPM	Reading	LPM	Readin	d LPM			70. c	1	
10.0	10.9	27.5	25.8	45.0	40.7	62.5	55.6	80.0	70.5		É.		1	
10.5	11.3	28.0	28.2	45.5	A1 1	63.0	56.0	80.5	70.9		33	<u> </u>	1. 1.	
110	117	28.5	26.6	1 46 0	A1 6	63.5	56.5	81.0	714			No.5 -	1	
116	12.2	20.0	27.1	40.0	41.0	64.0	56 0	R15	71.9					
120	12.4	29.0	27 5	40.0	42.0	64.5	50.8	820	72.2	***	-			
12.0	12.0	29.0	47.0	47.0	42.4	. 04.0	67 7	02.0	737				+	
12.0	13.0	30.0	8.13	41.0	42.0	05.0	5/./	04.0	72.1		د	1	· .	F
10.0	13.4	-30.5	40.3	40.0	43.3	00.0	50.2	03.0	13.1					
13.0	13.8	31.0	28.8	48.5	43.1	00.0	58.0	03.0	73.0		Λ ι		1 1100	Calibration
14.0	14.3	31.5	29.2	49.0	44.1	66.5	59.0	84.0	73.9		Arez A	tir N	ABALOC C	all platica)
14.5	14./	32.0	29.6	49.5	44.5	67.0	59.4	84.5			function of		La Pri -	
15.0	15.1	32.5	30.05	50,0	45.0	67.5	59.9	85.0	74.8		ei sala	-		
15.5	15.6	33.0	30.5	50.5	45.4	68.0	60.3	85.5	5 75.2		SNEET			
16.0	16.0	33.5	30.9	51.0	45.8	68.5	60.7	86.0	75.6		<i>y</i> 1 ( <i>a</i> )			
16.5	16.4	34.0	31.3	51.5	46.2	69.0	61.1	86.5	76.1					
17.0	16.8	34.5	31.8	52.0	46.7	69.5	61.6	87.0	76.5					
17.5	17.3	35.0	32.2	52.5	47.1	70.0	62.0	87.5	76.9					
18.0	17.7	35.5	32 R	53 0	47 5	70 5	62 4	88.0	77.3		-			
18.5	18 1	36.0	33.0	53 5	47 0	71 0	62 9	88 5	77.8			*		
19.0	18.5	36.5	325	54.0	41.5 AR A	71 6	62.2	AD O	78.2				,	
10.6	10 0	37 0	32.0	54.0 54.5	40.4	720	83.7	AO A	78.6		1	- 1		· ·
20.0	10 /	37 6	34.5	04.0 EE A	40.0	72.0	00.1 RA 1		70.0		<u> </u>	· [ · · · · · · · · · · · · · · · · · ·		
20.0	10.4	37.3	34.3	00.0 EF F	49.2	12.0	04.1	30.0	70 -			·	FFAL	MED
20.0	19.0	30.0	<u>, 34./</u>	50.0	49.6	/ 3.0	04.0	80.0	1 10.0			5 125	بالمحمد والمسترسية	L'A CODD
- 21,0	20.2	38.5	35.2	58.0	<u>1 50.1</u>	/ / / / / /	05.0	¥1.0	19.9			المتلج الألج	1-6-6-7-7	EHOUTT
21.6	20.7	39.0	35.6	56.5	50.5	74.0	65.4	81.5	80.3	l		f	1.	Lin Collety D
22.0	21.1	39.5	36.0	57.0	50.9	74.5	65.8	92.0	80.7			the second	+ Radiat	un annar "
22.5	21.5	40.0	36.4	57.5	51.3	75.0	66.3	92.5	81.2		ļ	45.90	+	1
23.0	22.0	40.5	36.9	58.0	51.8	75.5	66.7	93.0	B1.6			Ļ		1 march
23.5	. 22.4	41.0	37.3	58.5	52.2	76.0	67.1	93,5	5 82,0			1	LinkAR	p ; 2000
24.0	22.8	41.5	37.7	59.0	52.6	76.5	67.6	5 94.0	82.4		L	1	11:40	<b>T</b>
24.5	23.2	42.0	38.1	59.5	53.1	77.0	68.0	94.5	5 82.9			1		
25.0	23.7	42.5	38.6	60.0	53.5	77.5	68.4	95,0	83.3	1			1.1	18
25.5	24.1	43.0	39.0	60.5	53.9	78.0	68.8	95.5	5 83.7			DIS	nous	**************************************
26.0	24.5	43.5	39.4	61.0	54.3	78.5	69.2	2 96.0	84.2			ang	in the second second in the second	and the state of t
26.5	24.9	44.0	39 6	61.5	54 R	79.0	89	96.5	5 84.6	1				Total of the Calibra Barthe States & Williams
27.0	25 4	AA 5	1 40 3	62 0	55.7	70 6	70 1	97 (	85.0	1	••••••••••••••••••••••••••••••••••••••	ansatut	Cara San Mar Roand Street	well of the state



# ATTACHMENT K

# RADIATION SAFETY PLAN IMPLEMENTATION RECORDS

### Gateway Projects: Area Sampler Calculation Spreadsheet

						1999-000 - 1997 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 1998 - 19			_							
		Meter	Meter	Elapsed				Sample	Bkg	Count						
Collect		Start	Stop	Time	Flow rate	Total Vol	Count	Filter	Filter	Time	Filter	Bkg	Eff.	Conc.	Conc.	
Date	Time on	(min)	(min)	(min)	(L/m)	(L)	Date	(counts)	(counts)	(min)	(c/m)	(c/m)	(plate)	- d/m/:L	uCi/ml	% DAC
Davis Mill S	<u>Site</u>															
6/1/2006	12:30	24988.7	25748.6	759.9	32.7	24848.73	6/5/2006	16	8	10	1.6	0.8	0.24	0.000134	6.0975E-14	0.1
6/5/2006	8:45	25749.5	26254.6	505.1	32.7	16516.77	6/6/2006	38	12	10	3.8	1.2	0.24	0.000667	3.02963E-13	, 0.5
6/6/2006	8:30	26254.9	26728;3	473.4	34:0	1.6095.60	6/7/2006	. 46	6		»/ 4.6	0.6	0:24	0.001042	4.73445E-13	₩2 <b>0.8</b> (***
6/7/2006	9:04	26728,4	27168.7	440.3	35 -	15410.5	6/8/2006	42	9	10°	4.2	_;;;0;9 ↔	0.24	0.000898	4.07956E-18	0.7
6/8/2006	8:36	27169.1	27464.4	295.3	35	10335.5	6/9/2006	30	7	10	3	0.7	0.24	0.000942	4.28259E-13	0.7
6/9/2006	8:37	27464.6	27921.7	457.1	34.5	15770.0	6/10/2006	6	14	10	0.6	1.4	0.24	-0.000211	-9.59477E-14	-0.2
6/12/2006	9:05	27921.9	28359.5	437.6	34.5	15097.2	6/13/2006	58	8	10	5.8	0.8	0.23	0.00141	6.41085E-13	1.1
6/13/2006	8:45	28359.5	28814.7	455.2	34.5	15704.4	6/14/2006	50	7	10	5.0	0.7	0.24	0.001146	5.20846E-13	0.9
6/14/2006	8:48	28814.9	29268.8	453.9	34.5	15659.5	6/15/2006	53	6	10	5.3	0.6	0.24	0.001256	5.70928E-13	1.0
6/21/2006	1:47	29635.2	29830.6	195.4	34.5	6741.3	6/22/2006	27	16	10	2.7	1.6	0.24	0.00069	3.13805E-13	0.5
6/22/2006	9:03	29830.7	30336.4	505.7	34.5	17446.7	6/23/2006	40	8	10	4.0	0.8	0.24	0.000772	3.50988E-13	0.6
6/23/2006	Terminate	ed air sam	pling as e	xcavations	s were com	oleted and th	ne final statu	is survey i	required ai	li availabl	e time an	d resour	ces			
CDOT	Resumed	l area air s	ampling a	is new re <mark>n</mark>	nediation be	gan on adja	cent CDOT	property								
7/6/2006	9:20	30336.6	30445.7	109.1	34.5	3764.0	7/7/2006	19	8	10	1.9	0.8	0.24	0.001219	5.54062E-13	0.9
7/7/2006	9:20	30445.9	30853.8	407,9	34.5	14072.5	7/17/2006	10	2	10	1.0	0.2	0.24	0.000237	1.07777E-13	0.2
7/17/2006	9:22	30854.1	31307.7	453.6	34.5	15649.2	7/18/2006	69	7	10	6.9	0.7	0.24	0.00164	7.45531E-13	1.2
7/18/2006	10:00	31307.9	31564.2	256.3	34.5	8842.3	7/19/2006	33	3	10	3.3	0.3	0.24	0.001405	6.38439E-13	1.1
7/24/2006	10:00	31564.3	32022.5	458.2	34.5	15807.9	7/25/2006	37	4	10	3.7	0.4	0.24	0.000864	3.92831E-13	0.7
7/26/2006	10:00	32022.6	32561.8	539.2	34.5	18602.4	7/25/2006	60	3	10	6.0	0.3	0.24	0.001269	5.76597E-13	1.0
						·····									1	
INIntee'	÷														1	

Section near Willis Trailer @ site perimeter

1) General air monitoring station was centrally located in the work zone (2 days were monitored near Willis residence on NE corner of property during excavations in that area

2) Initial results for Davis Mill Site project were all well below action levels (10% or DAC) even on very dusty/windy days

3) As a result of very low initial results, low lapel sampling results, and constraints on time and resources in performing all aspects of the scope of work, general air monitoring was selectively performed on days of high temperatures, strong winds, or any other reason for which a high degree of visible dust generation was anticipated or observed.

## FRONTIER ENVIRONMENTAL SERVICES, INC.

5171 Ward Road, Unit 1 Wheat Ridge, CO 80033 (303) 234-9350 Project Remediation Control Program

FRONTIER PERSONNEL LOG	Date: 5-15-06
Project: CDPHE Davis Mill Remediation Project	Project No.: 060214
Location: Gateway; MESA County; Colorado	

NAME	REF.	COMPANY	TIME IN		SCAN	OUT			SCAN	OUT		TIME OUT
			MORNING		LUN	СН			EVEN	NING		EVENING
				RĦ	LH	RF	LF	RH	LH	RF	LF	
Clay Combrank	1010	FESI	01030	l	0	0	0	Ũ		0	0	1745
this the	5086	FEST	0645	$\mathcal{O}$	1	Į	l	l	1	0	ð	1745
Don	5020	Fesj	0645	Ø	:3	Ò	2	. 1	2	1	C	1745
Nick Ochs,	5091(2)	FESI	0645	0	0	0	Õ	0	1	0	$\mathcal{O}$	\$17:30
Davie S. Hunds	1001	FEST	0630	$\overline{\mathcal{O}}$	Ő	3	1	2	3	4	63	1745
Steve MikeNZ	5031	KEST	0645	2		0	3	O		0		1745
Bandy Whidson		MIEG	0830		)	2		0	0	2	$\bigcirc$	17:00
		<b>V</b>										
					-							, ,
· ·												

COPY TO: Robert Terry; Colorado of Public Health & Environment

# FRONTIER ENVIRONMENTAL SERVICES, INC. 5171 Ward Road, Unit 1 Wheat Ridge, CO 80033 (303) 234-9350

Project Remediation Control Program

FRONTIER PERSONNEL LOG	Date: 6-21-2006
Project: CDPHE Davis Mill Remediation Project	Project No.: 060214
Location: Gateway; MESA County; Colorado	

NAME	REF.	COMPANY	TIME IN		SCAN	OUT			SCAN	OUT		TIME OUT
			MORNING		LUN	СН			even	NING		EVENING
1				RH	LH	RF	LF	RH	LH	RF	LF	
Cton Combrink	1010	FESI	0645	l	3	6	1					1800
Q	5026	FEST	645	O	0	0	J	0	1	$\mathcal{O}$	$\bigcirc$	515
JOE FEILER	1015	FEST	0645	Ø	1'	Ô	U	Ő	1	O	$\bigcirc$	1730
Brat Scarbound	1011	FEST	0641		0	0	0	0	0	D	0	1770
This Hofe	5086	FEST	0695	l	0	2	1	1	0	0	1	1715
Travis Sourde	- 5098	FESI	0645	<u>i</u>	O	0	O	0	$\mathcal{O}_{\mathbb{C}}$	0	0	1730
Mill Ochs	5091	FESI	0845	1		$ \mathcal{O} $	$\mathcal{O}$	ſ	1	1	$\mathcal{O}$	1730
HENR MULENSI	5031	855I	0645	1	0	0	(		0	1	$\partial$	1730
R. MINICKER		MEG	0815	$\mathcal{O}$	Ó	/	1	3			0	17:30
munica		MEG	9:15	1. 0-		()	2	0	ł			16:00
CARA'L SHinds	1001	FEST	1445	<				l	l	2	1	1715

COPY TO: Robert Terry; Colorado of Public Health & Environment

	CDOT Facility: Site Remediation Gateway, Colorado	06062210288
Trucking Company: Sutherland Broth Larson Transpor	hers $\nabla$ Date: $\frac{7}{27}$	2006
Truck Number $36$	Trailer Number $42$	, ·
Gross: $\sqrt{2.3}$ Tons Gross:	Destination: <u>Uravan, Colorado</u>	
Time in: $\underline{1575}$ Time out	t: $0620$ Loader Operator:	S. Melcenzio
Visual inspection for loose material on	vehicle runners and trailer ledges OK	- (
Liner installed ? <u>M</u> Tarp in p	blace ? Entrance Scan	$(\alpha)$ Exit Scan $(\alpha)$
Trailer Scan ( $\mu$ R/hr.) Right Sic	de <u>34</u> Left Side <u>42</u>	Rear <u>69</u>
Total Activity S pCirTruck	//	
Scanned By:	<u> </u>	
COPY TO: CDOT - Grand Junction, U	JMETCO; Transportor	
	Frontier Environmental Services, Inc. CDOT Facility: Site Remediation Gateway, Colorado	060622 0293
Trucking Company: Sutherland Bro	thers $\square$ Date: $\frac{7}{27}$	12006
Driver Der PAXTON		
Driver $D_{ave}$ $A_{XTON}$ Truck Number $42$	Trailer Number_05	
Driver $D_{arriver}$ $A \times row$ Truck Number $42$ Site of Origin: <u>Gateway, Colorado</u>	Trailer Number. 05 Destination: <u>Uravan, Colorado</u>	 2
Driver $\underline{D_{otra}}$ $\underline{A \times TON}$ Truck Number $\underline{42}$ Site of Origin: <u>Gateway, Colorado</u> Gross: $\underline{33.3}$ Tons Gross:	Trailer Number <u>05</u> Destination: <u>Uravan, Colorado</u> <u>18:8</u> Cubic Yards	
Driver $D_{arr.}$ $A \times ToN$ Truck Number $42$ Site of Origin: <u>Gateway, Colorado</u> Gross: $\overline{\times 3.3}$ Tons Gross: Time in: $\underline{0 \times 45}$ Time ou	Trailer Number <u>05</u> Destination: <u>Uravan. Colorada</u> <u>18.8</u> Cubic Yards ut: <u>0905</u> Loader Operator:	5. Mikanzie
Driver $D_{arriver}$ $A \times TOP$ Truck Number $42$ Site of Origin: <u>Gateway, Colorado</u> Gross: $33.3$ Tons Gross: Time in: $0845$ Time ou Visual inspection for loose material or Liner installed? Tarp in	Trailer Number $35$ Destination: Uravan, Colorado18:8 Cubic Yardsut: $0905$ Loader Operator:n vehicle runners and trailer ledgesADplace ? $4$ Entrance Scan	$\frac{5 M c k c - 2}{7} (\alpha) Exit Scan (\alpha)$

Swipe Test Area = 10x10 cm<sup>2</sup> Counting Equipment: Ludium 2221 rate meter (SN# 97289) with Ludium 43-1 probe (SN# 140040) and 2nd shelf holder geometry Release Limit for Net Alpha Measurement = 20 cpm Inc.pm

			Background	Sample	Net Sample	
Date	Equipment Description / ID	Swipe Test Location	Swipe (clean) (cpm)	swipe (com)	Result (com)	Surveyor Initials
5/5/2006	Dozer 966G	Left front wheel	2	D	-2	M
n		Bucket	2	4	2	M
a		Cab floor	2	0	-2	MU
6/12/2006	Loader 950G	Bucket	0	1	1	11/11/
Ŧ		Cab fioor	0	0		AM
•		Wheel well	0	2	2	THE
6/12/2006	Truck 388 / Trailer T-223	Cab floor		2	1	Jui
	• • •	Box	1	0	-1	111
B4		Tire	1 1 1	0	1	Mel
6/13/2006	Truck 93 / Trailer T-93	Cab	1	0		Me
41999 4199 4199		Wheel well		1	0	M
		Trailer bed	1	1	<b>o</b>	The
6/16/2006	Truck / trailer 36	Wheel well	0	4	4	MA
		Cab	0	.3	3	RU
		Trailer bed	0	1	1	TON
6/16/2006	Truck / trailer 009	Wheel well	D	3	3	11M
		Cab	0	1	1	Pll
		Trailer bød	0	0	0	RW
6/21/06	Truck of /Trailer P]	wheel well			B	111
		Cab Floor	1	3	2	111
		Trailer bed		2	1 1	the
6/21/06	Truck 28/ trailer P28	wheel well		1	0	alle
		cab flar	1	2	<u>+</u>	1110
		trailer best	1	3	2	In
6/21/06	Truck 40/ Trailer 400	wheel well	1	2	<u> </u>	110-
المراجعة معارية معاملة مستحد معاملة معارية معاركة معاركة معاركة معاركة معاركة معاركة معاركة معاركة م		Cab Floor		1: 1	D	111
······································		Trailer Bed		3	2	1100

Swipe Test Area =  $10x10 \text{ cm}^2$ Counting Equipment: Ludium 2221 rate meter (SN# 97289) with Ludium 43-1 probe (SN# 140040) and 2nd shelf holder geometry Release Limit for Net Alpha Measurement =  $\frac{20 \text{ cpm}}{10}$  Com

			-			
Date	Equipment Description / ID	Swipe Test Location	Swipe (clean) (cpm)	swipe (cpm)	Result (cpm)	Surveyor Initials
6-21-01	Tluck 30 / Trailer P30	wheel well	<u> </u>	0	-1	m
		Cab Floor	]	1.1	. 0	Mur.
		trailer bed	j	1	0	Tho
6-29-00	Backhos 420 D	lear bucket		in Online		M
		Cab Floor		D	. ]	111
		Front bucket	·····	1. <b>)</b>	0	th
7-7-06	Truck / Tugiker COM	wheel well	)	$\mathcal{D}^{\mathcal{D}}$	- ]	the
		cab floor	1	- O	-1	nr
		trailer bed		D	-1	7/
7-7-01	Trk. 36/Trl. 44	wheel well	la l	(	0	C.t.C.
		cab floor		0	- 1	(.7. (.
		trailer bed	la di second	$\mathcal{O}$	-1	1.E.C.
7-7-06	Tuk. 308 Tul. 223	wheel well	2	O	-2	C.EC.
		cab floor	2	D	-2	C.E.C
		trailerbed	2	0	-2	C.E.C
7-7-06	Trk. 30/P30	wheel well	О			C.E.C.
		cab floor	0	0	0	1.20
andan Anana Markanan Anana ang ang ang ang ang ang ang ang ang		traiter bed	D	2	-2	(. 7. (.
7-7-06	T-k. 2/T-1.2a	Whee I well	0			C.F.C.
	4	Cab Floor	D		-1	1.7.6
		trailer bed	0	0	o	C.E.C.
7-8-06	Trk. 801/Trl. 801	wheel well	3	2	1	C.E.C.
	**************************************	cab floor	3	1	2	(.E.C.
		trailer bed	3	0	-3	(.4.(
7-8-06	Trk 93 Trl. 93	whee well	0	1		1.9. 0.
	······	cab floor	0	1	1 -1	1.4.1.
		trailer bed	0	D	-0	C.F.C.

2

. . .

### Swipe Test Area = 10x10 cm<sup>2</sup>

Counting Equipment: Ludium 2221 rate meter (SN# 97289) with Ludium 43-1 probe (SN# 140040) and 2nd shelf holder geometry Release Limit for Net Alpha Measurement = 10 cpm

Date	Equipment Description / ID	Swipe Test Location	Background Swipe (clean) (cpm)	Sample swipe (cpm)	Net Sample Result (cpm)	Surveyor Initials
7-8-06	Trk. 42/T.1. 05	wheelwell	Ð	0	0	(.E.C.
		cab floor	0	1	-1	C.F.C.
	·	trailer bed	Ø	2	-2	C.E.C.
7-8-06	D-6N XL Dozer	Blade	0	0	0	C. E.C.
		Cab Floor	0	2	-2	C.E.C.
		wheel well	0		-1	C.F.C.
7-8-06	T-K. 01/Tr1.01	wheelwell	1	0	- 1	1.2.1.
		cab floor	1	<u> </u>	0	CF.C.
		trailer bed	(	0	- 1	C.E.C.
78-06	T.K. 40/T.1.200	wheel well	)	0	-1	C.E.C.
		cab floor	1	<u> </u>	0	C.E.C.
		trailer bed	<u> </u>	2	1	6.8.6.
7-8-06	Trk. 28/Trl. 28	wheel well	Ð	0	0	C.F.C.
		cab floor	0	<u>l</u>	-1	C.E.C.
		trailer bed	L0	0	0	C. E.C.
8-3-03	Truck 103	Cab	0		<u> </u>	111
		wheel well	0	0	0	n
		trailer bed	0	10	10	Mi-
8-4.06	Truck 308	wheel Well	0	2	2	<u>an</u>
		(ab Floor	0	1	1	Mr-
		Trailer bed	0	4	4	f.
8.4.06	TRUCK 93	wheel well	0	3	14. 	914 C
	· ·	Laib Flor	0	4	24	an a
		Evailer bed	<u> </u>	5	6	gue.
8.8.06	Truck 801	Trauler bed	0			nî.lo
	······	UND DE		$\overline{\mathcal{O}}$	$1_{\mathbf{O}}$	M.C.
		Trail 192			1	T.S.W

Swipe Test Area = 10x10 cm<sup>2</sup> Counting Equipment: Ludium 2221 rate meter (SN# 97289) with Ludium 43-1 probe (SN# 140040) and 2nd shelf holder geometry Release Limit for Net Alpha Measurement = 10 cpm

Date	Equipment Description / ID	Swipe Test Location	Background Swipe (clean) (cpm)	Sample swipe (cpm)	Net Sample Result (cpm)	Surveyor Initials
8.8.06	THUNK 3124	Truch Bod	0	ĺ	Į.	MW
		I MAG AND	Ö		ļ	MW
		Truck Cabo	5	3	(V)	W.P
£ i	THICK OF-DUID	Bid	0	0	0	Iw
		· in all dell	0		(	MU
		Cab	0	2	2	Mid
1.7	T.28/2028	Bed	$\bigcirc$	4	4	$M(\tilde{d})$
		Cch	$\bigcirc$	-1	Ì	mil
		March Code		0	0	mu
13	Truck 40	Bed	<u> </u>	2	2	mu
		I Ohad Will	0	2	2	MW
		<u>Cab</u>	$\bigcirc$	0	$\bigcirc$	mw
1.5	TYUNK 03	Bed	0			MU
		to had load	<u> </u>	2	2	mw
		Can		0	$\square$	ma
£.	Trijer 42	Bed	0			MW
		Lichnel ( lo , W	<u> </u>	1		MW
		<u>. ('a b</u>	0	2	2	mid
١į	THURK DE THE	Bed	Ó	0	$\Box$	MW
		Unalloll	0			MW
		Cab	$\bigcirc$	$\left  \begin{array}{c} \end{array} \right $	$\square$	mw
	Truck 30			1997) 1997		_
		(36		N.	3	PW
		wheel well	0		2	RH/
	······································	han	$\Box \mathcal{D}$	<u> </u>	$\Box$	PV/

Swipe Test Area = 10x10 cm<sup>2</sup> Counting Equipment: Ludlum 2221 rate meter (SN# 97289) with Ludlum 43-1 probe (SN# 140040) and 2nd shelf holder geometry Release Limit for Net Alpha Measurement = 10 cpm

Date	Equipment Description / ID	Swipe Test Location	Background Swipe (clean) (cpm)	Sample swipe (cpm)	Net Sample Result (cpm)	Surveyor Initials
8.10.06	DOZER 9506	bucket	)	3	2	M
		(76	Ţ	]	0	111
		Where well	·	2	)	11-
Į, V	330 C	Prinket	1	2		MW
		Linh	Í	$\bigcirc$		mw
		NOTE TYDAKS	/		$\Box$	mi
				-		
		· · · ·				
		-				
	· · · ·					
					,	
					<u> </u>	1

# RADIATION TRAINING ATTENDANCE SHEET

PROJECT: Davis Mill Site remediation, Gateway, CO, 2006 INSTRUCTOR: Jan Johnson, Randy Whicker) or Craig Little from MFG Inc.

	ATTENDEE		
Date	Name (PLEASE PRINT)	Signiture 🖂	
3-34i	Dancel S. Hunds	1 cominter 4	-
3/23/2	I Joven R McKenzie	Struck R Millingis,	2.0 <sup>2</sup>
3/23/06	Brent A. Scarbround	But hum	t.
3/23/06	Clay E. Combrink	Chan & Carbit	L. **
3-23-06	Don LevAskevich	Chan z	2. ··
23 MAROL	JOE JEILER	Lisept/ Falor	4
33 Mar 06	Randy whicker	have Milling	instru.
5-1.04	STAN BAILEY	Stars. Barly	V
51.06	Michelle Whicker	CM-WRickh	140 <sup>-1</sup>
5-1-01	Cast Tasher	Call an	
5-1-06	FRANCES LHOUS	Inmail the	
5-1-06	Roy Cressler	floy Prester	4
5-1-05.	SERRY RANDON DAI	they know	2.4.4 -
5-1-05	Malcolin Young	Ming 1	V
5-1-05	Christopher Hofer	15-AF	N
5-1-06	Trent Scatherland	lit Suter	
5-1-06	Billy GOYNE	Billy Broyn,	
5-1-00	Douones Partien	Docelles Joak	
3-1-06	Jame Willials	Jaga Welbdurg	1.5
5-106	Glade young	I while laguring	4-
5-15-68	Nick Ochs	White Co Cot	£
6-5-06	Travis Snyder	y. Al	L-1
6-27-06	Elhiere Colombo	glun flolows	
6-27-00	John DAvid	Adre stand	i no j
6-27-06	Mike Couster	Vitre Laborer	Stort
62766	Ken Tard, f	Kung	observe lonly
6-27-00	5 Mike Feathers	mile Father	

(DOT Personnel

# RADIATION TRAINING ATTENDANCE SHEET

PROJECT: Davis Mill Site remediation, Gateway, CO, 2006

INSTRUCTOR: Jan Johnson, Randy Whicker, or Craig Little from MFG Inc.

	ATTENDEE	
Date	Name (PLEASE PRINT)	Signiture
7/5/06	Sacon larger	Aller .
1/5/16	Charles Jones	that was
119/26	Adam Hollidoord	alto sette to
15/0%	Pickan Suproman	A I A LA
7-6-06	Rep-ent Ran 1-1	ALT MA
r 1 01	l'all'	Rit
)-1-06	Drian Sutherland	Den Jui
		<u></u>
		<u> </u>
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
		·
·····		
		1
		-
	***************************************	
	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	· · · · · · · · · · · · · · · · · · ·
	**************************************	
		1
## ATTACHMENT L

FIELD ACTIVITY LOG BOOK NOTES

## FIELD ACTIVITY LOG BOOK NOTES

4	5-5-06: RW Barty claudy, =65°F=
5-4-06 KW SUMMY = 78°F	- control Larel filter for Chos H
	(got system working property)
- collected 24 background soil samples	
in Background Reference aree	- QC FOR BROK SCAN SUSJEM: 10207=5.2V
	Source: 56.08 URING (mean)
- Sample processing Icanting	Pkay: 21,55
	Eyslem OKAMI. (Stan of SU-1)
- establish new control Limits for	· · · · · · · · · · · · · · · · · · ·
MF67 Gamma system for Bridgert;	- Soil sample processing lanalysis
- Photor 1	MCA Sistems development i
Date: 3-4-06 (BKG) (source) Goometry smont	
Ballery= 58 V 20 lant 20-cant 63-13 2	SUIVEYA CLE LOEET WILL
stacked on	Swipe tests
1 23.26 55.81 Compty can	-9-06 FW 1arthy Clarky = 10"F-
2 21,44 50.03	no from the Bellenin Shi
3 2103 56.05 1 Kto	for - UL for partipart system; carrier is
4 21,89 57.55	AVAL - 20196 + in and see downing that
5 21.25 56.91 empty -	Evolom okay 3 adultional recurrington.
6 22,39 56,16 (An	
7 21,69 5706 an w/button	- Glattal scioning suil samples in pairing
8 22.67 31.22 Source	area (Survey Unit-1 area) after initial
7 22.42 56,42	cleanup - goal was lo establish gamma
$10 - \frac{21}{24} \frac{52}{90} \frac{52}{50}$	corretation with Ra-226 conc. of evaluate
510 = 0.70 0.62	- Soil Samp Deachesiles Landons
MER. 36: 17:7 39.1 MER. 16: 24.1 58.4	- Intromyat issues & RSO Addies (larel sampling)

·

2 3-21-06 RW Parthy Coolids, cool	10= 4-30-06 RW
	Spils Lab
Activity - Initial pre-chamup scans of areas	MODINZATION TO CONCURANT
on North side of property Using ME	6
Backpack System w/ Ludhm ZXZ"	
Marel 49-10 NAL debator of 4	5015 Rad Low Setup
- COSO INF. MOREL CIMPG 72 yea	- Rad saleby training for tructo
Notes: - All systems working property	
net John Willis & Douglas - nice	2- 5-2-06 RW SMNY-70°
l'ellours	and bell course controlled
	- XILS BUR SCOP Contraction
3-22-06 KAV SUMAY, MILA 3	30 - MOTHMONT OU CHER
ALIVITY - FINISHAD SITE SCARS	- cationation investigations
	- Lapel sampler initiation
3-23-06 RW SUMAY MY = 55	°F
	5-3-06 FW SMAY = 6-
Activity; Bolleding 7 soil samples (subace comp	ster soils lab setup, cont.
GU-1 through GW-7 for MCA Spectral	- instr. AC thecks
	test counts on standa
Quantum March 1998 (1998)	and a state of the second

.

ı

B	1
5-16-06 RW SUMY HOT - 90"=	5-17-06 RW SUMNY WARM = 80%=
- Swipe lests in mill hulding after	1
Aiball PROSSUR WASh	- counting test oits Samales Amon
in the second second second	laday Will
· Background (clean Filter) (counts in Imin.)	
cm = d	
Mill Location: ID CPM CFM	A set of the set of th
Floor 1st level 1A 5 4	······································
stairs fron 102 M level 13 1 0	
wall 1st level 10 3 2	
wall 2nd Lavel 2A 8 7	ι ετα ε αποσταρατοταματηρογία το του ματο ετα το ετά τη της της της της της της της από προγολογιας της της της Της της της της αποσταρατοταματηρογίας της της της από τ
Floor and level 2B 8 7	and a second
Flow prot stops to 3rd land 26 3 2	a maarina ay ahaa ahaa ahaa ahaa ahaa ahaa ahaa
Pailing, and Lavel 2D 4 3	nandarium inimizer ar an
Wall, 3rd Level (a) 3A 21 20	2 medicinalizations on a communication μ = control and the control of the co
Wall, 3rd Lovel (mil) 3B 4 3	an 2 a - 1 An 1 Addid addia anna an a' an annan ann a' a' a' A DHANNAN ANN 27, a - 100000
Floor, 3rd Lard 3C 4 3	an ann an ann an ann an ann an ann an an
Flack, 3rd level 30 5 4	· · · · · · · · · · · · · · · · · · ·
Floor, 3rd Level 35 3 2	
- Screening measurements for tranches in bellantard	
below Mill;	•
Trench 1 N38. 67932 WIOK. 97860	
1 " 2 N38,67750 W105,94875	
1 3 N 38. 67962 W108, 97894	
1 4 N.W. 67780 W108.97872	a construction of the second
	l

.

R.W. Partly Cloudy, windy ~701-5-9-06 5-11-06. RW CONE, SUNDY - QC MEADURACATS (MCA) - QC chart development Instrument QC measurements (MCA) & development of Control chart branch) - Larel Sample counts. - Soil sample processing lanentyes - RSO tasks (Lapel sampling) 5-12-06 RW Warm, SIMY = 80°1-Data Analysis ( development of Galary) --- QC MOASWOMENTS-(MCA) specific Lalibration curve adjustment Sample processing I counting tout -25 though 28) algorythins for MCA measurement of Ra-226 concentrations) - Lapel sampling a filter counting 1.5 having house last 2 days with Background RW SUMAY, COOL - 60°F 5-10-06 SUSTIMENT QC (MCS), cont. developmental control chart mensurements (ALICA-1 & GW-7) filler courts - they seem very high c12-K. (counts in 10 min) - am trying Background Phil Igidi With COPHE Visited Sile - We natrat the site of disassed energing issues. with Ian next week Nevertheless, collected 4 mire Backgrand samples upiker fillers are coming in (2) low GWB 16-28 lovel ) (@ Brokgoon of 105) san of excavated arms rearest mill building Hot, Sonny = 10"F Nas Gattery = 5.7% 5-15-06 RW 50016 = 55, 31 VRINT - New worker training (Nick Ochs) & Badying Dexingered = 21.00 - Lapel sampling (Nick achs) systems QC okay.

12 In the road 16 - 18 - Plan Centur of observatore 2130 AM 33 30 Py 30 40, 813 40,814 108 58.618 58.620 3:30 84 EL 4614 4102) Back side of mesa top 13-15 we the rock ple pile\_ 40,7 7 7 58,663 58,663 Wood Slash file H0.807 58,656 Soil samples takin from synface soile (0-2") waing pitchen spoon

Breh 13 rock 40 55 cvtod

.

.

5/24/26 Junny warm lig Preezes New GPS 10 Readings at trailer & Intrande 213 PM W 38 40.819 W 108 58.682 3:15 PM

elevation 4601 0:15 PM N 38 40, 819-W 10F 58,686 N. 38. 40,825 W 108 50,685 El. 4616

16 5-31AG R.11/ SMAY, WAMA = 85°F=	Jan J. Visited Site - degred of air sampler 17
- icound caunting at tab overations	6/1 start 12.34 Bn 24.988.7 32.7
- OC checks on MCA	- end 5:13 25.208.3 2.7
- Began 721-day counts on Bkg samples	1/2 5/04 6:51 25748.6 4 samples a vinne
- OC check on Backpark scanning system	- sampled a montyaed sonly near tailings
For soan of mesa alter excavations	pond below mill (45-350 UR/hr)
(results indicate one small spot	-conf. Chil with Jarc, Dan, Kob ICHY
23 UR/hr remains - I believe	6-2-06 RW SUMMY, Hot
this is a single ore rock that	- cont. Call with Jan, Dan, Bront
Was missed - will go collect it	- air sampling / lapel sampling
(a)(c)	- Lapel sampler called out aller tell hars,
5-31-06 KW SWANY, Hot 85-90" F	but reading came of 12 711/2 a log
- ac checks on MCA (Brg Fluduetion high)	- wanted chear to start watering slotpile
- 721-day counts cont	as well as preset lagas
QC check on prok system for scan of	- CRCAVALOC CRASHING LENINGS MCAI POR
Intera supes & bottom land interm	Mande pada langer
Скалир	- Counted area filter for I min = 119 chin -
6-1-01 RW SUMY HOT = 90°F	- Countral Blaceban Filler Inin = 0 Stra
- AC checks on MCA & sample counting	- 59 mpte lime = 759.9 m
- Sample Placessing / counting	- Volume = (32.7 4m)(759,9 m) = 9848,7 L
- ac check on Brok system for re-scan of	- efficiency = 0.24 (Hated)
mesa lop Iside stopes where prevents	لا الله الله الله الله الله الله الله ا
(emoved.	میں کا ایک اور ایک ایک ایک اور ایک ایک اور ا
	· ·

.

٠

1

Section of the sectio

5-24 40.780 °C T -06-01 21.4 58.673 5-21-06-02- 40,794 17.2 58,670 <u>5-24-06-03 40.808</u> 58-656 19.7 .03) 5-24-06-04 40.793 Q4) 19.2 58,655 11. complete 3:15 PM aa good. One area more water.

co lemoora What down due to Aleve at Oswoon Ste not related to Fatura disposal activities ilaide on the with copitE but relations person to whater from Japaten Chansel portest redestapped bite and interviewed Afel and me isitois were briefed sete safet and on protection prov to actorp sconne 1 on did not them record scan results all scans were below action levels, 5/2×/06 0

- Lord Souther aind withor Place	50497 H 28, W109, N38, W108.
start 8:37 27464.6 35	2× 2 68087 97715 68133 97794
end: 4:12 27921.7 34	34 4 68069 77904 1840 97784
be a use of land	4 68000 97894 68192 11782
- bool bus much an	6" 68010 97664 68 411 97742
- Guided clause of lits in SU-2+SU-3	71 * 68067 97727 68128 97752
	8° 68046 9772088125 77775 - resman
6-11-06 KW SUNNY, Hot	9 68029 17703 68/13 97770 1776
- Final Status Scan of SU-2	10 0000 1700 1 08101 17711 11* × 68029 97942 68112 97972
Final status subarrar samales)	12 5 68011 97729 (812) 97755
	13* × 67914 97714 88121 97742
6-12-06 FW SUMMY, Hot	14 68932 97756 69129 97731 50
- RC on MCA / sample processing / cambing	15 68015 17751 68/18 17720 11** 67998 97745 (sur 97737)
Start 923 97921.9 35	17 68024 97781 68100 37752
End 4:20 183975 35	18" ~ 68003 97778 BOTB 77782 7
	19 6792 9775 6928 77764
- OK ON NACH + Sample Processing Reventing	20 68012 7180 68087 1426
- ETLASTITAT SUIVEY UNIT SAMPLE	22 67773 97786 68072 97744
Luccess per lore 1	
<b>N</b>	

18 6-5-06 SUMMI, Hot > 70°F	6-7-06 RW Partly sonny = 90°F 19
Area Sampler Line Meter Elow Start: 8:94 257495 32.7 End: 5:17 26294.6 92.7	Mich Sampler: Time mor flow will be start 2:04 21728.4 3.5 (Trailec) And 4:25 271(8,7 3.5 High).
- OC newimals on MCA System - Sampled pit @ faot of intest access Boad ( Not scan to survivale content) - Sampled NE corner of projecty near Willis trailer (WYNE-1 ± -2) - both come Out @ or above cot of (4 d 12, pc//g) - Trained new FEST morner (Iravis Snyder) s issued baye & lapel sampler for dogs - quided Cleanup of pits Deer parting lot - arcess head (upper Uniters) and norr Willis Uniter	-QC on MCA System - New 2350 meters arrived MEG-12 & MEG-15 - Still motes MEG-15 - Cleanup antines near Willis trailer - Appears exautions for appear to be all Mirs Willis' forgerly line - Root balls of large cotton woods raimed from UMETRO (regarded for disposed)
6-6-06 SUMAY, 1406, 95-700°,= AICA AIT STUMPLEY LICE Flow (Willis) 91977: 9131 IL254.9 55 (TRIVET) CMJ: 4148 26728.3 3007 (Area)	6-8-06 RW Partly Sunny applied = 2017 Alicel Sangles Jime malles Elaw Stait 9:36 2+169-1 35 End 2 22469.4 2
- Mica d lapel sampling & counting - Q.C. measurements on M.C.A. system - guiding cleanup near with s trainler	- QC on MCA. Somple processing I counting - Calleded sangules in pits man winis traiter betweed (2) be closed up (conjust samples).

-

.

	- MCA QC, Soil sample Precessing launting - collected SU-3 samples
	- Final scan of SU-3 - MCA QL & sample processing/authing
	1 432 X108. # N38. WIOR 6-19-06 RU/ SIMM. HOT
	1 1 68017 17130 21 68077 97879 - WCA QC sample processing camping
	2 68033 17816 22 68087 17862 - Hot spot clanar in sull sull
	3 6346 1777 23 6810 1782 [escars of small latgets aller
`	× 5 (8/40) 97966 25 68073 97791 - anno 540 to mos will s for daylor
	× 6 (8000B) 97700 USC (air sanyler * drilled welle har give
	7 68069 97793 * 16t spot composile 6-20-06 RW SUMMY, Not
	8 68060 (77812 Sample (IXIO IN) MGA OC, Sample processia I counting
	9 Barts 17807
	11 19952 197957
	12 62062 177840 1 617840 1 617 Ft bas
	13 68074 97827 2 67960 97997 1.0 lt 865
	× 14 68028 97808 CLOT 3 68029 97883
	15 Hours G3010 4119C POND 61199 47800 Surface water
	19 100/03 11891/ 19 15097 97820 - Brown stations and somely I araticles
	18 68087-197839 BC SU-4
	19 68074 9785
	20 66063 77947
	Na se

	er .	· · · ·			· · · ·					
	22 1 12 11	Rul	SIMBLE I	that give t	Survey unit	50-5	50-5	W-5	34.5	· Su-
	6-19-06	, , , , , , , , , , , , , , , , , , ,	1 7 1	Windy	Sag/c.ft	N38.	WIDE	t.	N 38.	. who
	- Near Sangar	Time	Meler	flow	Ø	6795	17912	** 2.7-	67932	978
ł	STAR	8:45	8399.5	85		67400	17897	×28	67719	978
	end.	<u>4:17</u>	28814.7	34	03	6788	9785	1		
. 1	- Collected		(Final s	tatus) in	;	67900	87.865			- • •
	SU-L	۱. ۱		Manage a complementations of	5	61712	97876	Į	· · · ·	
	- Cob Tr	Ily on Sil	10, 10-50	mpling		61927	97890	t txt	a grid s	annes
	- MCA Q	C. Soil	sample fla	cossily acounting.	7	6799	97868	hec.	59 Xan i ~715CA~W	MI AND AN
	6-14-06	RUL	SUM	My, Het, Windy	8	67975	77855	Lhan	anticina.	kt.
	- Aroz Sangla	Time	marc	Car	9	67908	77841			
	start	848	18841.9	35	10	61914	17823	X. Ant	Cipation 1	lbt sp
	. end	9:20 2	7268.8	34	, H	67929	97832	SAM	pips Laka	n hva
	- OC/ SA	mple calla	etion (se	(-2), Smple_	12	67943	17845	1451	1193 Jan	Ming 1
	process	ing an	a his	·	13	67950	97825	A1.91 81.61	nyic shis y discher	201 11/0 NGC/0
	- quid en	g clean	p in si	1-3		61736	97816	190	ping us	y not
	6-15-0	6 KW	l.S.	may_ ~ 80-901	= 15	51718	77805	Þ¢,	AUTY, HE	;- th
	Ally Samples	I Inne	pacter	flow	16	67922	97187	Wer	e compos	ite.
		. 10.43	29268.9	35	17	67941	97779	5210	ples auc	
	tha	4.48	29635.	55	18	01758	97203	<b>3</b> X	3.m.	۰
	- 201	MA	manalo	Stranger Mar ( an et a		67464	47777			-
		all with	yanyic f	acessing/carom	20	12910	11116	·		
		alls W	JAN, VE	in, for leny_'	21	67167	97168			· · `
	1	a out 51	1-5 Sau	mpie locations:	. 24	GTITT	71771		• .	•
	- A.I.	ALN WA	ovatida	stapped by	1 20	4016 YA SAI	1/8/4 .			•
	- Ja	V3 CIN	All	and the second second	8175	17 195	11816		. i	i
U. I.	n 11:14	Isontinue	All SAMPL	ing inices needed	** 16	67047	47894)			
				'			1707			

× .

,

CONTENTS "Rite in the Rain all weather WRITING PAPER PAOF REFERENCE DATE Name Randy Whicker MEG, INC. Address 3201 Automation Way Ft. Callins, 10 8082.5 Phono 970-223-9600 Project Daws Mill Site Cleanup, Cateway, CO Spring, 2006 S. C. S. S. 12.27 در میں ..... Conser Vining Protections Supermenter (Scen, No. 20) and incidenter for this asyste of non-cho-helpe projects your nonsporces form while it shall. Constant your country or the 2.1. User the Composition 4.0.y.e

28 6-21-06 RW Anvity Sunny, b - QC on MUA, sample Iracessing / a - continuent starturg out & contents Sample 5 - IDP N 32, WK08, 1 69976 97929 504-2 2 67926 97937 NV88, 3 67972 97926 4 67912 97920 5 67939 97926 4 67999 97920 5 67939 97926 9 67959 97926 10 679949 97872 10 679949 97872 10 67972 97926 11 67769 97872 12 67972 97926 13 67969 97872 14 67969 97872 15 67995 97800	$\frac{bt}{95^{\circ}} = 100  Air sampler, is pm due to maxing anting (interminated marchial tran bad-out as SU-4 Aira down to pond - decontam reverse sorveys of 4 rules arca sampter rine meter level start \rightarrow 1.47 + 29635.2 + 35\frac{brosh}{10072}brosh$
16 67960 97849 17 67976 97857 18 67789 97869 19 67716 97849 20 67934 97859 11 M 7 21 67939 97803 23 58 22 679715 97823	8 52.9 18.1 9 52.9 18.7 W 52.8 18.7 55 W109. W 97 877 NCA SMATH. GATT 903 2989.7 23 CMU 5:2.7 30 338.4 35

4	
4	5-5-76: RW Barty clady, =-63-7-5
5-4-06 KW SUMAY = 75°F	- contrad Lapel filter for Chris H
	(got system working property)
- Collected 24 Backalowing soil samples	Ac A manual 201
in Background Keleronic areq	- QC for bept son 31/5/00 BARY= SV
- concle armosothe logithis	Source: 56.08 UKING (mean)
- Sample processing reconting	OKG : LIBS
- establish new matrol Limits for	29212ml 05-019 (2004 06 2011)
MF67 canina system for Backpart;	- Soil sample processing lanalysis
1etedor	MCA Systems-development i
Mit. 3-9-00 (BKG) (sauce) (connetty sham)	- CONVERSION & DORED 11.10
Worde Avenue Avenue button in IPD,	CUIDE LOCK WICH
1 1321 scol (Mpty can	Ding Bul south a din The
2 21,44 50.03	
3 2103 56.05 1 Kto	tor - Q.C. for Backpark system : Battery = 5.6V
4 21,89 57,53	GANAC: 59.9) Dra 70.96
5 21.25 56.91 empty -	Grand Brand Brand Buildianal pre- cleaning san
6 22,39 56,16 (M	
7 01.69 5406 M W/ button	- Collected screening soil samples in paining
1 07 117 5/ 117	alea (Survey Unit-) area) alter initial
10 21.56 55.23	contrelation with Co-226 cape of reveloping
mian: 21.96 56.51	cleanup thus far
mtan.36: 17.8 54.7	- Soil SAMPE Processing / 2028/1515
MEANT :0 = 24,1 58.4	- Intromitat issues & KSO Equesciated Selfer

~

۰

,

.

## ATTACHMENT M

SELECT PHOTOGRAPHS BY SURVEY UNIT (SU) OF THE 2006 GEORGE E. DAVIS MILL REMEDIATION



SU-1: Temporary stockpile of excavated material on hill top above mill building



SU-1: Hill top above mill building after excavations



SU-2: Excavated trench next to resident trailer



SU-2: Excavated pit at Willis root cellar



SU-2: Spot excavation pit in Willis yard



SU-3: General excavations near resident trailer



SU-3: Excavated pit near FESI trailer



SU-3: Excavated pit near resident trailer



SU-3: Excavated pit near upper resident parking area



SU-3: Excavated pit near resident trailer



SU-4: General excavations below mill and near load-out area



SU-4: Excavations next to CDOT fence



SU-4: Excavations next to CDOT fence (tree was later removed)



SU-4: Interim excavation and stockpiling of material in Survey Unit 4



SU-4: Interim excavations near mill building and temporary haul road to load-out area



SU-4: Late excavations directly below mill building



SU-4: Late excavations directly below mill building (groundwater level is where pond has formed)



SU-4: Pond below mill after excavation and re-grading



SU-5: Early excavations southwest of mill building



SU-5: Temporary stockpile of material south of mill building



SU-5: Late excavations southwest of mill building



SU-5: Temporary pond formed southwest of mill building as excavations reached a little below groundwater table



SU-5: Post-cleanup re-grading in Survey Unit 5



SU-5: New ditch constructed in Survey Unit 5 during re-grading