DOE/GJ/79491-938
CONTRACT NO. DE-AC13-02GJ79491

POST-REMEDIAL ACTION REPORT FOR THE QUARRY PROPER (RU027)

WELDON SPRING SITE REMEDIAL ACTION PROJECT
WELDON SPRING, MISSOURI

DECEMBER 2003 **REV. 0**

U.S. Department of Energy
Grand Junction Office
Weldon Spring Site Remedial Action Project

010904

Weldon Spring Site Remedial Action Project Contract No. DE-AC13-02GJ79491	
	Rev. No. 0
PLAN TITLE: Post-Remedial Action Report for the Quarry Proper (RU027)	

APPROVALS

Originator — Date: 1-12-04

Project Director — Date: 1-12-04

Weldon Spring Site Remedial Action Project

Post-Remedial Action Report for the Quarry Proper (RU027)

Revision 0

December 2003

Prepared by

U.S. DEPARTMENT OF ENERGY
Grand Junction Office
DE-AC13-02GJ79491

DOE/GJ/79491-938, Rev. 0

Printed in the United States of America. Available from the National Technical Information Service, NTIS, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

NTIS Price Codes -	Printed Copy:	A03
	Microfiche:	A01

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1. INTRODUCTION

1.1 Purpose

This report details the results of soil confirmation activities within the Quarry proper, known as remedial unit (RU) 027 at the Weldon Spring Site Remedial Action Project (WSSRAP). Included is information relating to soil confirmation sampling and the analytical results for post-excavation (confirmed) soils within the Quarry proper boundaries.

The Quarry Proper area had nine confirmation units (CUs) and are identified in Figure 1-1. Individual CU figures are presented in Section 4 of this report.

1.2 Scope

This report describes only the remedial activities and soil confirmation surveying and sampling conducted on contaminated soils within RU027. Confirmation walkovers and soil sampling were conducted in accordance with the *Quarry Proper Confirmation Plan* (Ref. 1) and addendums: *Addendum 1: Additional Areas Associated with Quarry Water treatment Plant Demolition* (Ref. 2) and *Addendum 2: Additional Areas Associated with Quarry Reclamation* (Ref. 3). Additional areas were confirmed under IOC Addendums, which are included in Appendix C. These plans were developed to ensure that goals established by the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 4).

This report does not cover the confirmation activities at the Quarry Water Treatment Plant Equalization Basin. These confirmation results and additional specific confirmation information are detailed in the *Post-Remedial Action Report for the Quarry Water Treatment Plant Equalization Basin (RU026)* (Ref. 5).

1.3 Remediation and Confirmation Process

This report details the activities conducted to remediate the Quarry Proper area designated as Remedial Unit 27 (RU027). This RU encompassed numerous small, noncontiguous confirmation units. Following the remediation activities, walkovers were conducted and confirmation samples were collected.

The entire remediation process included: characterization sampling, historical data review, COC identification, confirmation plan development, contaminated soil excavation, completion of disposition forms, quality assurance/quality control (QA/QC review), summary of findings and conclusions, and closure report preparation.

The confirmation sampling process in the Quarry Proper area was conducted in accordance with the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref.

4), to attain cleanup goals set forth in the ROD. The walkover and sampling details are presented in the *Quarry Proper Confirmation Plan* (Ref. 1).

Figure 1-1 CONFIRMATION SAMPLING LOCATIONS AT THE WELDON SPRING QUARRY PROPER AREA

2. PRE-REMEDIATION ACTIVITIES

2.1 Determining Contaminants of Concern

Contaminants of concern (COCs) determination was dependant upon historical information, characterization results, and visual observation during field activities. COCs identified for RU027 were Radium-226 (Ra-226), Radium-228 (Ra-228), Thorium-230 (Th-230), Thorium-232 (Th-232), and Uranium-238 (U-238).

2.2 Data Quality Objectives

Data Quality Objectives (DQOs) were identified to specify quality data and ensure that the data would be sufficient to support the decision making process throughout remedial activities, including the confirmation process. Confirmation DQOs were developed for sampling and analyzing soils during remediation and for the subsequent data evaluation. The DQOs were designed to make statistically defensible decisions regarding attainment of cleanup standards. Sampling and analytical programs for RU027 were designed in accordance with DQOs stated in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 4).

2.3 Cleanup Standards

The objectives of the Department of Energy (DOE) ALARA process is to reduce exposures and risks associated with residual contamination. The ROD (Ref. 6) established two different sets of cleanup standards: risk-based cleanup criteria and As Low As Reasonably Achievable (ALARA) Goals. Remedial activities for RU027 were designed to remove soil where the COC concentrations were found by characterization or during remediation activities to exceed criteria. Table 2-1 summarizes the cleanup criteria values established in the ROD that are applicable for COCs in the RU027 area. Throughout the remedial activities at RU027, COC concentrations were evaluated with the ALARA process.

2.4 Cleanup Confirmation Process

The cleanup confirmation process is used to determine, under the remedial guidelines, if remediation activities have achieved the cleanup standards. Figure 2-1 shows the cleanup confirmation process for remedial activities conducted for the Quarry Proper Area.

The decision-making process specifies how the data will be applied and evaluated within the cleanup confirmation process. The decision-making process includes provisions for any hot spots that may be encountered by applying a formula to determine the acceptable concentration for the COC.

Table 2-1 ROD Cleanup Standards for COCs within the RU027 Area

	SURFACE[a]		SUBSURFACE [b]	
RADIONUCLIDE (pCi/g)	ALARA	CRITERIA	ALARA	CRITERIA
Ra-226	5.0	6.2	5.0	16.2
Ra-228	5.0	6.2	5.0	16.2
Total Radium	5.0	6.2	5.0	16.2
Th-230	5.0	6.2	5.0	16.2
Th-232	5.0	6.2	5.0	16.2
U-238	30.0	120.0	30.0	120.0

(a) Values listed for surface soils apply to contamination within the upper 15 cm (6 in.) of the soil column.
(b) Values for subsurface apply to contamination in soils below 15 cm (6 in.).

Source: *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site* (Ref. 6).

3. REMEDIAL ACTIVITIES

3.1 Field Activities

Contaminated soils from the RU027 area were first excavated to design depth as detailed in the work package specifications. After the initial excavation was complete, radiological walkover surveys were conducted to evaluate the need for additional excavation. When the surveys indicated no additional excavation was needed, confirmation soil samples were collected. Deviations from this procedure that occurred in the field are documented in Section 4 of this report.

Confirmation results were then reviewed, and additional excavation and confirmation sampling was conducted in hot spot areas, if necessary. After achieving cleanup standards, a disposition form was completed with preliminary analytical results. The form was reviewed and signed by authorized project personnel. The confirmation unit (CU) was then released back to the subcontractor for final grading.

Field activities completed during remediation, such as walkover surveys and soil sampling, were conducted in accordance with procedures specified in the *Quarry Proper Confirmation Plan* (Ref. 1). Field activities were conducted to achieve and document sampling objectives specified in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 4). All sampling and remedial action surveys were conducted and documented in accordance with Weldon Spring Site Remedial Action Project (WSSRAP) Environmental Safety and Health (ES&H) procedures.

3.1.1 Walkover Surveys

Radiological walkover surveys were conducted after contaminated soil removal was completed to determine if confirmation sample collection could begin. The surveys were conducted using a 2 in. x 2 in. sodium iodide (NaI) scintillation detector. The survey readings were within an acceptable range (less than 1.5 times background) throughout the entire work zone. Walkover surveys were not conducted in trenches for safety reasons. The background ranges for each CU are listed in the CU Summary Forms in Section 4 of this report. Copies of the walkover forms are presented in Appendix A.

3.1.2 Soil Sampling

Once the walkovers were completed, soil sampling was conducted as part of the confirmation process. The sampling locations for CUs in RU027 are shown in the figures in Section 4. Analytical suites for the CUs were dependant upon the COC list developed from historical information, characterization data, and visual identification in the field as discussed in Section 2.

Sixteen Th-230 hot spots were encountered during confirmation of this RU, of which half were remediated in accordance with the guidelines established in the *Chemical Plant*

Area Cleanup Attainment Confirmation Plan (Ref. 4). Details regarding these hotspots can be found in the appropriate CU Summary Forms in Section 4 of this report.

The subsequent survey and confirmation sample results indicated that contaminants were below cleanup standards and the averages were less than ALARA; therefore, no further remediation was conducted for RU027. Disposition forms were completed following the receipt of preliminary analytical data for all CUs.

3.2 Laboratory Activities

Radiological analyses for RU027 were conducted at both the on-site and off-site laboratories in accordance with the *Project Management Contractor Quality Assurance Program* (Ref. 7) and the *Environmental Quality Assurance Project Plan* (Ref. 8). CU releases were based on estimated Ra-226 results. In addition, the concentration of Th-232 was calculated based on the analytical results of Ra-228 and the calculated value was used for CU releases. Both of these calculations are explained in detail in interoffice correspondences in Appendix C.

Summaries of the analytical results for each CU can be found in Section 4 of this report. Analytical data were subjected to data evaluation and validation upon receipt from the laboratory as discussed in Section 5 of this report.

3.3 Verification Activities

The Oak Ridge Institute for Science and Education (ORISE) was contracted by the U.S. Department of Energy (DOE) to verify confirmation soil sampling in the chemical plant area. No audits by ORISE were conducted on any of the RU027 confirmation units.

4. CONFIRMATION UNITS RESULTS SUMMARY

This section summarizes the confirmation unit analytical results for the nine CUs in RU027. In total, 249 locations were sampled between July 19,2000 and July 15, 2002. Preliminary results were below cleanup criteria with the exception of thirteen hotspots as discussed in Section 3 of this report and the following summary forms. Average COC concentrations as indicated by preliminary data for RU027 remained below criteria with the exception of Th-230 for CU411. In addition, with the exception of CU411, all 100 m^2 averages from final data were less than criteria.

After the preliminary data were reviewed, disposition forms were completed and signed by authorized reviewers. Based on the preliminary confirmation data, all CUs with the exception of CU411 in RU027 were fully released as complying with surface cleanup standards. The ALARA committee met to discuss the results for CU411 as discussed in Table 4-1.

Note that the preliminary data were the initial results available immediately from the laboratory and were used for releases. These preliminary results could vary from the final results based upon laboratory quality checks or Weldon Spring Site Remedial Action Project (WSSRAP) verification activities. Upon receipt of the data packages, the final data were reviewed and compared to the preliminary data. The final analytical results agreed with the preliminary results and indicated that the remedial activities were completed. The final results met the cleanup standards as detailed in the *Chemical Plant Area Cleanup Area Attainment Confirmation Plan* (Ref. 4) for all CUs in RU027. Tables 4-1 through 4-9 and associated figures provide the confirmation details for each CU, and all data presented is final data. Copies of the final walkover forms are in Appendix A. The final data are presented in Appendix B.

Table 4 - 1 Summary of CU411

CU 411 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-1

DATE RELEASED FOR UNRESTRICTED USE: 08/ 24/00

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m^2 < CRITERIA? [ ] YES [X] NO

LOCATION DESCRIPTION: *This CU represented the northeast slope at the Quarry.*

WALKOVER SURVEY INFORMATION

BACKGROUND: 11,300 cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [ ] YES [X] NO

DATE(S) SCANNED: *08/23/2000*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 29

TOTAL # OF UTILITY SAMPLES : 0

AVERAGES < ALARA? [ ] YES [X] NO

HOTSPOTS REMAINING? [X] YES [ ] NO

ADDITIONAL EXCAVATION REQUIRED? [X] YES [ ] NO

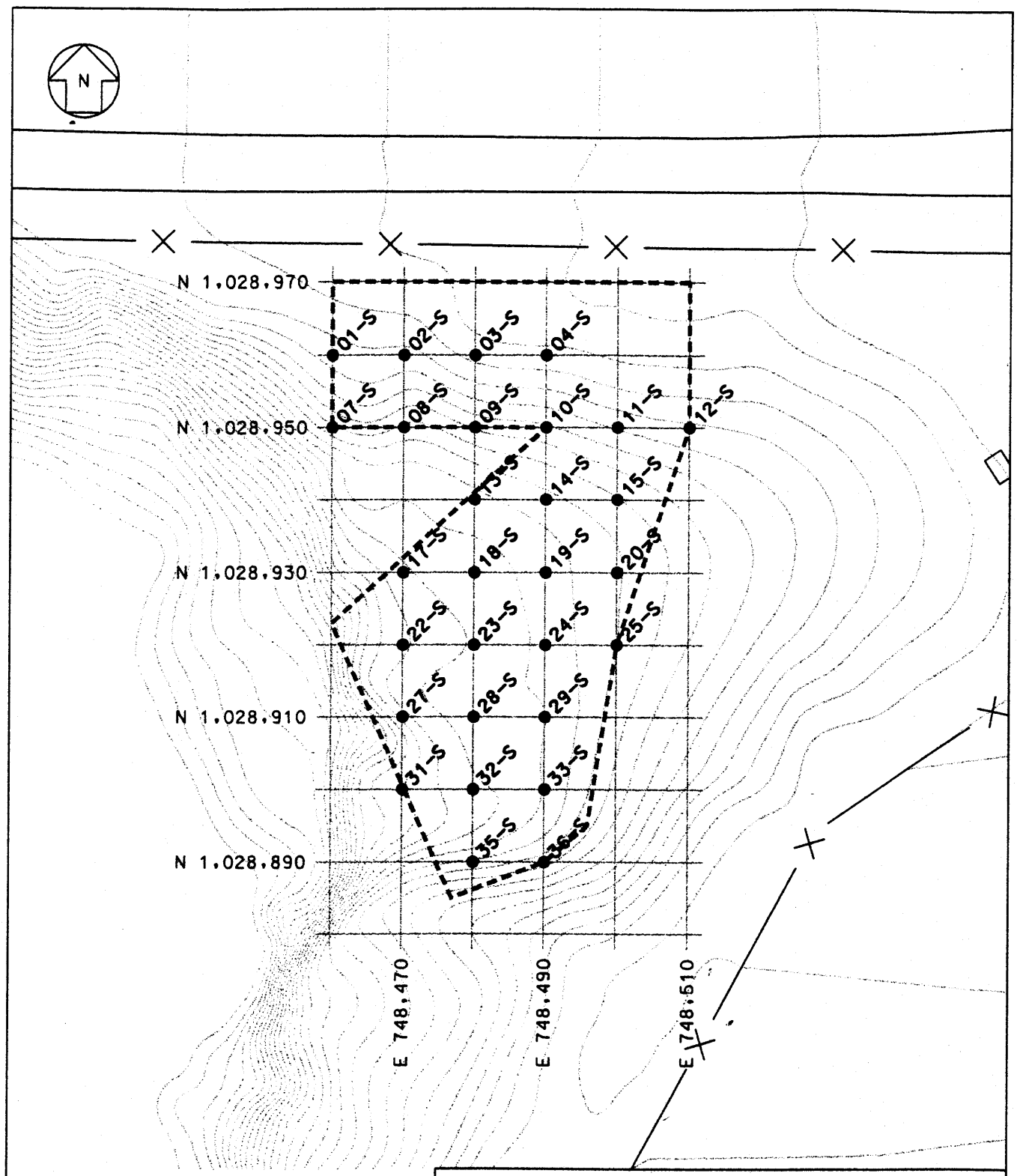
GENERAL COMMENTS - *This CU did not satisfy the requirements for unrestricted release. The area contained more than 5 hotspots and 2 of the hotspots exceeded three times cleanup criteria. Additional excavation could not be performed; however, because the hotspots were located on bedrock and not soil. The samples had been collected by removing soil from crevices and picking up dirt clods within an approximate 3 ft. radius of the sample location. An ALARA committee meeting was called. See the 'ALARA Committee Action' section below for details.*

ALARA COMMITTEE ACTION - *The ALARA committee met to discuss remediation options including vacuuming or pressure washing the crevices. In accordance with the principles established in the Chemical Plant Area Cleanup Attainment Confirmation Plan, the committee agreed that while the cleanup concentrations were not obtained, the ALARA principle had been met. A unanimous decision was made by the committee that no further remedial action was required and the area could be backfilled . The confirmation unit was released on August 24, 2000.*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	29	0.59 - 7.06	1.70	6.2	1
Ra-228	29	0.91 - 9.47	1.83	6.2	1
Total Radium	29	2.00 - 16.53	3.53	6.2	3
Th-230	29	1.27 - 77.9	8.92	6.2	6
U-238	29	0.28 - 3.91	1.68	120	0

NOTE: Radiological contaminants are listed in pCi/g.



CONFIRMATION SAMPLING LOCATIONS
AT THE NORTHEAST SLOPE
(RU027; CU411)

● - SAMPLE POINT

0 20 40

SCALE FEET

FIGURE 4-1

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/029/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 2 Summary of CU412

CU 412 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-2

DATE RELEASED FOR UNRESTRICTED USE: 08/ 16/00

CLEANUP STANDARD [ ] SURFACE [X] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the ditch area at the Quarry.*

WALKOVER SURVEY INFORMATION

BACKGROUND: 6,900 cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [X] YES [ ] NO

DATE(S) SCANNED: *07/24/00*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 25

TOTAL # OF UTILITY SAMPLES : 0

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [X] YES [ ] NO

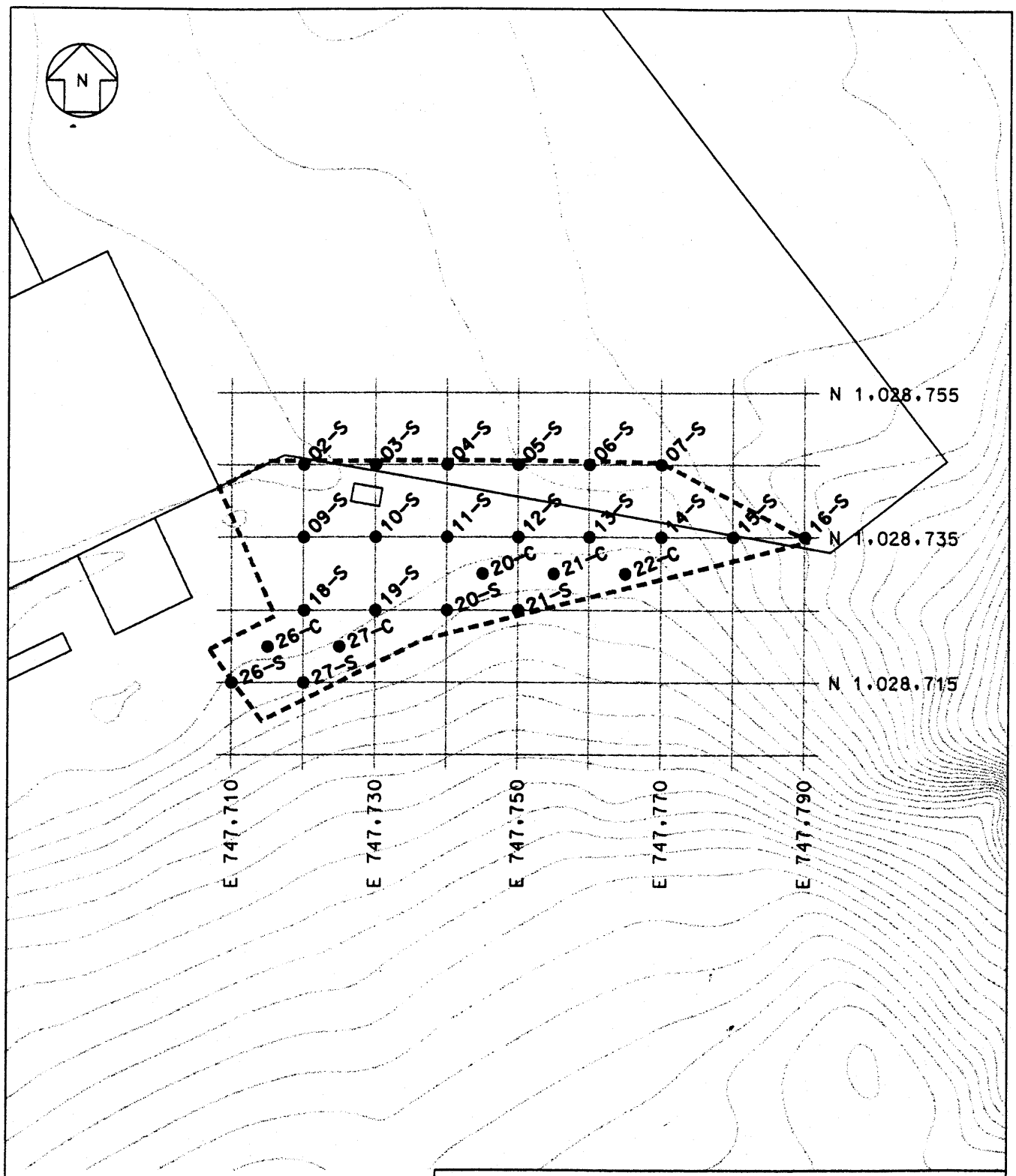
GENERAL COMMENTS - *There were eight Th-230 hotspots identified during the orginial sampling effort. These hotspots were remediated and resampled. All results were less than subsurface criteria.*

ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	25	0.87 - 7.91	1.89	16.2	0
Ra-228	25	0.29 - 2.77	1.00	16.2	0
Total Radium	25	1.37 - 8.83	2.88	16.2	0
Th-230	25	1.59 - 13.2	4.10	16.2	0
U-238	25	0.50 - 10.10	3.90	120	0

NOTE: Radiological contaminants are listed in pCi/g.



● - SAMPLE POINT

0 20 40

SCALE FEET

CONFIRMATION SAMPLING LOCATIONS
AT THE DITCH AREA
(RU027; CU412)

FIGURE 4-2

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/030/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 3 Summary of CU413

CU 413 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-3

DATE RELEASED FOR UNRESTRICTED USE: 07/ 31/00

CLEANUP STANDARD [ ] SURFACE [X] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the snake pit area at the Quarry.*

WALKOVER SURVEY INFORMATION

BACKGROUND: 8,199 cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [X] YES [ ] NO

DATE(S) SCANNED: *07/16/00*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 35

TOTAL # OF UTILITY SAMPLES : 0

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [X] YES [ ] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

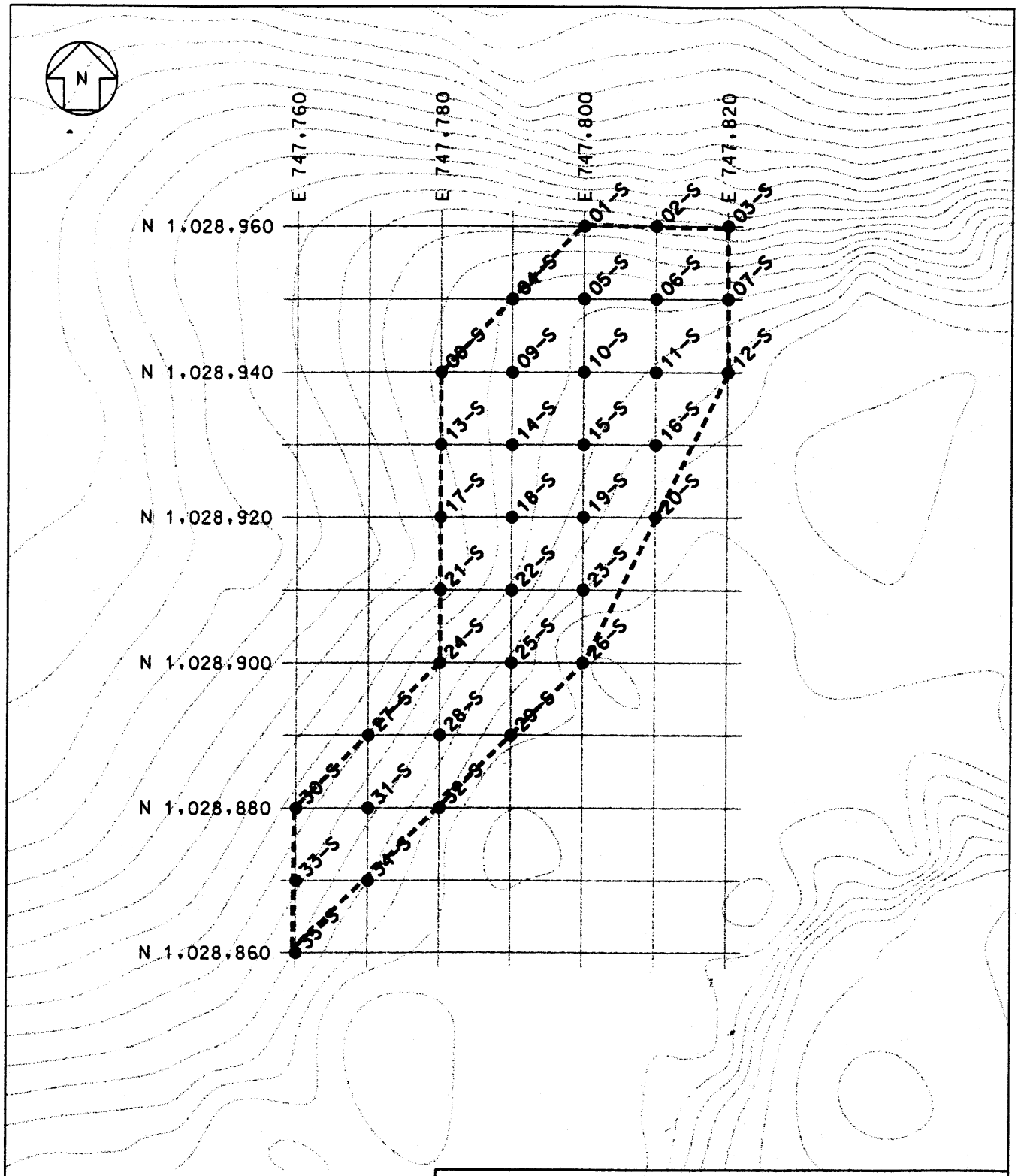
GENERAL COMMENTS - *Two Th-230 hotspots were identified. These were less than 25 square meters and less than three times the cleanup criteria. No further remediation was required.*

ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	35	0.24 - 1.43	0.7	16.2	0
Ra-228	35	0.32 - 1.19	0.61	16.2	0
Total Radium	35	0.57 - 2.30	1.31	16.2	0
Th-230	35	0.78 - 17.74	2.8	16.2	2
U-238	35	0.85 - 1.49	1.05	120	0

NOTE: Radiological contaminants are listed in pCi/g.



CONFIRMATION SAMPLING LOCATIONS
AT THE SNAKE PIT AREA
(RU027; CU413)

● - SAMPLE POINT

0 20 40

SCALE FEET

FIGURE 4-3

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/031/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 4 Summary of CU416

CU 416 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-4

DATE RELEASED FOR UNRESTRICTED USE: 04/ 24/01

CLEANUP STANDARD [ ] SURFACE [X] SUBSURFACE

EACH 100m^2 < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the utility trench area at the Quarry.*

WALKOVER SURVEY INFORMATION

BACKGROUND: N/A cpm

(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [ ] YES [ ] NO

DATE(S) SCANNED: *Walkovers not conducted in trenches.*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 25

TOTAL # OF UTILITY SAMPLES : 25

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

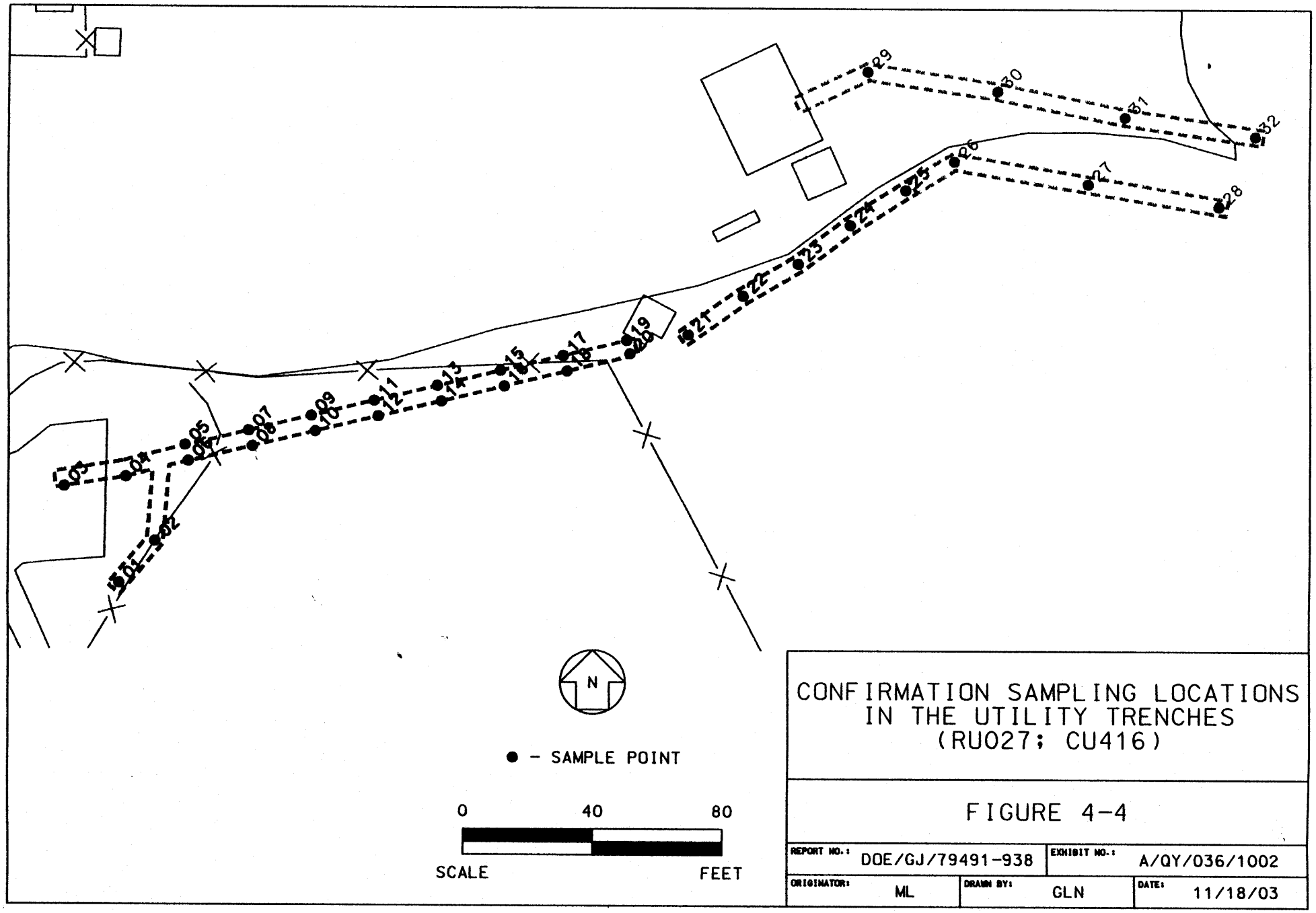
GENERAL COMMENTS - *During remediation activities; it was discovered that contaminated lines leading into the Quarry sump were in bedrock trenches. Soil was not present in the bottom of the trenches nor the sidewalls. Sample locations 26 through 32 were deleted from the confirmation unit, leaving a total of 25 locations that were sampled.*

ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	25	0.64 - 1.33	0.89	16.2	0
Ra-228	25	0.39 - 1.93	1.14	16.2	0
Total Radium	25	1.07 - 3.26	2.04	16.2	0
Th-230	25	1.02 - 5.48	2.22	16.2	0
U-238	25	0.07 - 2.56	1.37	120	0

NOTE: Radiological contaminants are listed in pCi/g.



CONFIRMATION SAMPLING LOCATIONS
IN THE UTILITY TRENCHES
(RU027; CU416)

FIGURE 4-4

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/036/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 5 Summary of CU417

CU 417 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-5

DATE RELEASED FOR UNRESTRICTED USE: 08/ 02/00

CLEANUP STANDARD [ ] SURFACE [X] SUBSURFACE

EACH 100m^2 < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the clarifier pad at the Quarry.*

WALKOVER SURVEY INFORMATION

BACKGROUND: n/a cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [ ] YES [ ] NO

DATE(S) SCANNED: *Walkover information not available.*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 25

TOTAL # OF UTILITY SAMPLES : 0

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

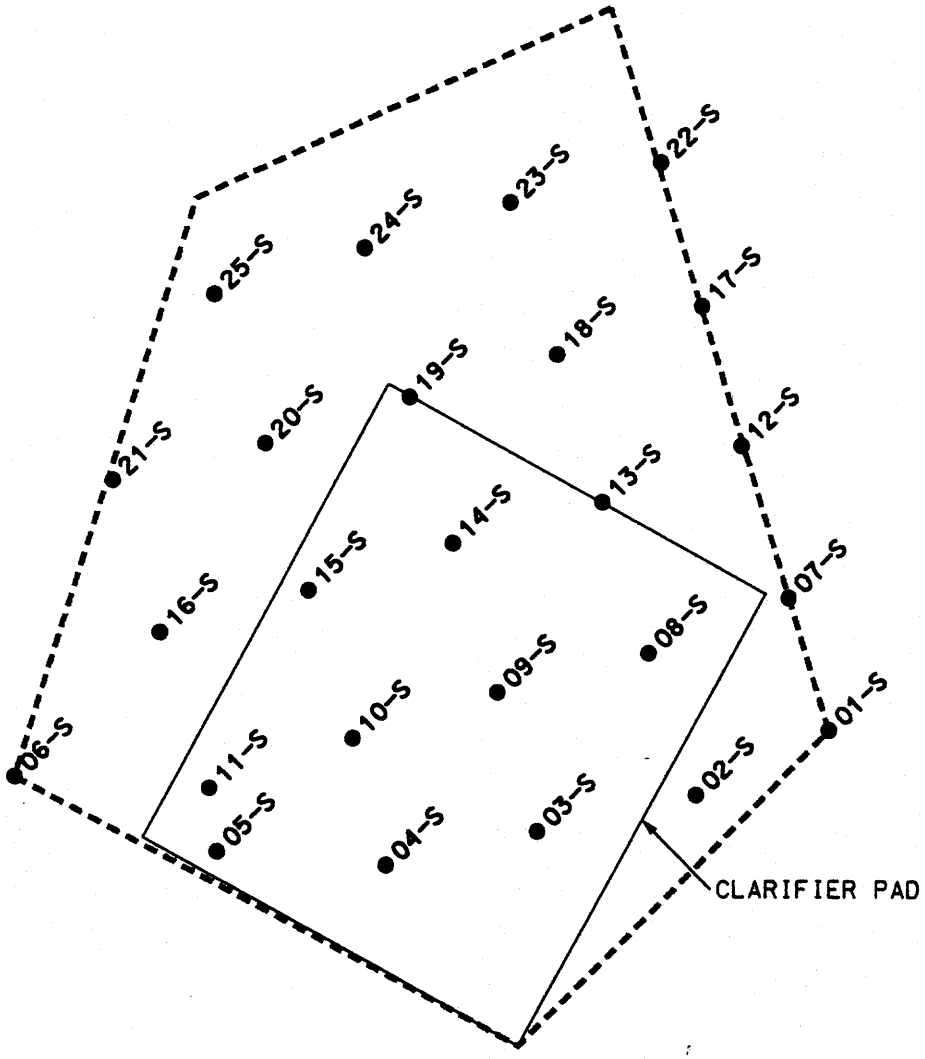
GENERAL COMMENTS - *None*

ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	25	0.47 - 1.48	0.80	16.2	0
Ra-228	25	0.44 - 1.76	0.83	16.2	0
Total Radium	25	0.92 - 3.18	1.63	16.2	0
Th-230	25	0.86 - 3.09	1.73	16.2	0
U-238	25	0.47 - 4.29	1.70	120	0

NOTE: Radiological contaminants are listed in pCi/g.



N

● - SAMPLE POINT

0 5 10

SCALE FEET

CONFIRMATION SAMPLING LOCATIONS
IN THE CLARIFIER PAD AREA
(RU027; CU417)

FIGURE 4-5

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/037/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 6 Summary of CU418

CU 418 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-6

DATE RELEASED FOR UNRESTRICTED USE: 05/ 01/01

CLEANUP STANDARD [ ] SURFACE [X] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the decontamination pad and associated piping at the Quarry.*

WALKOVER SURVEY INFORMATION

BACKGROUND: 8,000 cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [X] YES [ ] NO

DATE(S) SCANNED: *04/19/01; 04/26/01*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 27

TOTAL # OF UTILITY SAMPLES : 16

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

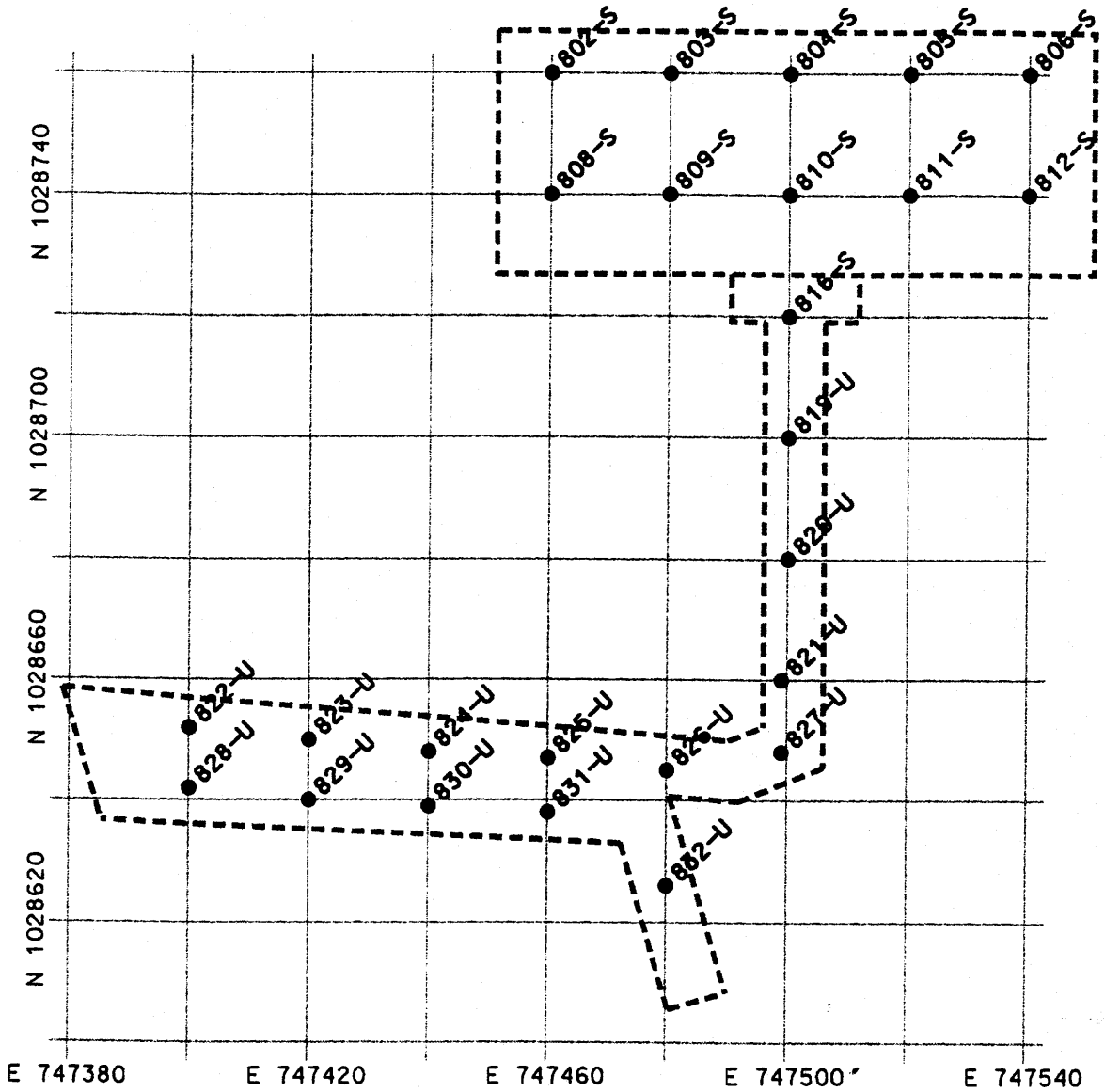
GENERAL COMMENTS - *None*

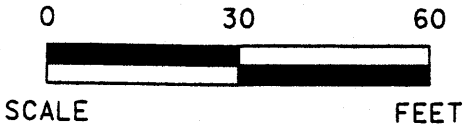
ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	27	0.64 - 1.32	0.89	6.2	0
Ra-228	27	0.26 - 1.74	1.11	6.2	0
Total Radium	27	1.12 - 3.06	2.00	6.2	0
Th-230	27	0.60 - 2.75	1.29	6.2	0
U-238	27	0.96 - 3.12	1.76	120	0

NOTE: Radiological contaminants are listed in pCi/g.





CONFIRMATION SAMPLING LOCATIONS AT THE DECONTAMINATION PAD (RU-027; CU418)

FIGURE 4-6

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/038/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 7 Summary of CU419

CU 419 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-7

DATE RELEASED FOR UNRESTRICTED USE: 05/ 11/01

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the Quarry Water Treatment Plant.*

WALKOVER SURVEY INFORMATION

BACKGROUND: na cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [ ] YES [ ] NO

DATE(S) SCANNED: *Walkover information not available.*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 25

TOTAL # OF UTILITY SAMPLES : 9

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

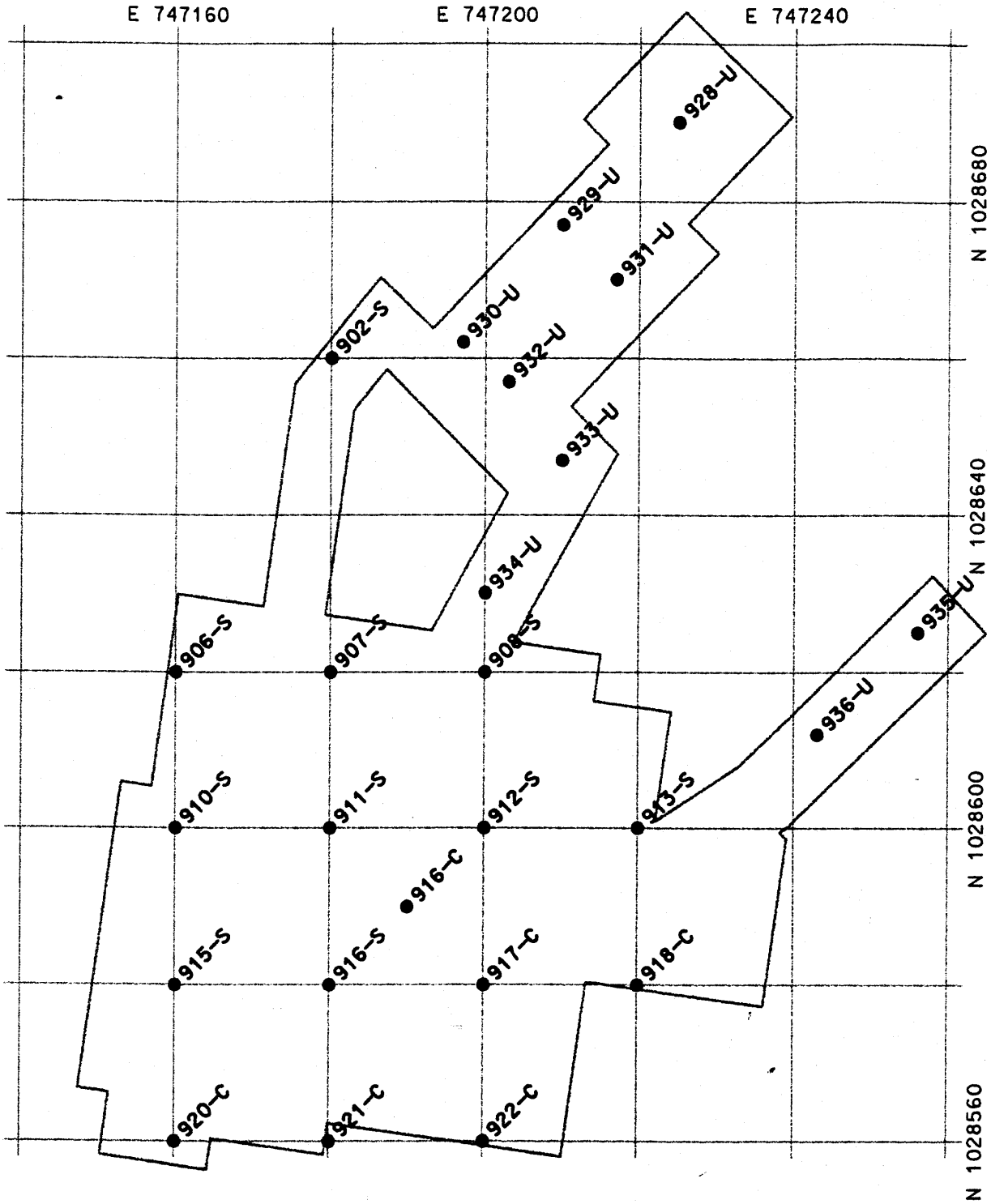
GENERAL COMMENTS - *None*

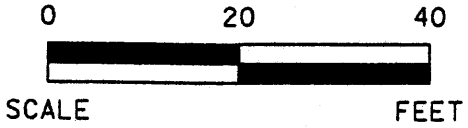
ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	25	0.33 - 1.22	0.82	6.2	0
Ra-228	25	0.48 - 1.59	1.10	6.2	0
Total Radium	25	0.96 - 2.57	1.92	6.2	0
Th-230	25	0.60 - 2.75	1.29	6.2	0
U-238	25	0.56 - 3.87	1.80	120	0

NOTE: Radiological contaminants are listed in pCi/g.





CONFIRMATION SAMPLING LOCATIONS
QUARRY WATER TREATMENT PLANT
(RU-027; CU419)

FIGURE 4-7

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/032/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 8 Summary of CU420

CU 420 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-8

DATE RELEASED FOR UNRESTRICTED USE: 06/ 28/01

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the Quarry Laydown Area.*

WALKOVER SURVEY INFORMATION

BACKGROUND: n/a cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [ ] YES [ ] NO

DATE(S) SCANNED: *Walkover information not available.*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 33

TOTAL # OF UTILITY SAMPLES : 0

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

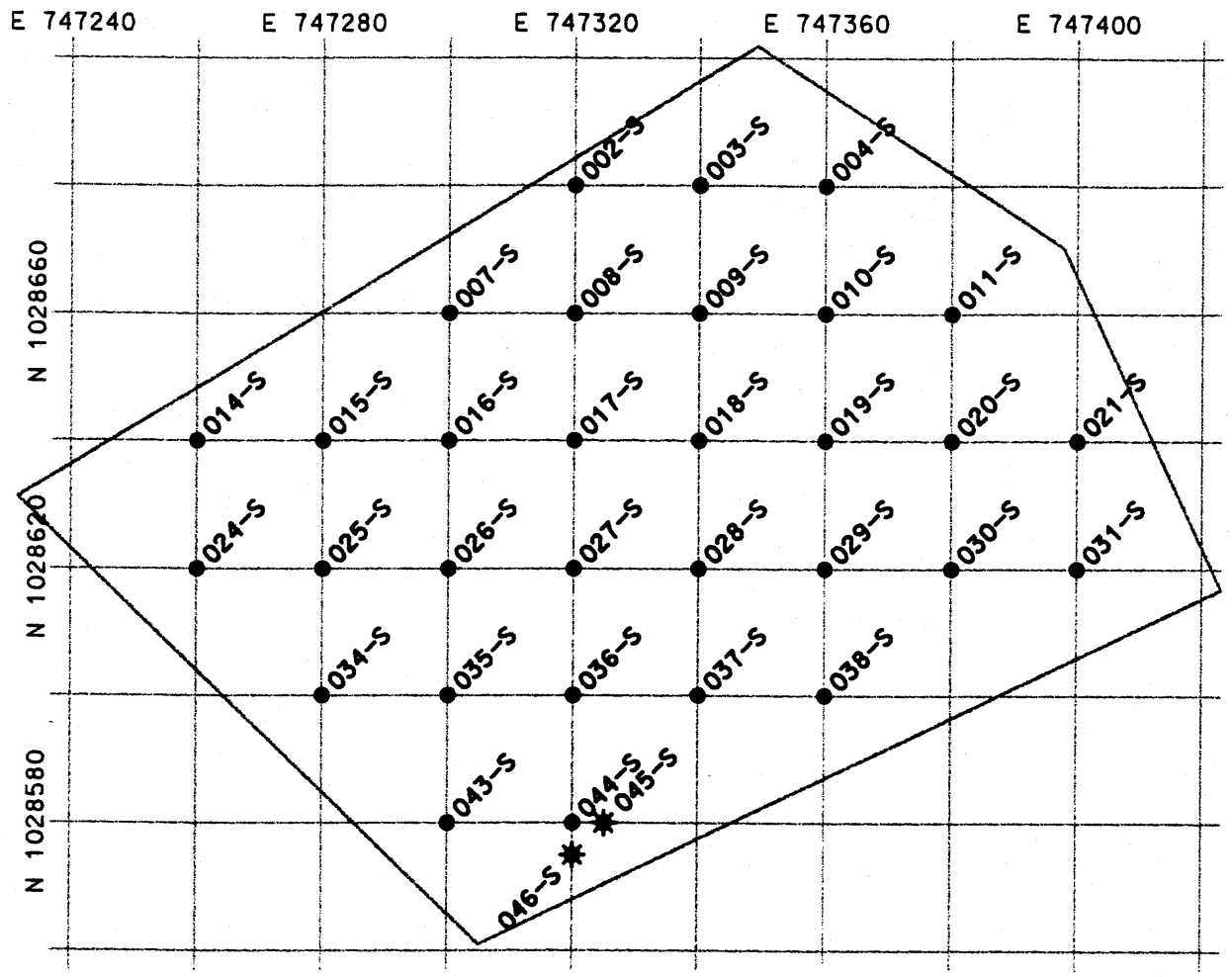
GENERAL COMMENTS - *This CU was fully released on 06/11/01. Two additional sample locations were later added when visible resin was identified in the field. The 06/28/01 release includes the original sample location data plus the data from the two additional samples.*

ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	33	0.22 - 1.11	0.77	6.2	0
Ra-228	33	0.27 - 1.38	0.98	6.2	0
Total Radium	33	0.51 - 2.40	1.74	6.2	0
Th-230	33	0.14 - 3.53	1.30	6.2	0
U-238	33	0.83 - 14.5	2.52	120	0

NOTE: Radiological contaminants are listed in pCi/g.



● - SAMPLE POINT

✱ - APPROXIMATE LOCATION OF ADDITIONAL SAMPLE POINT

N

0 30 60

SCALE FEET

CONFIRMATION SAMPLING LOCATIONS
QUARRY LAYDOWN AREA
(RU-027; CU420)

FIGURE 4-8

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/033/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

Table 4 - 9 Summary of CU421

CU 421 **RU** 27

COC

Ra-226	X	As	
Ra-228	X	Cr	
Th-230	X	Pb	
Th-232		Tl	
U-238	X	PAH	
		PCB	
		TNT	

Reference Figure: 4-9

DATE RELEASED FOR UNRESTRICTED USE: 07/ 22/02

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU represented the Effluent Pond 2 at the Quarry*

WALKOVER SURVEY INFORMATION

BACKGROUND: 10,000 - 12,000 cpm
(shielding may have been used on a case-by-case basis)

FINAL SURVEY(S) BELOW 1.5 X BACKGROUND ? [X] YES [ ] NO

DATE(S) SCANNED: *06/27/02; 06/28/02; 07/01/02; 07/02/02; 07/09/02*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 25

TOTAL # OF UTILITY SAMPLES : 0

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

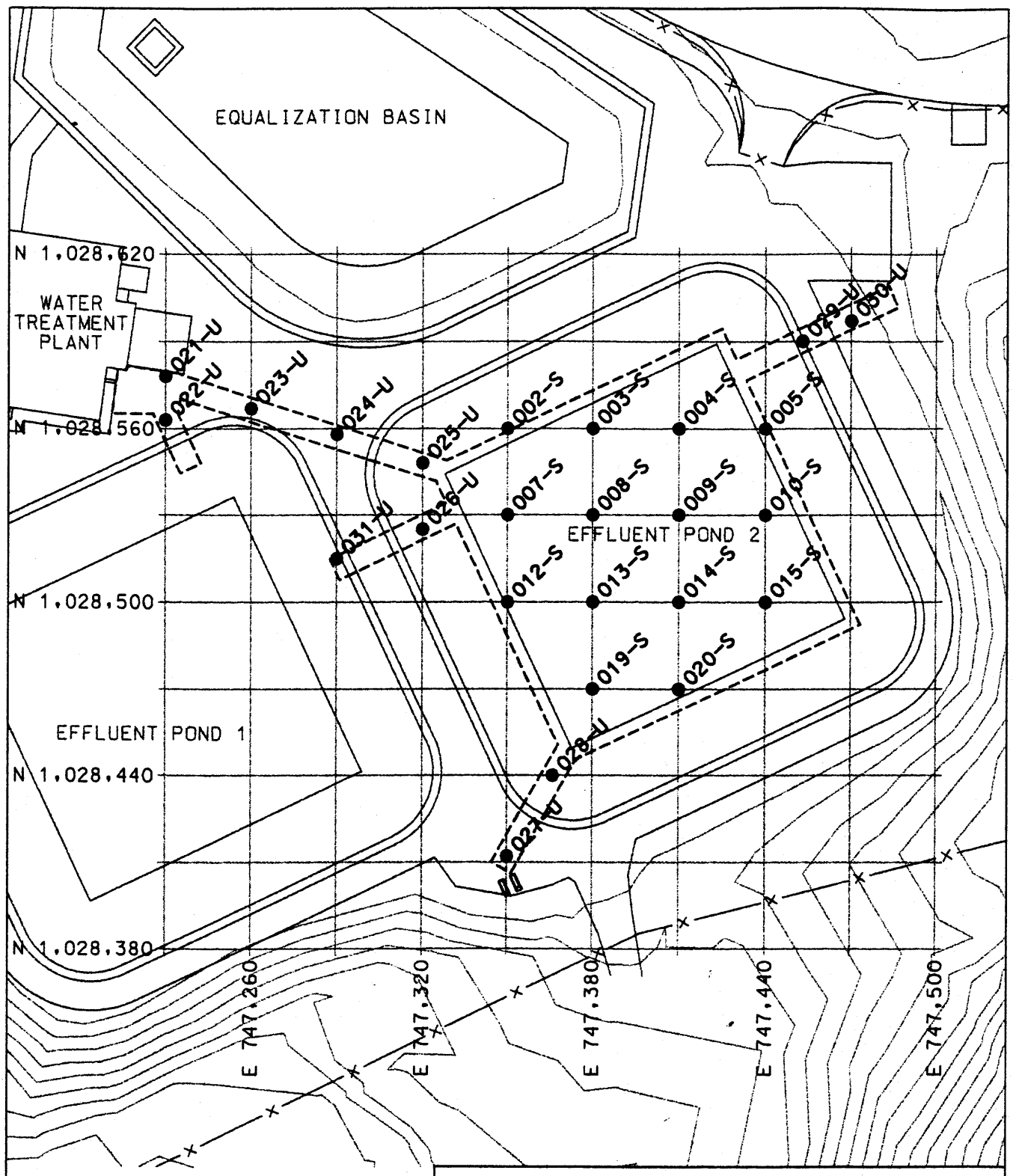
GENERAL COMMENTS - *None*

ALARA COMMITTEE ACTION - *None*

CU SUMMARY DATA

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	FULL AVERAGE CONCENTRATION	CRITERIA	NO. > CRITERIA
Ra-226	25	0.38 - 1.28	0.87	6.2	0
Ra-228	25	0.75 - 1.56	1.09	6.2	0
Total Radium	25	1.47 - 2.81	1.96	6.2	0
Th-230	25	0.19 - 2.76	0.59	6.2	0
U-238	25	0.28 - 2.52	1.33	120	0

NOTE: Radiological contaminants are listed in pCi/g.



● - SAMPLE LOCATION

N

0 50 100

SCALE FEET

CONFIRMATION SAMPLING LOCATIONS AT EFFLUENT POND #2 (RU027; CU421)

FIGURE 4-9

REPORT NO.: DOE/GJ/79491-938		EXHIBIT NO.: A/QY/034/1002	
ORIGINATOR: ML	DRAWN BY: GLN	DATE: 11/18/03	

5. DATA EVALUATION

Final analytical data were evaluated to determine whether data quality objectives developed for the Weldon Spring Site Remedial Action Project (WSSRAP) were met and to ensure that overall data quality- results were generated from these remedial activities. The data were evaluated in accordance with the *Project Management Contractor Quality Assurance Program* (Ref. 7) and the *Environmental Quality Assurance Project Plan* (Ref. 8). The data evaluation process was completed by data verification, data review, data validation, and data management activities as stated in the *Chemical Plant Area Cleanup Area Attainment Confirmation Plan* (Ref. 4).

5.1 Data Verification

Data verification was conducted in accordance with ES&H 4.9.1, *Environmental Monitoring Data Verification*, to ensure that documentation and data were reported in compliance with established reporting requirements and standard operating procedures (SOPs), and to ensure that all analyses were performed. All analytical results received from the laboratory were reviewed to verify that samples were properly handled according to WSSRAP protocol. The following factors were reviewed and evaluated: sample identification, chain of custody, holding times, sample preservation requirements, sample analysis request forms, data reviews, laboratory tracking, data reporting requirements, and the database transfer.

5.2 Data Review

Specific data quality requirements (DQRs) were developed for the WSSRAP in accordance with the Environmental Protection Agency guidance for the release of Quarry confirmation units. Quality control sample results were compared to DQR goals to assess the precision and accuracy of the data and to identify samples that may require further validation activities. QC results are included in Appendix B.

To assess the precision of the Quarry data sets, duplicate samples, secondary duplicate samples, and field replicates were taken. Precision is a measurement, expressed as a percentage, which represents the repeatability of the result by the analytical system. This measurement is based on the relative percent differences between laboratory duplicates and their respective parent analysis. Zero percent difference is the best precision. All precision-related sample results from the confirmation sampling of RU027 were generally within recommended DQR limits. Even though some parameters exceeded recommended limits, no further analysis was performed because the results for the parameters in question were well below their respective criteria concentrations.

To assess the accuracy of the Quarry data sets, matrix spike samples and matrix spike duplicate samples were taken. Accuracy is a statistical measurement, expressed as a percentage, which represents how close the analytical data are to the "true" value. Matrix spike and matrix spike duplicate samples are intra-laboratory splits of a single sample that receive identical spike concentrations of the target analyte and are used to

document the accuracy and bias of a method in a given sample matrix. All accuracy-related samples taken during the confirmation sampling of RU027 satisfied the DQR goals. Overall, percent recoveries and relative percent differences were within acceptable ranges. Poor percent recoveries and relative percent differences for a few parameters were attributed to sample heterogeneity.

Equipment blanks were sent for off-site analysis to confirm no cross contamination had occurred in the confirmation sampling activity. The cross contamination would result from either field and/or laboratory procedures. No contamination was detected in any of the confirmation samples. Therefore, the reported data was viewed as representative of the media sampled.

6. SUMMARY OF CLOSURE REPORT FINDINGS

The Quarry work zone requiring confirmation consisted of the nine confirmation units within RU027. Summary information regarding the remedial activities is presented in Section 4 of this report.

6.1 Data Evaluation

Upon completion of remediation activities, preliminary results were used to complete disposition forms in accordance with ES&H 1.2.1, *Soil Remediation Disposition Process*. Based on the preliminary results, each CU was released when disposition forms were reviewed and signed by authorized project personnel.

6.2 Summary of RU027 Confirmation Results

Table 6-1 provides a summary of the total number of samples collected and analyzed for each contaminant during remedial activities in RU027. The number of results and the minimum, maximum, and average concentrations are also provided for each contaminant. The table was generated using final data sets compiled from all samples that represented soils left in place.

Table 6-1 Summary Totals for RU027

CONTAMINANT	NO. OF SAMPLES	CONCENTRATION RANGE	AVERAGE CONCENTRATION	SURFACE / SUBSURFACE CRITERIA
Ra-226 (pCi/g)	249	0.22 – 7.91	1.02	6.20
Ra-228 (pCi/g)	249	0.26 – 9.47	1.07	6.20
Total Radium* (pCi/g)	249	0.51 – 16.53	2.09	6.20
Th-230 (pCi/g)	249	0.14 – 77.9	2.75	6.20
U-238 (pCi/g)	249	0.07 – 14.5	1.88	120.00

* Total Radium consists of Ra-226 values plus Ra-228 values.

Final analytical results generated from the remedial activities indicated that the RU027 average concentrations for each COC were below the ALARA goal. For each of the nine CUs, COC averages are also less than criteria with the exception of Th-230 for CU411. In addition, with the exception of CU411, all 100 m^2 averages were less than criteria.

7. REFERENCES

1. MK-Ferguson and Jacobs Engineering Group. *Quarry Proper Confirmation Plan Details*, Rev 0. DOE/OR/21548-866. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. July 2000.

2. MK-Ferguson and Jacobs Engineering Group. *Quarry Proper Confirmation Plan Details Addendum 1: Additional Areas Associated with Quarry Water Treatment Plant Demolition*, Rev 0. DOE/OR/21548-866 ADD 1. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. March 2001.

3. MK-Ferguson and Jacobs Engineering Group. *Quarry Proper Confirmation Plan Details Addendum 2: Additional Areas Associated with Quarry Reclamation*, Rev 0. DOE/OR/21548-866 ADD 2. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. April 2002.

4. MK-Ferguson and Jacobs Engineering Group. *Chemical Plant Area Cleanup Attainment Confirmation Plan,* Rev. 3. DOE/OR/21548-491. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. December 1995.

5. MK-Ferguson and Jacobs Engineering Group. *Post-Remedial Action Report for the Quarry Water Treatment Plant Equalization Basin (RU026),* Rev. 0. DOE/OR/21548-890. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. July 2001.

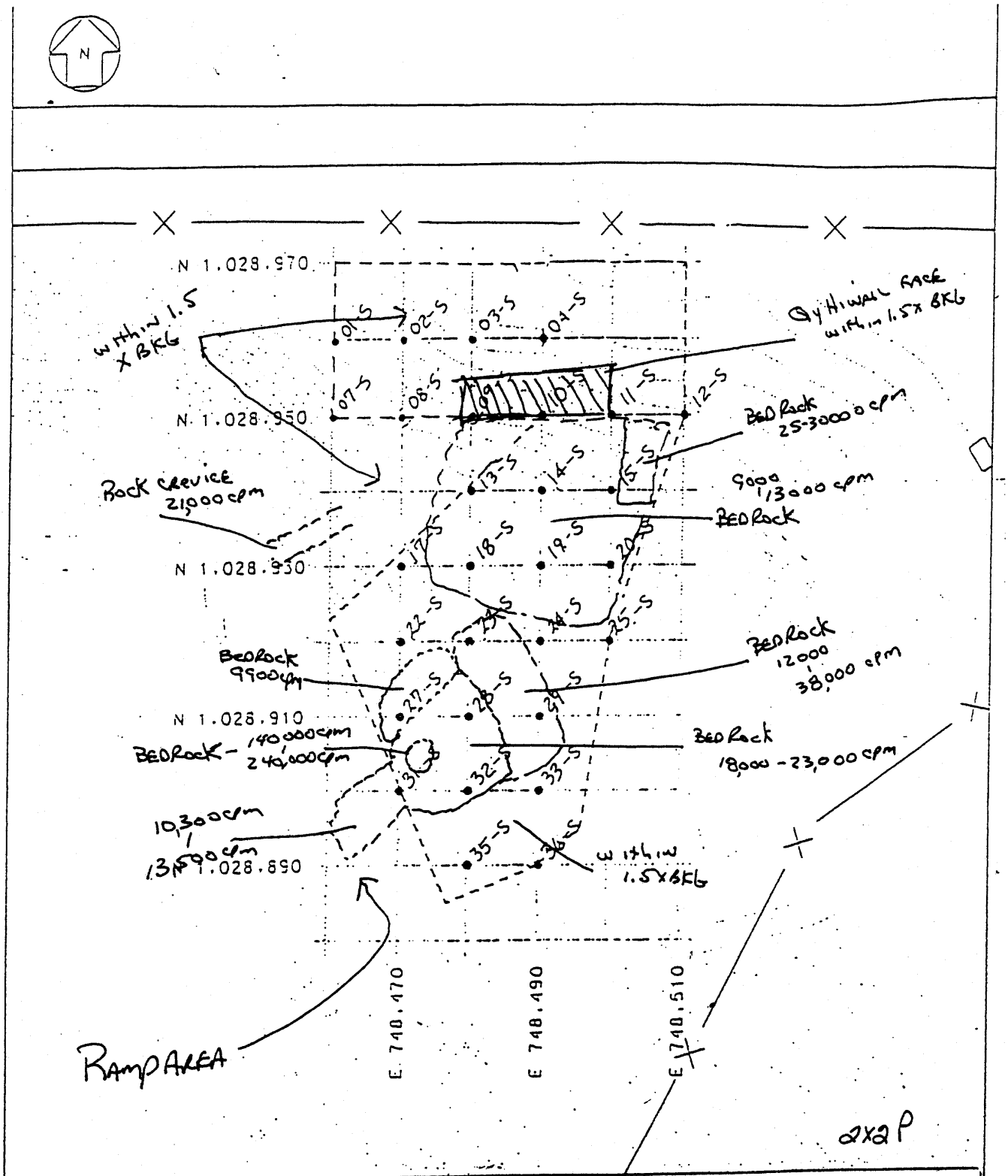
6. Department of Energy. *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site.* DOE/OR/21548-376. Oak Ridge Field Office. St. Charles, MO. September 1993.

7. MK-Ferguson Company and Jacobs Engineering Group. *Project Management Contractor Quality Assurance Program*, Rev. 3. DOE/OR/21548-506. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. November 2000.

8. MK-Ferguson and Jacobs Engineering Group. *Environmental Quality Assurance Project Plan*, Rev. 5. DOE/OR/21548-352. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. November 2000.

APPENDIX A
RU027 Final Walkover Forms

FINAL WALKOVER SURVEY FORM RU027 CU411 (NE SLOPE)



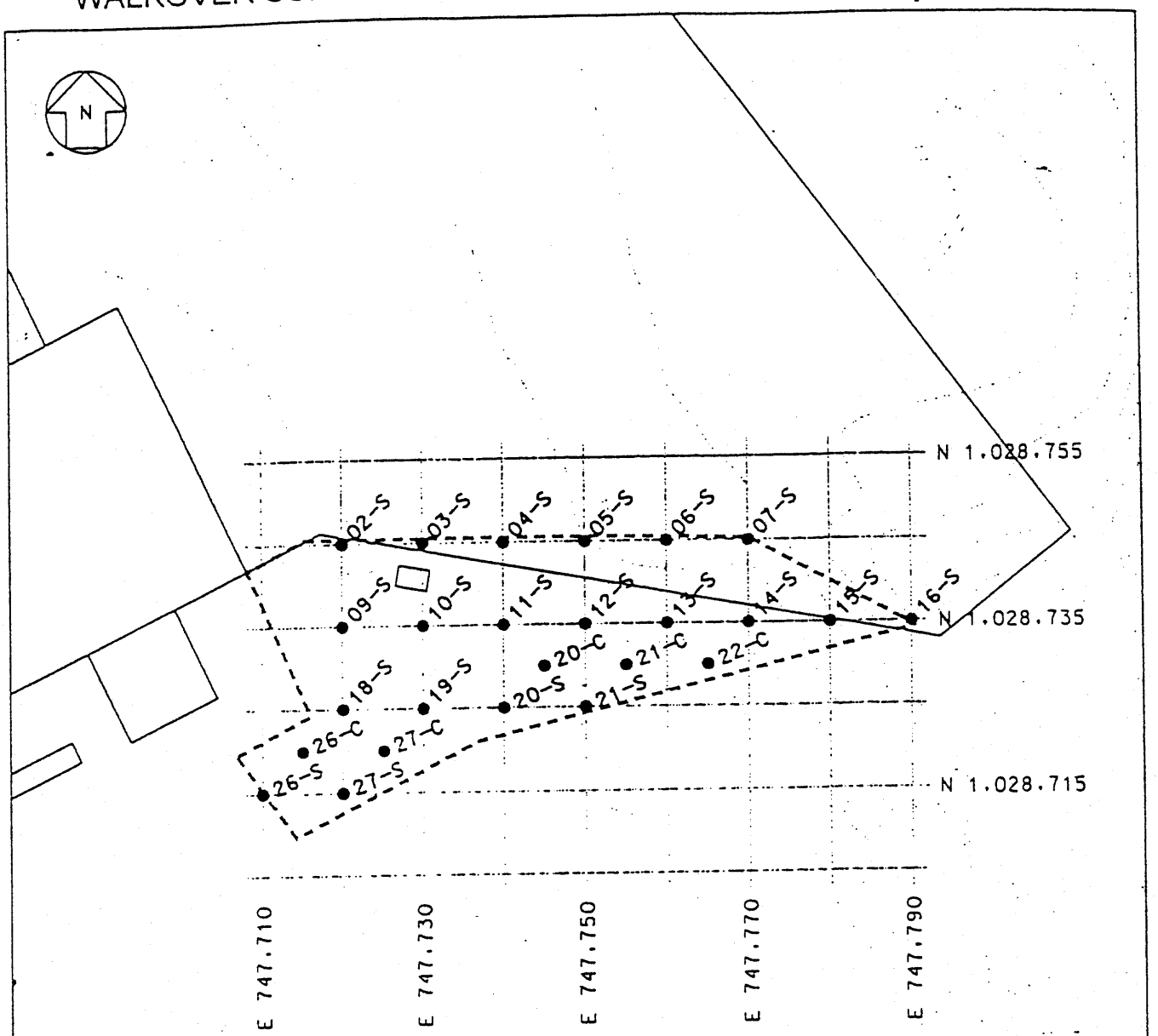
Meter Model#:	~~154199~~ 2221	Detector Model#:	
Meter Serial#:	154199	Detector Serial#:	17606
Calibration Due:	2-9-01	Calibration Due:	1-21-01
Survey Date/Time:	8-23-00 @ 0950	Field Bkg.:	1300 X 1.5 = 1695 cpm
Surveyor(s):	Harry		
Comments:	Bed Rock in most Area's		

* NOT TO SCALE -

0 20 40

SCALE FEET

WALKOVER SURVEY FORM - RU027 CU412 (S.W. Ditch)



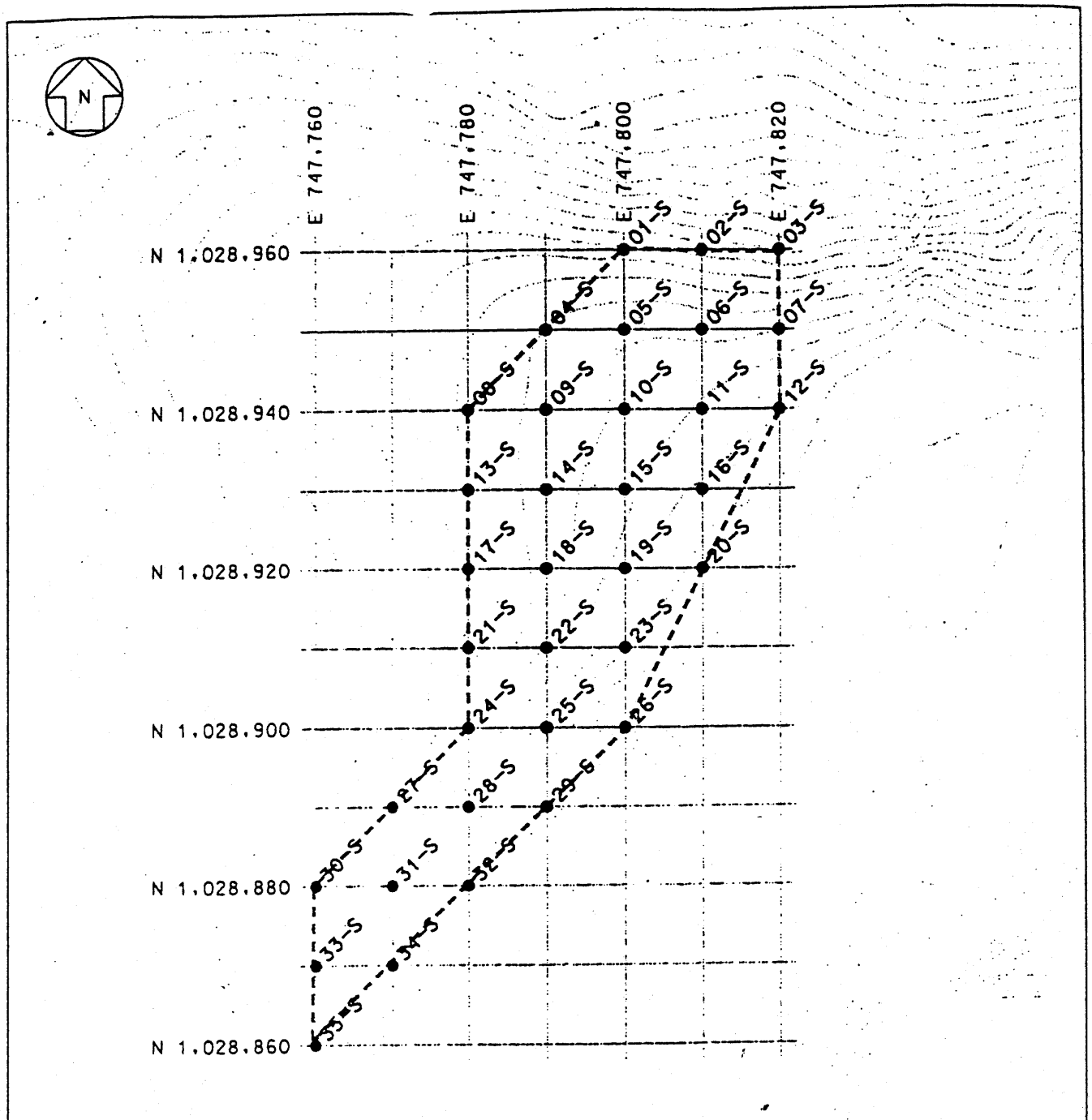
Meter Model#:	2221	Detector Model#:	44-10
Meter Serial#:	117617	Detector Serial#:	130764
Calibration Due:	10/13/00	Calibration Due:	9/24/00
Survey Date/Time:	7-24-00 0900	Field Bkg.:	6900 cpm
Surveyor(s):	Harry Hufker		
Comments:	ALL AREA LESS THAN FIELD BKG (3400-5800)		

● - SAMPLE POINT

0 20 40

SCALE FEET

WALKOVER SURVEY FORM - RU027 CU413 (SNAKE PIT)



● - SAMPLE POINT

0 20 40

SCALE FEET

Meter Model#:	2221	Detector Model#:	44-10
Meter Serial#:	117617	Detector Serial#:	130764
Calibration Due:	10/13/00	Calibration Due:	9/24/00
Survey Date/Time:	7-16-00 10:00	Field Bkg.:	8199 cpm
Surveyor(s):	Harry Hufker		
Comments:	ALL AREA'S LESS THAN FIELD BKG. (3200-6400)		

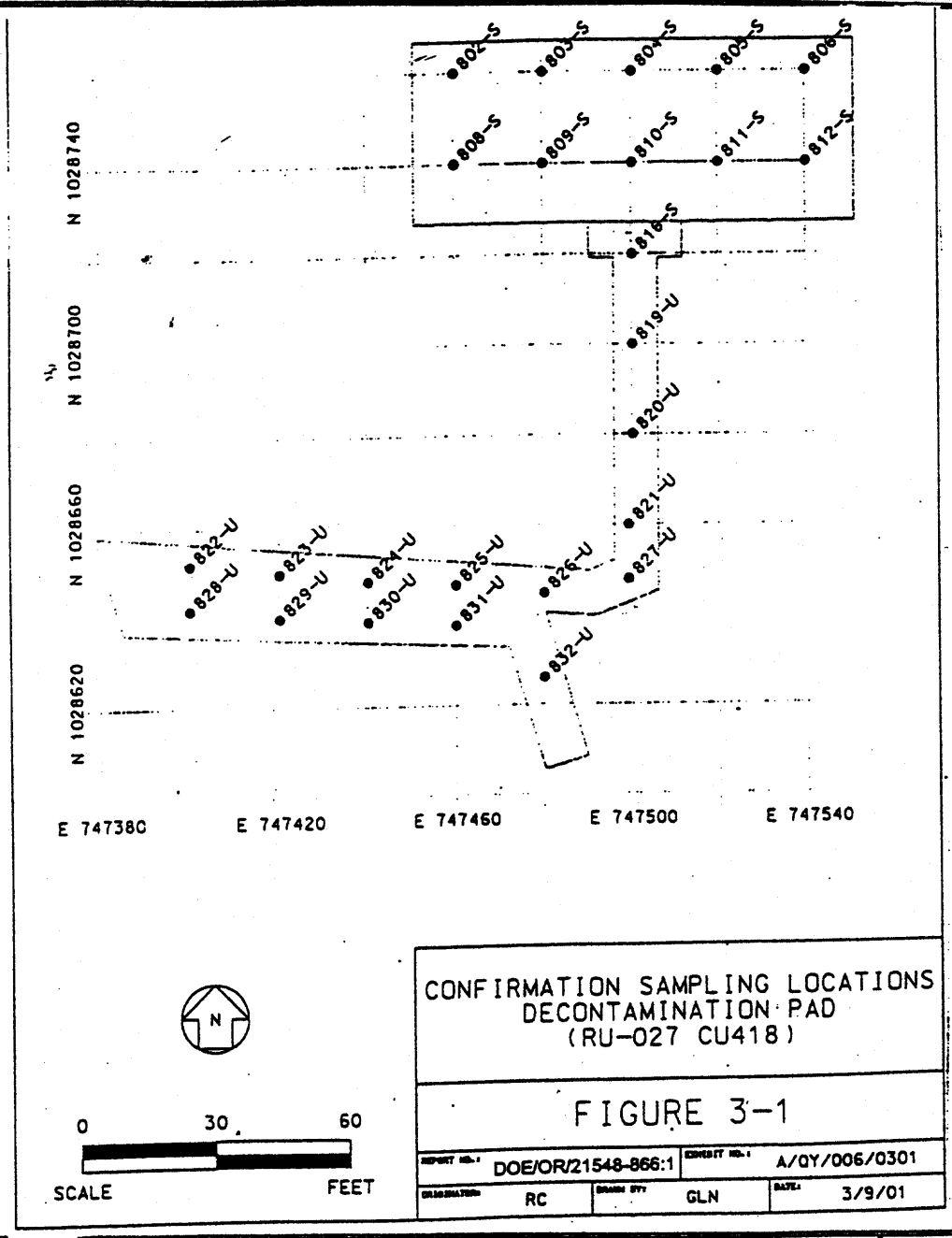
WELDON SPRING SITE REMEDIAL ACTION PROJECT

RADIOLOGICAL SURVEY REPORT (Optional Supplement)

DESCRIPTION: QUARRY DECON PAD CU418

DATE: 04-26-01 | TIME: 0900 | WP No: 553

SURVEY MAP



REMARKS: Sample points 802S through 806-S, 808S through 812-S & 816S
BACKGROUND WAS @ 8000 WALKOVER READINGS NEVER EXCEEDED 1.5 TIMES BACKGROUND

TECHNICIAN(S) SIGNATURE/DATE: George A Hamm 04-26-01

REVIEWER SIGNATURE/DATE: D 4-30-01

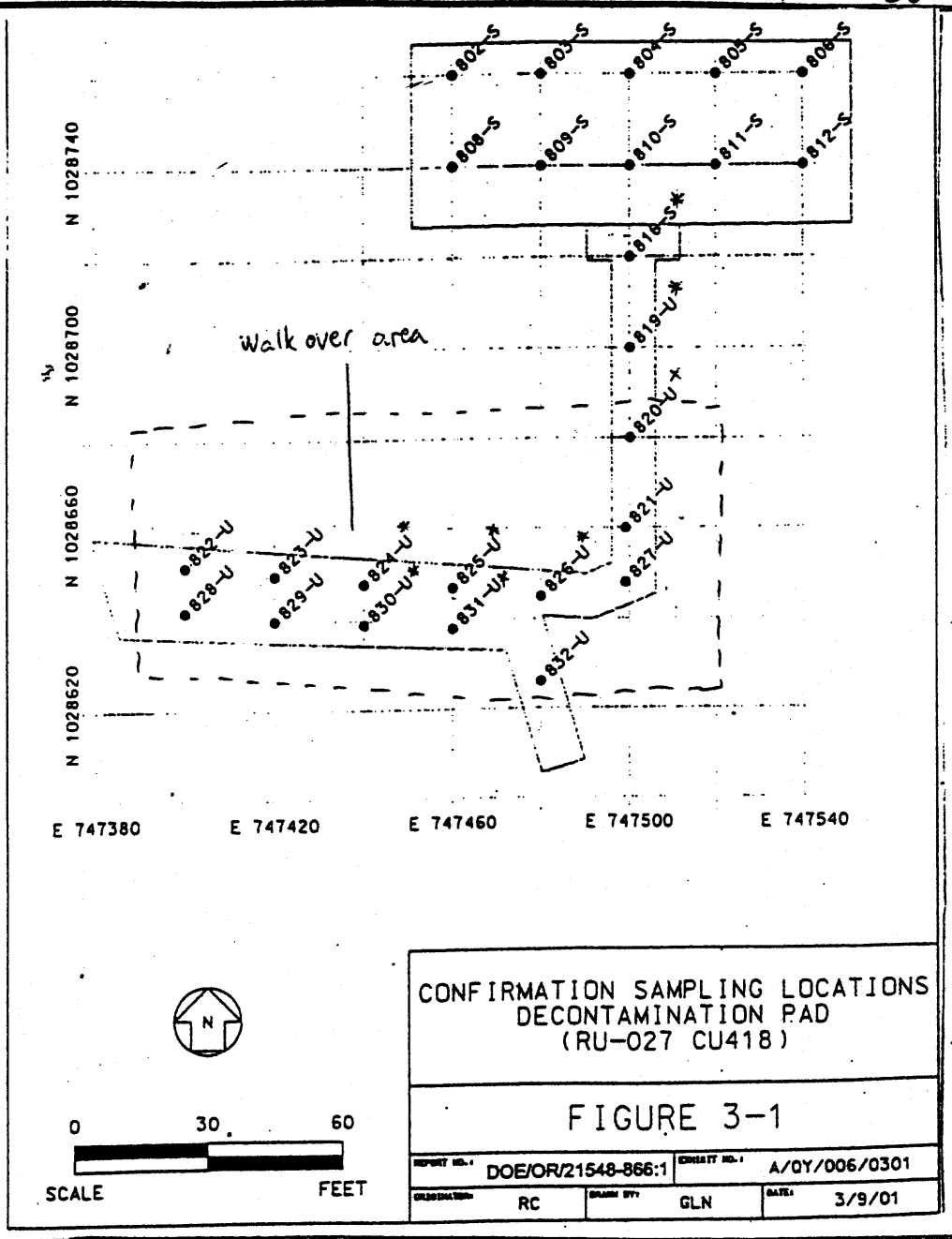
WELDON SPRING SITE REMEDIAL ACTION PROJECT

RADIOLOGICAL SURVEY REPORT (Optional Supplement)

DESCRIPTION: CU 418 Sample Piles

DATE: 04.19.01 | TIME: 1400 | WP No: 553

SURVEY MAP



REMARKS: BKG = 8000 cpm. Additional walkover of areas bordering trenches also < 1.5 times BKG.

* 824-U, 825-U, 826-U, 830-U, 831-U not ~~surveyed~~ surveyed - inaccessable. Also 816-S, 819-U inaccessable

TECHNICIAN(S) SIGNATURE/DATE: [signature] / 04.19.01 /

REVIEWER SIGNATURE/DATE: [signature] / 4.25.01

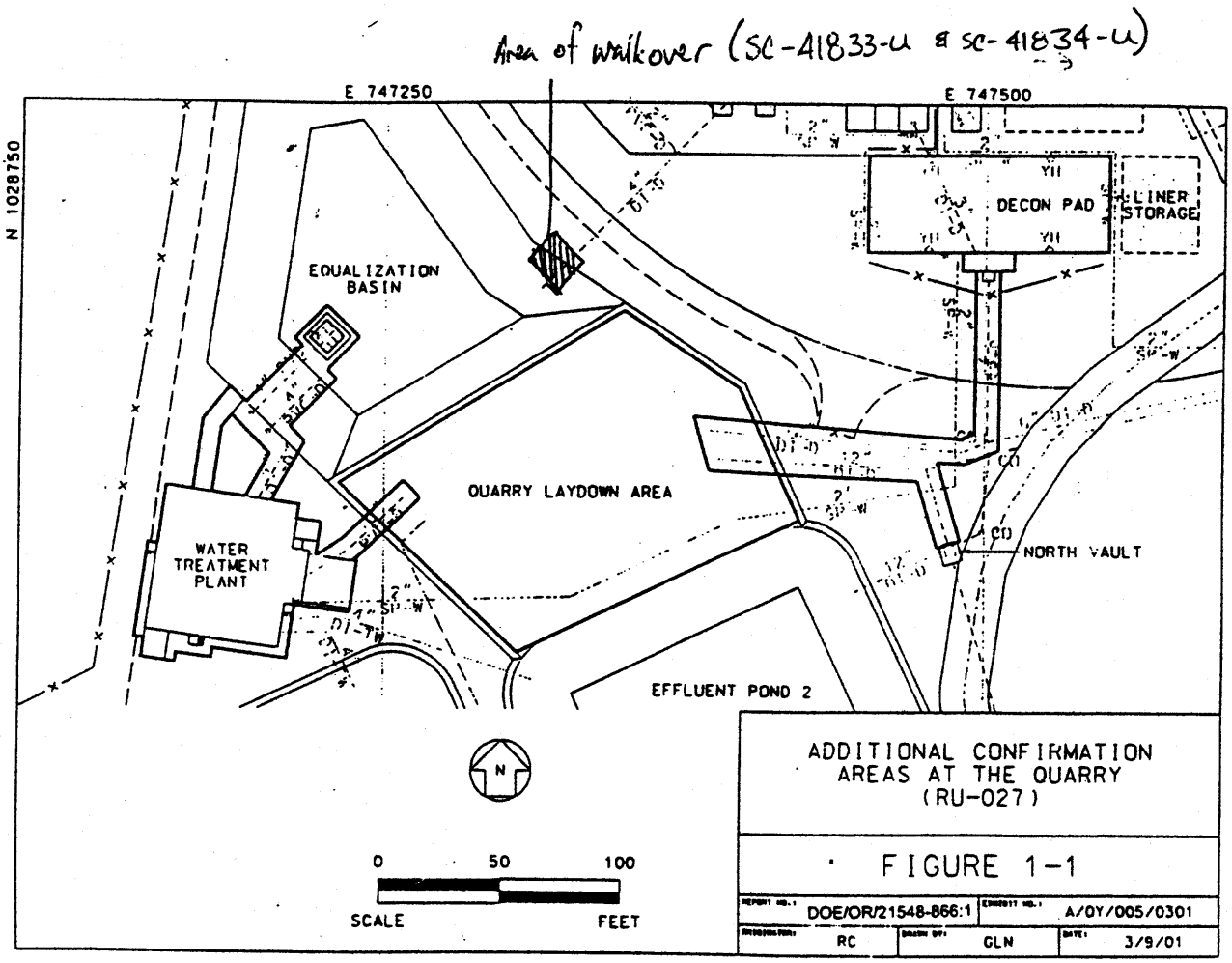
WELDON SPRING SITE REMEDIAL ACTION PROJECT

RADIOLOGICAL SURVEY REPORT (Optional Supplement)

DESCRIPTION: 4" H_2O line

DATE: 04.19.01 | TIME: 1500 | WP No: 553

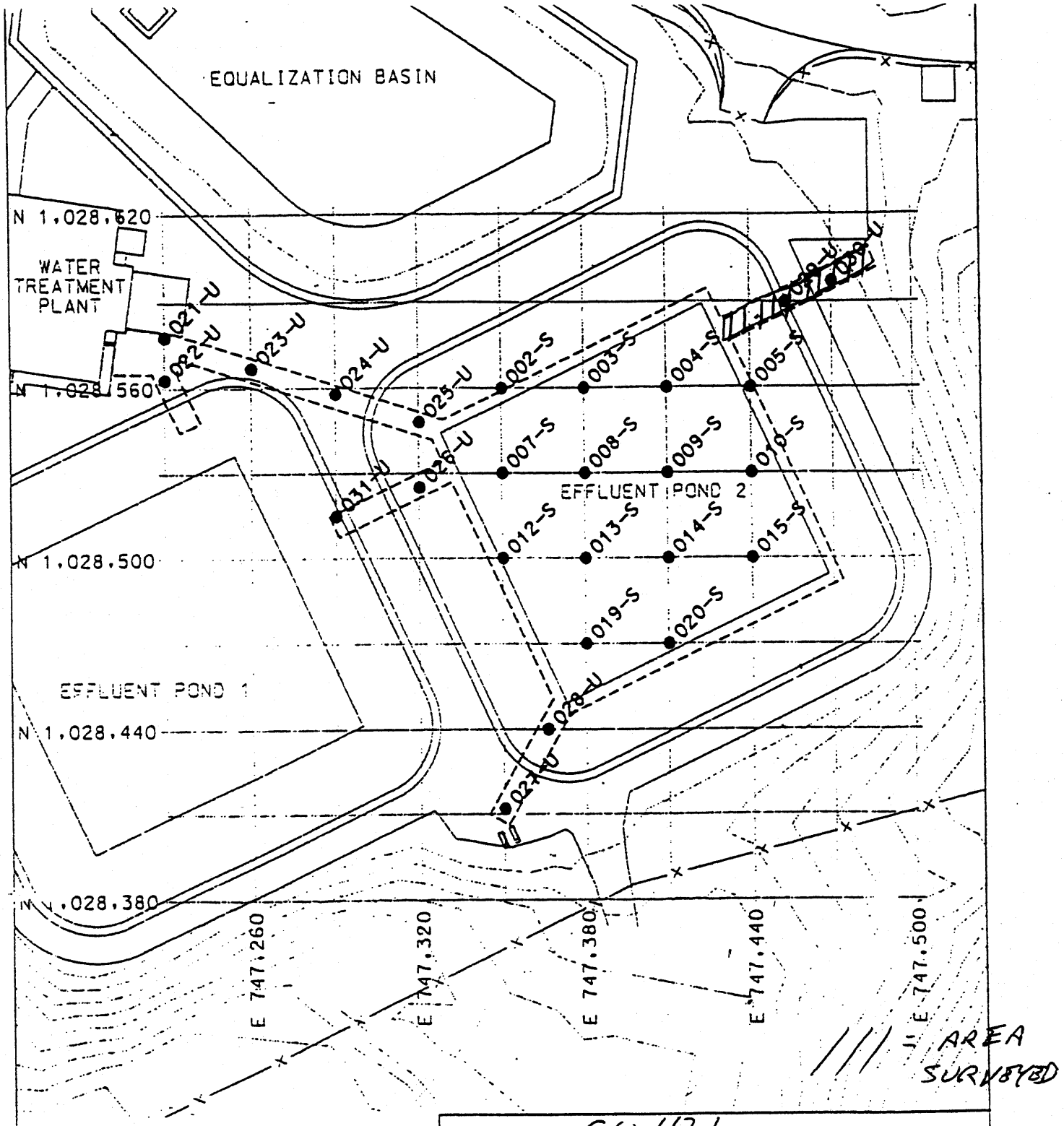
SURVEY MAP



REMARKS: BKG = 8,000 cpm

TECHNICIAN(S) SIGNATURE/DATE: [signature] 04.19.01

REVIEWER SIGNATURE/DATE: D Gill 4.25.01



● - SAMPLE LOCATION

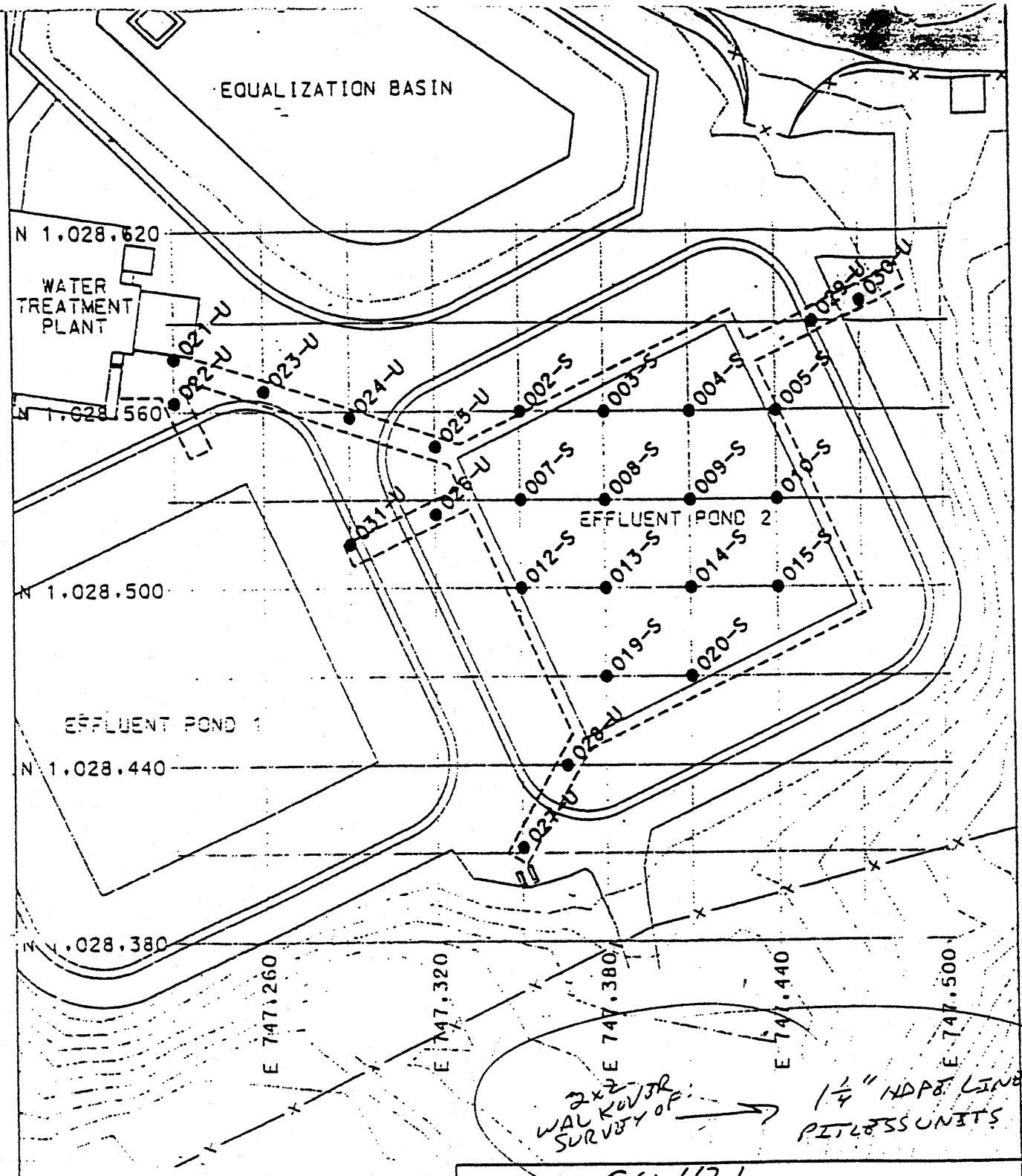
N

0 50 100

SCALE FEET

CU 421

Meter Model #:	2221	Detector Model #:	44-10-2
Meter Serial #:		Detector Serial #:	54966
Calibration Due:	10-10-02	Calibration Due:	2-8-03
Survey Date / Time:	6-27-02 / 1400	Field Bkg.:	10K cpm
Surveyor(s):	D FLEMING		
Comments:	ALL SURVEY RESULTS <1.5 x BKG		



● - SAMPLE LOCATION

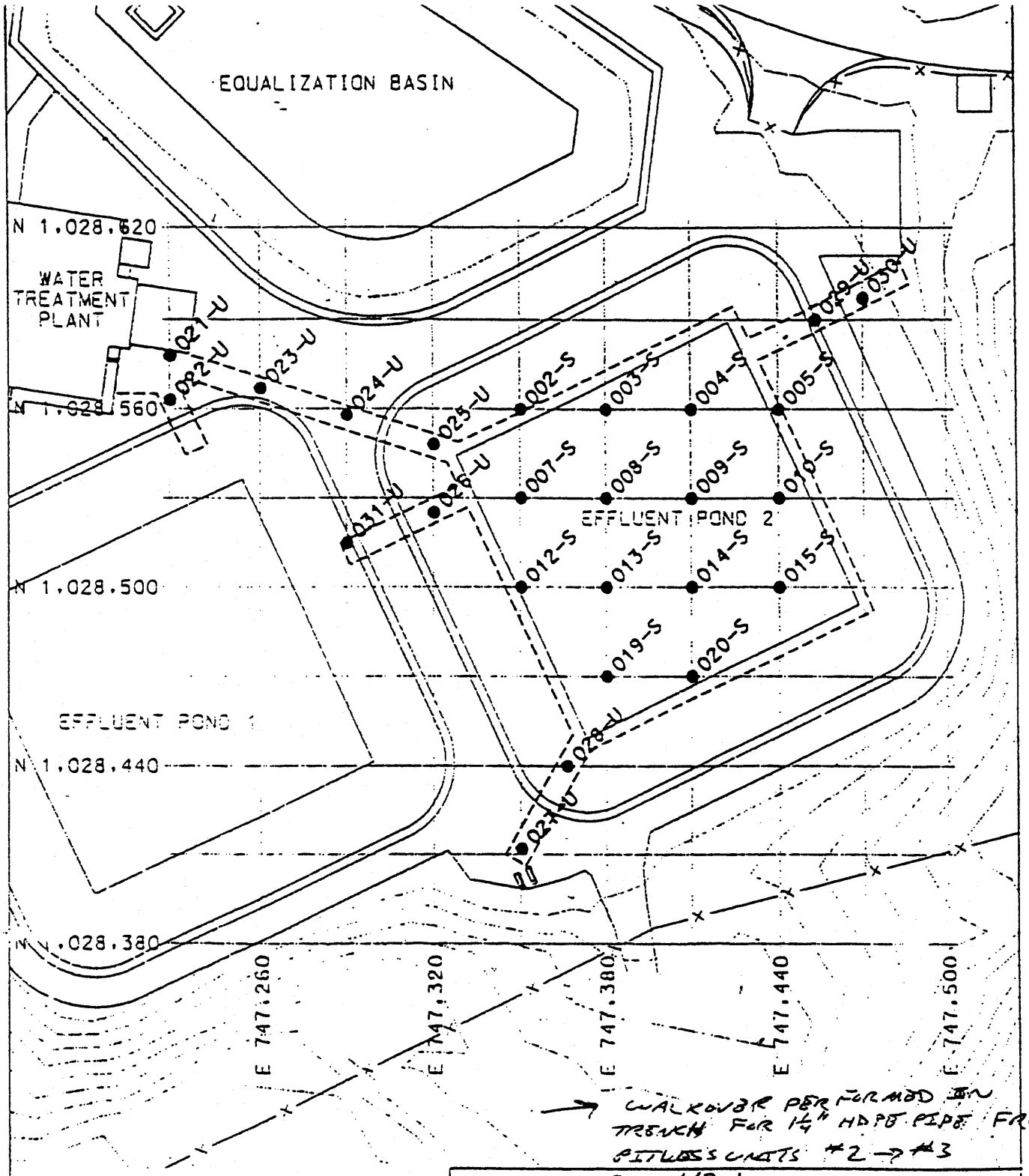
N

0 50 100

SCALE FEET

CU 421

Meter Model #:	2221	Detector Model #:	44-10-2
Meter Serial #:	154228	Detector Serial #:	54966
Calibration Due:	10-10-02	Calibration Due:	2-8-03
Survey Date / Time:	6-28-02/1500	Field Bkg.:	10K cpm
Surveyor(s):	D FLEMING		
Comments:	ALL SURVEY RESULTS <1.5 x BKG		



WALKOVER PERFORMED ON TRENCH FOR 1½" HDPE PIPE FROM PITLESS UNITS #2 → #3

● - SAMPLE LOCATION

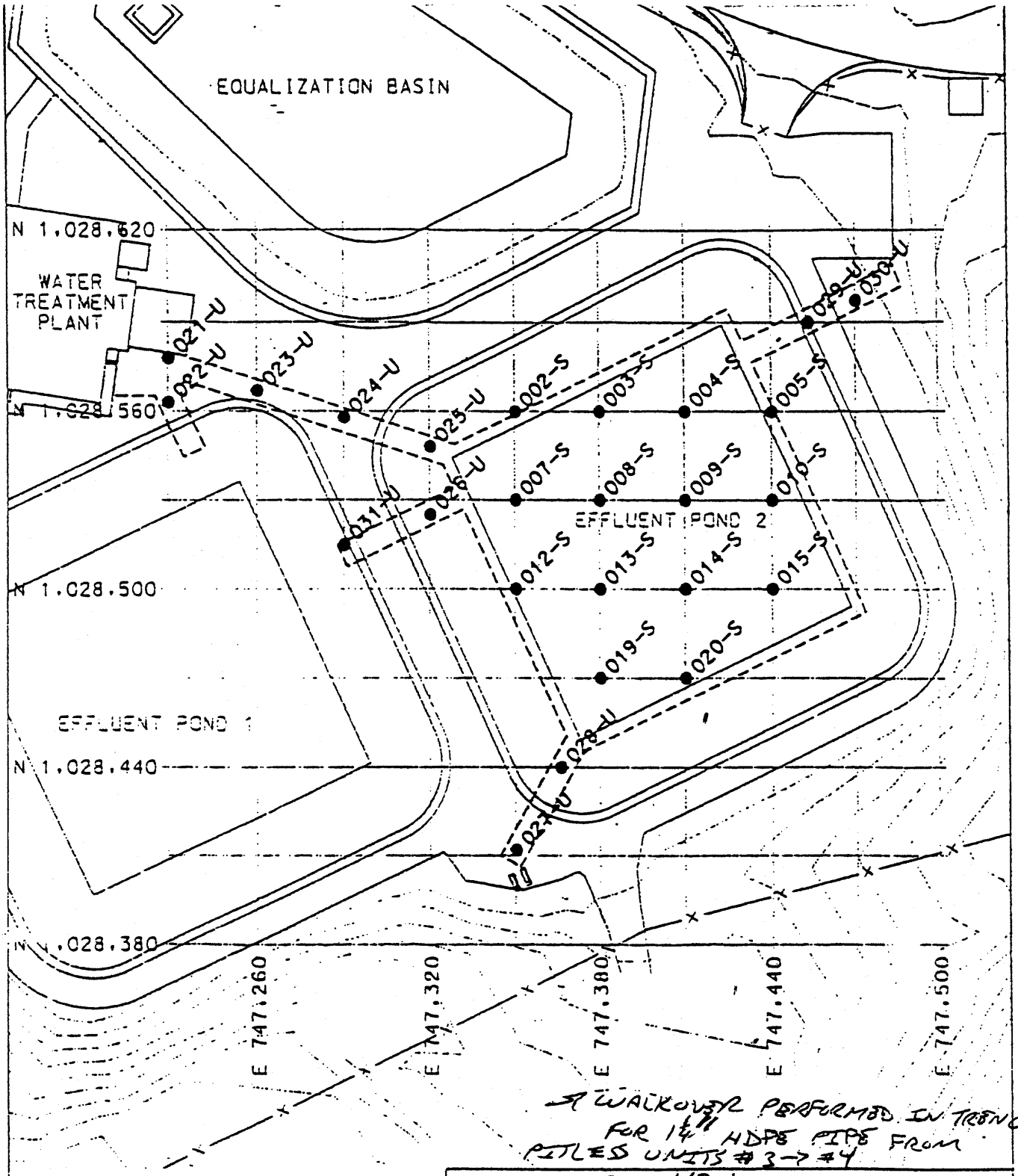
N

0 50 100

SCALE FEET

CU 421

Meter Model #:	2221	Detector Model #:	44-10-2 U
Meter Serial #:	154238	Detector Serial #:	54966
Calibration Due:	10-10-02	Calibration Due:	2-8-03
Survey Date / Time:	7-1-02 / 1500	Field Bkg.:	10 k cpm
Surveyor(s):	D FLEMING		
Comments:	ALL WALKOVER SURVEY RESULTS < 1.5 x BKG		



WALKOVER PERFORMED IN TRENCH FOR 1¼" HDPE PIPE FROM PITLESS UNITS #3 → #4

CU 421

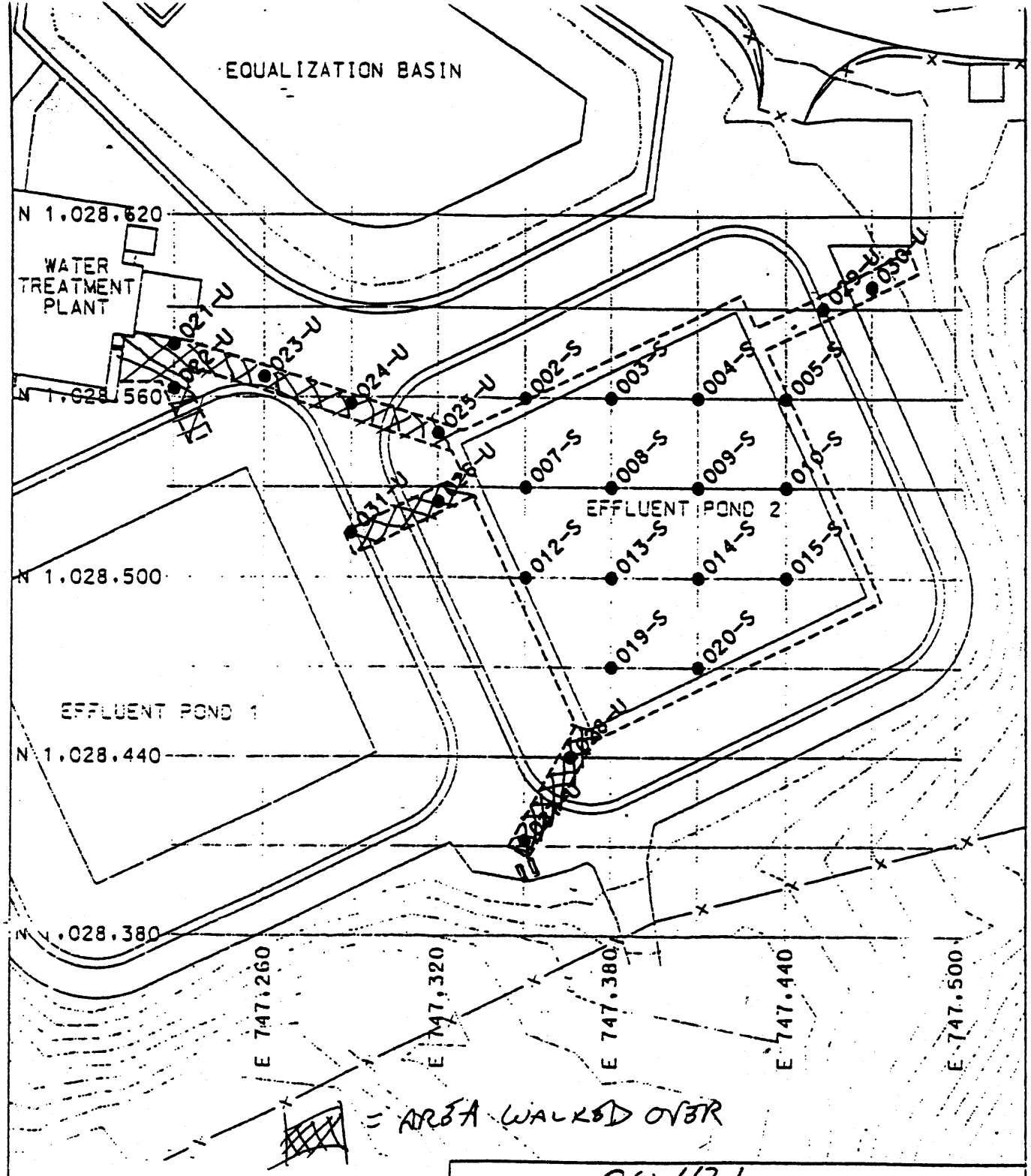
● - SAMPLE LOCATION

N

0 50 100

SCALE FEET

Meter Model #:	2221	Detector Model #:	44-10-2
Meter Serial #:	154228	Detector Serial #:	54966
Calibration Due:	10-10-02	Calibration Due:	2-8-03
Survey Date / Time:	7-2-02/1600	Field Bkg.:	10K cpm
Surveyor(s):			
Comments:	ALL WALKOVER SURVEY RESULTS < 1.5 x BKG		



● - SAMPLE LOCATION

N

0 50 100

SCALE FEET

CU 421

Meter Model #:	2221	Detector Model #:	44-10-2 (2x2)
Meter Serial #:	154228	Detector Serial #:	54966
Calibration Date:	10-10-02	Calibration Date:	2-8-03
Survey Date / Time:	7-9-02 / 1530	Field Bkg.:	12K cpm
Surveyor(s):	D. FLEMING		

Comments: MAJORITY OF AREA WAS NARROW, DEEP TRENCH, CAUSING THE ELEVATED BKG.

ALL AREAS WALKED OVER WERE <1.5xBKG

APPENDIX B
RU027 Final Data

APPENDIX B RU027 Final Data

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41101-S	08/14/2000	RADIUM-226	1.54	0.457	PCI/G
SC-41102-S	08/14/2000	RADIUM-226	0.915	0.347	PCI/G
SC-41103-S	08/14/2000	RADIUM-226	1.05	0.36	PCI/G
SC-41104-S	08/14/2000	RADIUM-226	1.07	0.342	PCI/G
SC-41107-S	08/14/2000	RADIUM-226	3.26	0.61	PCI/G
SC-41108-S	08/14/2000	RADIUM-226	0.819	0.324	PCI/G
SC-41109-S	08/14/2000	RADIUM-226	1.01	0.429	PCI/G
SC-41110-S	08/14/2000	RADIUM-226	1.2	0.32	PCI/G
SC-41111-S	08/14/2000	RADIUM-226	1.14	0.279	PCI/G
SC-41112-S	08/14/2000	RADIUM-226	1	0.595	PCI/G
SC-41113-S	08/14/2000	RADIUM-226	7.06	0.5	PCI/G
SC-41114-S	08/14/2000	RADIUM-226	2.2	0.496	PCI/G
SC-41116-S	08/14/2000	RADIUM-226	1.31	0.321	PCI/G
SC-41117-S	08/14/2000	RADIUM-226	6.1	0.644	PCI/G
SC-41118-S	08/14/2000	RADIUM-226	1.84	0.44	PCI/G
SC-41119-S	08/14/2000	RADIUM-226	1.11	0.325	PCI/G
SC-41120-S	08/14/2000	RADIUM-226	1.41	0.416	PCI/G
SC-41122-S	08/14/2000	RADIUM-226	1.08	0.299	PCI/G
SC-41123-S	08/14/2000	RADIUM-226	0.845	0.472	PCI/G
SC-41124-S	08/14/2000	RADIUM-226	1.91	0.584	PCI/G
SC-41125-S	08/14/2000	RADIUM-226	0.592	0.408	PCI/G
SC-41127-S	08/14/2000	RADIUM-226	1.46	0.344	PCI/G
SC-41128-S	08/14/2000	RADIUM-226	1.42	0.649	PCI/G
SC-41129-S	08/14/2000	RADIUM-226	1.39	0.407	PCI/G
SC-41131-S	08/14/2000	RADIUM-226	1.66	0.353	PCI/G
SC-41132-S	08/14/2000	RADIUM-226	1.13	0.879	PCI/G
SC-41133-S	08/14/2000	RADIUM-226	0.918	0.355	PCI/G
SC-41135-S	08/14/2000	RADIUM-226	1.2	0.395	PCI/G
SC-41136-S	08/14/2000	RADIUM-226	1.63	0.619	PCI/G
SC-41202-S	07/25/2000	RADIUM-226	1.37	0.66	PCI/G
SC-41203-S	07/25/2000	RADIUM-226	1.08	0.224	PCI/G
SC-41204-S	07/25/2000	RADIUM-226	2.35	0.398	PCI/G
SC-41205-S	07/25/2000	RADIUM-226	2.2	0.633	PCI/G
SC-41206-S	07/25/2000	RADIUM-226	1.78	0.492	PCI/G
SC-41207-S	07/25/2000	RADIUM-226	4.45	0.583	PCI/G
SC-41209-S	07/25/2000	RADIUM-226	1.41	0.524	PCI/G
SC-41210-S	07/25/2000	RADIUM-226	1.14	0.291	PCI/G
SC-41211-S	07/25/2000	RADIUM-226	2.07	0.455	PCI/G
SC-41212-S	07/25/2000	RADIUM-226	1.05	0.548	PCI/G
SC-41213-C	07/25/2000	RADIUM-226	1.19	0.55	PCI/G
SC-41213-S	07/25/2000	RADIUM-226	2.88	0.286	PCI/G
SC-41214-S	07/25/2000	RADIUM-226	1.7	0.747	PCI/G
SC-41215-S	07/25/2000	RADIUM-226	1.58	0.328	PCI/G
SC-41218-S	07/25/2000	RADIUM-226	1.63	0.397	PCI/G
SC-41219-S	07/25/2000	RADIUM-226	1.05	0.557	PCI/G
SC-41220-S	07/25/2000	RADIUM-226	7.91	0.689	PCI/G
SC-41220-C	07/25/2000	RADIUM-226	1.73	0.295	PCI/G
SC-41221-C	07/25/2000	RADIUM-226	0.873	0.561	PCI/G
SC-41221-S	07/25/2000	RADIUM-226	1.33	0.544	PCI/G
SC-41222-C	07/25/2000	RADIUM-226	1.28	0.452	PCI/G
SC-41226-C	07/25/2000	RADIUM-226	1.13	0.268	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41226-S	07/25/2000	RADIUM-226	1.28	0.534	PCI/G
SC-41227-C	07/25/2000	RADIUM-226	1.56	0.312	PCI/G
SC-41227-S	07/25/2000	RADIUM-226	1.16	0.43	PCI/G
SC-41301-S	07/20/2000	RADIUM-226	0.76	0.27	PCI/G
SC-41302-S	07/20/2000	RADIUM-226	0.71	0.24	PCI/G
SC-41303-S	07/20/2000	RADIUM-226	0.265	0.53	PCI/G
SC-41304-S	07/20/2000	RADIUM-226	0.6	0.24	PCI/G
SC-41305-S	07/20/2000	RADIUM-226	0.78	0.24	PCI/G
SC-41306-S	07/20/2000	RADIUM-226	0.68	0.26	PCI/G
SC-41307-S	07/20/2000	RADIUM-226	0.265	0.53	PCI/G
SC-41308-S	07/20/2000	RADIUM-226	0.62	0.18	PCI/G
SC-41309-S	07/20/2000	RADIUM-226	0.71	0.26	PCI/G
SC-41310-S	07/20/2000	RADIUM-226	0.68	0.22	PCI/G
SC-41311-S	07/20/2000	RADIUM-226	0.67	0.25	PCI/G
SC-41312-S	07/20/2000	RADIUM-226	0.79	0.25	PCI/G
SC-41313-S	07/20/2000	RADIUM-226	0.28	0.56	PCI/G
SC-41314-S	07/20/2000	RADIUM-226	0.79	0.26	PCI/G
SC-41315-S	07/20/2000	RADIUM-226	0.83	0.27	PCI/G
SC-41316-S	07/20/2000	RADIUM-226	0.82	0.26	PCI/G
SC-41317-S	07/20/2000	RADIUM-226	0.29	0.58	PCI/G
SC-41318-S	07/20/2000	RADIUM-226	1.12	0.24	PCI/G
SC-41319-S	07/20/2000	RADIUM-226	0.88	0.23	PCI/G
SC-41320-S	07/20/2000	RADIUM-226	0.77	0.23	PCI/G
SC-41321-S	07/20/2000	RADIUM-226	1.02	0.25	PCI/G
SC-41322-S	07/20/2000	RADIUM-226	0.79	0.22	PCI/G
SC-41323-S	07/20/2000	RADIUM-226	0.82	0.24	PCI/G
SC-41324-S	07/20/2000	RADIUM-226	0.73	0.23	PCI/G
SC-41325-S	07/20/2000	RADIUM-226	0.27	0.54	PCI/G
SC-41326-S	07/20/2000	RADIUM-226	1.03	0.26	PCI/G
SC-41327-S	07/20/2000	RADIUM-226	1.43	0.3	PCI/G
SC-41328-S	07/20/2000	RADIUM-226	0.265	0.53	PCI/G
SC-41329-S	07/20/2000	RADIUM-226	0.3	0.6	PCI/G
SC-41330-S	07/20/2000	RADIUM-226	0.89	0.24	PCI/G
SC-41331-S	07/20/2000	RADIUM-226	0.245	0.49	PCI/G
SC-41332-S	07/20/2000	RADIUM-226	1.02	0.14	PCI/G
SC-41333-S	07/20/2000	RADIUM-226	0.235	0.47	PCI/G
SC-41334-S	07/20/2000	RADIUM-226	1.27	0.22	PCI/G
SC-41335-S	07/20/2000	RADIUM-226	0.99	0.24	PCI/G
SC-41601-U	07/25/2000	RADIUM-226	0.795	0.573	PCI/G
SC-41602-U	07/25/2000	RADIUM-226	0.854	0.352	PCI/G
SC-41603-U	04/19/2001	RADIUM-226	0.86	0.407	PCI/G
SC-41604-U	04/19/2001	RADIUM-226	0.712	0.339	PCI/G
SC-41605-U	07/24/2000	RADIUM-226	0.985	0.42	PCI/G
SC-41606-U	07/24/2000	RADIUM-226	0.823	0.644	PCI/G
SC-41607-U	07/22/2000	RADIUM-226	1.1	0.41	PCI/G
SC-41608-U	07/22/2000	RADIUM-226	1.09	0.54	PCI/G
SC-41609-U	07/22/2000	RADIUM-226	1.14	0.591	PCI/G
SC-41610-U	07/22/2000	RADIUM-226	0.96	0.436	PCI/G
SC-41611-U	07/21/2000	RADIUM-226	1.06	0.362	PCI/G
SC-41612-U	07/21/2000	RADIUM-226	0.995	0.417	PCI/G
SC-41613-U	07/21/2000	RADIUM-226	1.01	0.323	PCI/G
SC-41614-U	07/21/2000	RADIUM-226	0.665	0.355	PCI/G
SC-41615-U	07/20/2000	RADIUM-226	0.824	0.334	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41616-U	07/20/2000	RADIUM-226	0.926	0.354	PCI/G
SC-41617-U	07/19/2000	RADIUM-226	0.852	0.482	PCI/G
SC-41618-U	07/19/2000	RADIUM-226	0.639	0.299	PCI/G
SC-41619-U	08/03/2000	RADIUM-226	0.68	0.26	PCI/G
SC-41620-U	08/03/2000	RADIUM-226	0.67	0.27	PCI/G
SC-41621-U	08/09/2000	RADIUM-226	0.91	0.315	PCI/G
SC-41622-U	08/09/2000	RADIUM-226	0.782	0.491	PCI/G
SC-41623-U	08/09/2000	RADIUM-226	1.04	0.25	PCI/G
SC-41624-U	08/09/2000	RADIUM-226	1.33	0.574	PCI/G
SC-41625-U	08/09/2000	RADIUM-226	0.71	0.466	PCI/G
SC-41701-S	07/25/2000	RADIUM-226	1.3	0.386	PCI/G
SC-41702-S	07/25/2000	RADIUM-226	0.874	0.399	PCI/G
SC-41703-S	07/25/2000	RADIUM-226	0.948	0.292	PCI/G
SC-41704-S	07/25/2000	RADIUM-226	1.15	0.397	PCI/G
SC-41705-S	07/25/2000	RADIUM-226	1.48	0.552	PCI/G
SC-41706-S	07/25/2000	RADIUM-226	1.06	0.489	PCI/G
SC-41707-S	07/25/2000	RADIUM-226	1.37	0.621	PCI/G
SC-41708-S	07/25/2000	RADIUM-226	0.89	0.375	PCI/G
SC-41709-S	07/25/2000	RADIUM-226	1.27	0.183	PCI/G
SC-41710-S	07/25/2000	RADIUM-226	0.515	0.0877	PCI/G
SC-41711-S	07/25/2000	RADIUM-226	0.688	0.13	PCI/G
SC-41712-S	07/25/2000	RADIUM-226	0.569	0.0895	PCI/G
SC-41713-S	07/25/2000	RADIUM-226	0.507	0.0917	PCI/G
SC-41714-S	07/25/2000	RADIUM-226	0.506	0.144	PCI/G
SC-41715-S	07/25/2000	RADIUM-226	0.562	0.0982	PCI/G
SC-41716-S	07/25/2000	RADIUM-226	0.681	0.102	PCI/G
SC-41717-S	07/25/2000	RADIUM-226	0.476	0.1	PCI/G
SC-41718-S	07/25/2000	RADIUM-226	0.555	0.0953	PCI/G
SC-41719-S	07/25/2000	RADIUM-226	0.687	0.0801	PCI/G
SC-41720-S	07/25/2000	RADIUM-226	0.609	0.131	PCI/G
SC-41721-S	07/25/2000	RADIUM-226	0.473	0.116	PCI/G
SC-41722-S	07/25/2000	RADIUM-226	0.562	0.0907	PCI/G
SC-41723-S	07/25/2000	RADIUM-226	0.627	0.107	PCI/G
SC-41724-S	07/25/2000	RADIUM-226	0.875	0.0966	PCI/G
SC-41725-S	07/25/2000	RADIUM-226	0.621	0.0985	PCI/G
SC-41802-S	04/26/2001	RADIUM-226	0.775	0.236	PCI/G
SC-41803-S	04/26/2001	RADIUM-226	0.681	0.22	PCI/G
SC-41804-S	04/26/2001	RADIUM-226	0.676	0.421	PCI/G
SC-41805-S	04/26/2001	RADIUM-226	0.849	0.22	PCI/G
SC-41806-S	04/26/2001	RADIUM-226	0.82	0.177	PCI/G
SC-41808-S	04/26/2001	RADIUM-226	0.797	0.239	PCI/G
SC-41809-S	04/26/2001	RADIUM-226	0.906	0.195	PCI/G
SC-41810-S	04/26/2001	RADIUM-226	0.95	0.075	PCI/G
SC-41811-S	04/26/2001	RADIUM-226	0.815	0.308	PCI/G
SC-41812-S	04/26/2001	RADIUM-226	0.686	0.087	PCI/G
SC-41816-S	04/26/2001	RADIUM-226	1.01	0.204	PCI/G
SC-41819-U	04/19/2001	RADIUM-226	1.03	0.426	PCI/G
SC-41820-U	04/19/2001	RADIUM-226	1.01	0.411	PCI/G
SC-41821-U	04/19/2001	RADIUM-226	1.11	0.268	PCI/G
SC-41822-U	04/26/2001	RADIUM-226	0.769	0.193	PCI/G
SC-41823-U	04/26/2001	RADIUM-226	0.753	0.304	PCI/G
SC-41824-U	04/19/2001	RADIUM-226	1.05	0.363	PCI/G
SC-41825-U	04/19/2001	RADIUM-226	0.921	0.298	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41826-U	04/19/2001	RADIUM-226	1.05	0.26	PCI/G
SC-41827-U	04/19/2001	RADIUM-226	0.636	0.268	PCI/G
SC-41828-U	04/26/2001	RADIUM-226	0.858	0.219	PCI/G
SC-41829-U	04/26/2001	RADIUM-226	0.88	0.103	PCI/G
SC-41830-U	04/19/2001	RADIUM-226	1.32	0.369	PCI/G
SC-41831-U	04/19/2001	RADIUM-226	0.804	0.293	PCI/G
SC-41832-U	04/19/2001	RADIUM-226	0.982	0.124	PCI/G
SC-41833-U	04/19/2001	RADIUM-226	0.867	0.169	PCI/G
SC-41834-U	04/19/2001	RADIUM-226	1.07	0.199	PCI/G
SC-41902-S	05/08/2001	RADIUM-226	0.686	0.738	PCI/G
SC-41906-S	05/08/2001	RADIUM-226	0.588	0.497	PCI/G
SC-41907-S	05/08/2001	RADIUM-226	0.482	0.964	PCI/G
SC-41908-S	05/08/2001	RADIUM-226	0.884	0.426	PCI/G
SC-41910-S	05/08/2001	RADIUM-226	0.796	0.354	PCI/G
SC-41911-S	05/08/2001	RADIUM-226	0.334	0.648	PCI/G
SC-41912-S	05/08/2001	RADIUM-226	0.696	0.46	PCI/G
SC-41913-S	05/08/2001	RADIUM-226	1.04	0.368	PCI/G
SC-41915-S	05/08/2001	RADIUM-226	0.591	0.957	PCI/G
SC-41916-C	05/08/2001	RADIUM-226	1.05	0.421	PCI/G
SC-41916-S	05/08/2001	RADIUM-226	0.995	0.382	PCI/G
SC-41917-C	05/08/2001	RADIUM-226	0.757	0.927	PCI/G
SC-41918-C	05/08/2001	RADIUM-226	1.04	0.41	PCI/G
SC-41920-C	05/08/2001	RADIUM-226	0.779	0.318	PCI/G
SC-41921-C	05/08/2001	RADIUM-226	0.796	0.419	PCI/G
SC-41922-C	05/08/2001	RADIUM-226	0.624	0.297	PCI/G
SC-41928-U	05/08/2001	RADIUM-226	0.873	0.424	PCI/G
SC-41929-U	05/08/2001	RADIUM-226	1.06	0.41	PCI/G
SC-41930-U	05/08/2001	RADIUM-226	0.546	1.01	PCI/G
SC-41931-U	05/08/2001	RADIUM-226	1.22	0.351	PCI/G
SC-41932-U	05/08/2001	RADIUM-226	1.15	1.17	PCI/G
SC-41933-U	05/08/2001	RADIUM-226	0.992	0.374	PCI/G
SC-41934-U	05/08/2001	RADIUM-226	1.01	0.3	PCI/G
SC-41935-U	05/08/2001	RADIUM-226	0.507	1.09	PCI/G
SC-41936-U	05/08/2001	RADIUM-226	1.05	0.567	PCI/G
SC-42002-S	06/05/2001	RADIUM-226	0.714	0.288	PCI/G
SC-42003-S	06/05/2001	RADIUM-226	0.792	0.23	PCI/G
SC-42004-S	06/05/2001	RADIUM-226	0.745	0.278	PCI/G
SC-42007-S	06/05/2001	RADIUM-226	0.823	0.251	PCI/G
SC-42008-S	06/05/2001	RADIUM-226	0.771	0.147	PCI/G
SC-42009-S	06/05/2001	RADIUM-226	0.781	0.246	PCI/G
SC-42010-S	06/05/2001	RADIUM-226	0.843	0.203	PCI/G
SC-42011-S	06/05/2001	RADIUM-226	0.851	0.128	PCI/G
SC-42015-S	06/05/2001	RADIUM-226	0.694	0.19	PCI/G
SC-42016-S	06/05/2001	RADIUM-226	1.09	0.202	PCI/G
SC-42017-S	06/05/2001	RADIUM-226	1.04	0.239	PCI/G
SC-42018-S	06/05/2001	RADIUM-226	0.645	0.223	PCI/G
SC-42019-S	06/05/2001	RADIUM-226	0.7	0.381	PCI/G
SC-42020-S	06/05/2001	RADIUM-226	0.795	0.432	PCI/G
SC-42021-S	06/05/2001	RADIUM-226	0.586	0.438	PCI/G
SC-42024-S	06/05/2001	RADIUM-226	0.761	0.577	PCI/G
SC-42025-S	06/05/2001	RADIUM-226	0.858	0.335	PCI/G
SC-42026-S	06/05/2001	RADIUM-226	0.955	0.411	PCI/G
SC-42027-S	06/05/2001	RADIUM-226	0.896	0.427	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-42028-S	06/05/2001	RADIUM-226	0.941	0.48	PCI/G
SC-42029-S	06/05/2001	RADIUM-226	0.587	0.428	PCI/G
SC-42030-S	06/05/2001	RADIUM-226	1.06	0.455	PCI/G
SC-42031-S	06/05/2001	RADIUM-226	0.532	0.329	PCI/G
SC-42034-S	06/05/2001	RADIUM-226	0.847	0.412	PCI/G
SC-42035-S	06/05/2001	RADIUM-226	0.905	0.446	PCI/G
SC-42036-S	06/05/2001	RADIUM-226	0.858	0.312	PCI/G
SC-42037-S	06/05/2001	RADIUM-226	1.11	0.431	PCI/G
SC-42038-S	06/05/2001	RADIUM-226	0.879	0.445	PCI/G
SC-42042-S	06/05/2001	RADIUM-226	0.405	0.427	PCI/G
SC-42043-S	06/05/2001	RADIUM-226	0.672	0.476	PCI/G
SC-42044-S	06/05/2001	RADIUM-226	0.664	0.375	PCI/G
SC-42045-S	06/25/2001	RADIUM-226	0.242	0.046	PCI/G
SC-42046-S	06/25/2001	RADIUM-226	0.217	0.044	PCI/G
SC-421002-S	06/24/2002	RADIUM-226	1.22	0.751	PCI/G
SC-421003-S	06/24/2002	RADIUM-226	1.28	0.552	PCI/G
SC-421004-S	06/24/2002	RADIUM-226	0.878	0.375	PCI/G
SC-421005-S	06/24/2002	RADIUM-226	1.02	0.378	PCI/G
SC-421007-S	06/24/2002	RADIUM-226	0.716	0.763	PCI/G
SC-421008-S	06/24/2002	RADIUM-226	0.859	0.574	PCI/G
SC-421009-S	06/24/2002	RADIUM-226	0.873	0.379	PCI/G
SC-421010-S	06/24/2002	RADIUM-226	0.944	0.623	PCI/G
SC-421012-S	06/24/2002	RADIUM-226	0.866	0.433	PCI/G
SC-421013-S	06/24/2002	RADIUM-226	0.96	0.517	PCI/G
SC-421014-S	06/24/2002	RADIUM-226	0.829	0.633	PCI/G
SC-421015-S	06/24/2002	RADIUM-226	0.887	0.511	PCI/G
SC-421019-S	06/24/2002	RADIUM-226	0.705	0.506	PCI/G
SC-421020-S	06/24/2002	RADIUM-226	0.865	0.638	PCI/G
SC-421021-U	07/11/2002	RADIUM-226	0.606	0.419	PCI/G
SC-421022-U	07/11/2002	RADIUM-226	0.757	0.662	PCI/G
SC-421023-U	07/11/2002	RADIUM-226	0.916	0.351	PCI/G
SC-421024-U	07/11/2002	RADIUM-226	0.838	0.434	PCI/G
SC-421025-U	07/11/2002	RADIUM-226	1.1	0.687	PCI/G
SC-421026-U	07/11/2002	RADIUM-226	0.875	0.311	PCI/G
SC-421027-U	07/15/2002	RADIUM-226	0.786	0.535	PCI/G
SC-421028-U	07/15/2002	RADIUM-226	0.379	0.622	PCI/G
SC-421029-U	06/27/2002	RADIUM-226	0.827	0.173	PCI/G
SC-421030-U	06/27/2002	RADIUM-226	0.674	0.181	PCI/G
SC-421031-U	07/11/2002	RADIUM-226	0.992	0.439	PCI/G
SC-41101-S	08/14/2000	RADIUM-228	1.43	0.791	PCI/G
SC-41102-S	08/14/2000	RADIUM-228	1.32	0.637	PCI/G
SC-41103-S	08/14/2000	RADIUM-228	1.31	0.697	PCI/G
SC-41104-S	08/14/2000	RADIUM-228	1.2	0.47	PCI/G
SC-41107-S	08/14/2000	RADIUM-228	1.36	0.808	PCI/G
SC-41108-S	08/14/2000	RADIUM-228	1.27	0.671	PCI/G
SC-41109-S	08/14/2000	RADIUM-228	1.46	0.765	PCI/G
SC-41110-S	08/14/2000	RADIUM-228	1.5	0.518	PCI/G
SC-41111-S	08/14/2000	RADIUM-228	1.6	0.586	PCI/G
SC-41112-S	08/14/2000	RADIUM-228	1.55	0.943	PCI/G
SC-41113-S	08/14/2000	RADIUM-228	9.47	0.68	PCI/G
SC-41114-S	08/14/2000	RADIUM-228	4.15	0.689	PCI/G
SC-41116-S	08/14/2000	RADIUM-228	2.39	0.669	PCI/G
SC-41117-S	08/14/2000	RADIUM-228	1.23	1.06	PCI/G

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SC-41118-S	08/14/2000	RADIUM-228	1.5	0.642	PCI/G
SC-41119-S	08/14/2000	RADIUM-228	1.57	0.672	PCI/G
SC-41120-S	08/14/2000	RADIUM-228	1.94	1.2	PCI/G
SC-41122-S	08/14/2000	RADIUM-228	1.19	0.777	PCI/G
SC-41123-S	08/14/2000	RADIUM-228	1.31	0.477	PCI/G
SC-41124-S	08/14/2000	RADIUM-228	2.12	1.05	PCI/G
SC-41125-S	08/14/2000	RADIUM-228	1.41	0.61	PCI/G
SC-41127-S	08/14/2000	RADIUM-228	1.15	0.478	PCI/G
SC-41128-S	08/14/2000	RADIUM-228	0.905	1.81	PCI/G
SC-41129-S	08/14/2000	RADIUM-228	1.29	0.69	PCI/G
SC-41131-S	08/14/2000	RADIUM-228	1.89	0.656	PCI/G
SC-41132-S	08/14/2000	RADIUM-228	1.41	1.14	PCI/G
SC-41133-S	08/14/2000	RADIUM-228	1.37	0.932	PCI/G
SC-41135-S	08/14/2000	RADIUM-228	1.18	0.635	PCI/G
SC-41136-S	08/14/2000	RADIUM-228	1.58	1.31	PCI/G
SC-41202-S	07/25/2000	RADIUM-228	0.755	1.51	PCI/G
SC-41203-S	07/25/2000	RADIUM-228	0.294	0.588	PCI/G
SC-41204-S	07/25/2000	RADIUM-228	1.19	0.78	PCI/G
SC-41205-S	07/25/2000	RADIUM-228	1.5	1.21	PCI/G
SC-41206-S	07/25/2000	RADIUM-228	0.571	0.51	PCI/G
SC-41207-S	07/25/2000	RADIUM-228	2.77	0.827	PCI/G
SC-41209-S	07/25/2000	RADIUM-228	0.679	0.735	PCI/G
SC-41210-S	07/25/2000	RADIUM-228	0.627	0.498	PCI/G
SC-41211-S	07/25/2000	RADIUM-228	0.938	0.605	PCI/G
SC-41212-S	07/25/2000	RADIUM-228	0.724	0.807	PCI/G
SC-41213-C	07/25/2000	RADIUM-228	1.36	0.714	PCI/G
SC-41213-S	07/25/2000	RADIUM-228	1.49	0.629	PCI/G
SC-41214-S	07/25/2000	RADIUM-228	1.04	2.08	PCI/G
SC-41215-S	07/25/2000	RADIUM-228	0.431	0.862	PCI/G
SC-41218-S	07/25/2000	RADIUM-228	1.61	0.824	PCI/G
SC-41219-S	07/25/2000	RADIUM-228	0.861	0.779	PCI/G
SC-41220-S	07/25/2000	RADIUM-228	0.923	1.04	PCI/G
SC-41220-C	07/25/2000	RADIUM-228	0.742	0.682	PCI/G
SC-41221-S	07/25/2000	RADIUM-228	1.04	0.834	PCI/G
SC-41221-C	07/25/2000	RADIUM-228	0.74	1.48	PCI/G
SC-41222-C	07/25/2000	RADIUM-228	0.886	0.521	PCI/G
SC-41226-S	07/25/2000	RADIUM-228	1.05	0.741	PCI/G
SC-41226-C	07/25/2000	RADIUM-228	0.786	0.67	PCI/G
SC-41227-C	07/25/2000	RADIUM-228	0.956	0.57	PCI/G
SC-41227-S	07/25/2000	RADIUM-228	0.941	0.534	PCI/G
SC-41301-S	07/20/2000	RADIUM-228	0.42	0.84	PCI/G
SC-41302-S	07/20/2000	RADIUM-228	0.75	0.39	PCI/G
SC-41303-S	07/20/2000	RADIUM-228	0.39	0.78	PCI/G
SC-41304-S	07/20/2000	RADIUM-228	0.81	0.32	PCI/G
SC-41305-S	07/20/2000	RADIUM-228	0.315	0.63	PCI/G
SC-41306-S	07/20/2000	RADIUM-228	0.99	0.38	PCI/G
SC-41307-S	07/20/2000	RADIUM-228	0.36	0.72	PCI/G
SC-41308-S	07/20/2000	RADIUM-228	0.81	0.37	PCI/G
SC-41309-S	07/20/2000	RADIUM-228	1.19	0.36	PCI/G
SC-41310-S	07/20/2000	RADIUM-228	0.64	0.41	PCI/G
SC-41311-S	07/20/2000	RADIUM-228	0.39	0.78	PCI/G
SC-41312-S	07/20/2000	RADIUM-228	0.95	0.33	PCI/G
SC-41313-S	07/20/2000	RADIUM-228	0.405	0.81	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41314-S	07/20/2000	RADIUM-228	0.9	0.3	PCI/G
SC-41315-S	07/20/2000	RADIUM-228	0.37	0.74	PCI/G
SC-41316-S	07/20/2000	RADIUM-228	0.68	0.32	PCI/G
SC-41317-S	07/20/2000	RADIUM-228	0.395	0.79	PCI/G
SC-41318-S	07/20/2000	RADIUM-228	1.18	0.41	PCI/G
SC-41319-S	07/20/2000	RADIUM-228	0.33	0.66	PCI/G
SC-41320-S	07/20/2000	RADIUM-228	0.71	0.29	PCI/G
SC-41321-S	07/20/2000	RADIUM-228	0.41	0.82	PCI/G
SC-41322-S	07/20/2000	RADIUM-228	0.69	0.33	PCI/G
SC-41323-S	07/20/2000	RADIUM-228	0.32	0.64	PCI/G
SC-41324-S	07/20/2000	RADIUM-228	0.6	0.32	PCI/G
SC-41325-S	07/20/2000	RADIUM-228	0.37	0.74	PCI/G
SC-41326-S	07/20/2000	RADIUM-228	1.13	0.34	PCI/G
SC-41327-S	07/20/2000	RADIUM-228	0.395	0.79	PCI/G
SC-41328-S	07/20/2000	RADIUM-228	0.39	0.78	PCI/G
SC-41329-S	07/20/2000	RADIUM-228	0.355	0.71	PCI/G
SC-41330-S	07/20/2000	RADIUM-228	0.93	0.4	PCI/G
SC-41331-S	07/20/2000	RADIUM-228	0.345	0.69	PCI/G
SC-41332-S	07/20/2000	RADIUM-228	0.94	0.33	PCI/G
SC-41333-S	07/20/2000	RADIUM-228	0.33	0.66	PCI/G
SC-41334-S	07/20/2000	RADIUM-228	0.76	0.33	PCI/G
SC-41335-S	07/20/2000	RADIUM-228	0.355	0.71	PCI/G
SC-41601-U	07/25/2000	RADIUM-228	0.934	0.88	PCI/G
SC-41602-U	07/25/2000	RADIUM-228	0.53	1.06	PCI/G
SC-41603-U	04/19/2001	RADIUM-228	1.82	0.751	PCI/G
SC-41604-U	04/19/2001	RADIUM-228	1.01	0.503	PCI/G
SC-41605-U	07/24/2000	RADIUM-228	1.37	0.509	PCI/G
SC-41606-U	07/24/2000	RADIUM-228	0.68	1.36	PCI/G
SC-41607-U	07/22/2000	RADIUM-228	1.18	0.602	PCI/G
SC-41608-U	07/22/2000	RADIUM-228	1.33	0.593	PCI/G
SC-41609-U	07/22/2000	RADIUM-228	1.26	1.32	PCI/G
SC-41610-U	07/22/2000	RADIUM-228	1.46	0.704	PCI/G
SC-41611-U	07/21/2000	RADIUM-228	1.91	0.628	PCI/G
SC-41612-U	07/21/2000	RADIUM-228	1.43	0.536	PCI/G
SC-41613-U	07/21/2000	RADIUM-228	1.19	0.714	PCI/G
SC-41614-U	07/21/2000	RADIUM-228	0.981	0.477	PCI/G
SC-41615-U	07/20/2000	RADIUM-228	1.23	0.604	PCI/G
SC-41616-U	07/20/2000	RADIUM-228	0.878	0.578	PCI/G
SC-41617-U	07/19/2000	RADIUM-228	0.624	0.806	PCI/G
SC-41618-U	07/19/2000	RADIUM-228	0.871	0.459	PCI/G
SC-41619-U	08/03/2000	RADIUM-228	0.39	0.78	PCI/G
SC-41620-U	08/03/2000	RADIUM-228	0.78	0.33	PCI/G
SC-41621-U	08/09/2000	RADIUM-228	0.949	0.737	PCI/G
SC-41622-U	08/09/2000	RADIUM-228	0.858	0.567	PCI/G
SC-41623-U	08/09/2000	RADIUM-228	1.49	0.611	PCI/G
SC-41624-U	08/09/2000	RADIUM-228	1.93	1.09	PCI/G
SC-41625-U	08/09/2000	RADIUM-228	1.49	0.782	PCI/G
SC-41701-S	07/25/2000	RADIUM-228	1.76	0.668	PCI/G
SC-41702-S	07/25/2000	RADIUM-228	0.51	1.02	PCI/G
SC-41703-S	07/25/2000	RADIUM-228	0.936	0.738	PCI/G
SC-41704-S	07/25/2000	RADIUM-228	0.864	0.874	PCI/G
SC-41705-S	07/25/2000	RADIUM-228	1.7	0.635	PCI/G
SC-41706-S	07/25/2000	RADIUM-228	0.72	1.44	PCI/G

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SC-41707-S	07/25/2000	RADIUM-228	1.44	0.844	PCI/G
SC-41708-S	07/25/2000	RADIUM-228	0.781	0.676	PCI/G
SC-41709-S	07/25/2000	RADIUM-228	0.61	0.347	PCI/G
SC-41710-S	07/25/2000	RADIUM-228	0.723	0.177	PCI/G
SC-41711-S	07/25/2000	RADIUM-228	0.91	0.258	PCI/G
SC-41712-S	07/25/2000	RADIUM-228	0.82	0.165	PCI/G
SC-41713-S	07/25/2000	RADIUM-228	0.721	0.126	PCI/G
SC-41714-S	07/25/2000	RADIUM-228	0.932	0.219	PCI/G
SC-41715-S	07/25/2000	RADIUM-228	0.508	0.21	PCI/G
SC-41716-S	07/25/2000	RADIUM-228	0.777	0.2	PCI/G
SC-41717-S	07/25/2000	RADIUM-228	0.44	0.167	PCI/G
SC-41718-S	07/25/2000	RADIUM-228	0.636	0.181	PCI/G
SC-41719-S	07/25/2000	RADIUM-228	0.622	0.16	PCI/G
SC-41720-S	07/25/2000	RADIUM-228	0.767	0.261	PCI/G
SC-41721-S	07/25/2000	RADIUM-228	0.783	0.218	PCI/G
SC-41722-S	07/25/2000	RADIUM-228	0.851	0.197	PCI/G
SC-41723-S	07/25/2000	RADIUM-228	0.549	0.189	PCI/G
SC-41724-S	07/25/2000	RADIUM-228	0.748	0.173	PCI/G
SC-41725-S	07/25/2000	RADIUM-228	0.635	0.197	PCI/G
SC-41802-S	04/26/2001	RADIUM-228	1.01	0.487	PCI/G
SC-41803-S	04/26/2001	RADIUM-228	0.628	0.433	PCI/G
SC-41804-S	04/26/2001	RADIUM-228	0.549	0.78	PCI/G
SC-41805-S	04/26/2001	RADIUM-228	1.14	0.496	PCI/G
SC-41806-S	04/26/2001	RADIUM-228	1.14	0.317	PCI/G
SC-41808-S	04/26/2001	RADIUM-228	0.924	0.309	PCI/G
SC-41809-S	04/26/2001	RADIUM-228	0.969	0.332	PCI/G
SC-41810-S	04/26/2001	RADIUM-228	1.25	0.274	PCI/G
SC-41811-S	04/26/2001	RADIUM-228	1.03	0.312	PCI/G
SC-41812-S	04/26/2001	RADIUM-228	0.787	0.184	PCI/G
SC-41816-S	04/26/2001	RADIUM-228	1.34	0.306	PCI/G
SC-41819-U	04/19/2001	RADIUM-228	1.29	0.829	PCI/G
SC-41820-U	04/19/2001	RADIUM-228	1.47	0.702	PCI/G
SC-41821-U	04/19/2001	RADIUM-228	1.24	0.587	PCI/G
SC-41822-U	04/26/2001	RADIUM-228	1.35	0.324	PCI/G
SC-41823-U	04/26/2001	RADIUM-228	1.15	0.353	PCI/G
SC-41824-U	04/19/2001	RADIUM-228	1.26	0.525	PCI/G
SC-41825-U	04/19/2001	RADIUM-228	1.25	0.429	PCI/G
SC-41826-U	04/19/2001	RADIUM-228	1.01	0.52	PCI/G
SC-41827-U	04/19/2001	RADIUM-228	1.13	0.649	PCI/G
SC-41828-U	04/26/2001	RADIUM-228	0.2625	0.525	PCI/G
SC-41829-U	04/26/2001	RADIUM-228	1.33	0.214	PCI/G
SC-41830-U	04/19/2001	RADIUM-228	1.74	0.664	PCI/G
SC-41831-U	04/19/2001	RADIUM-228	1.02	0.44	PCI/G
SC-41832-U	04/19/2001	RADIUM-228	0.942	0.466	PCI/G
SC-41833-U	04/19/2001	RADIUM-228	1.1	0.332	PCI/G
SC-41834-U	04/19/2001	RADIUM-228	1.63	0.356	PCI/G
SC-41902-S	05/08/2001	RADIUM-228	1.05	2.1	PCI/G
SC-41906-S	05/08/2001	RADIUM-228	0.982	0.825	PCI/G
SC-41907-S	05/08/2001	RADIUM-228	0.478	1.89	PCI/G
SC-41908-S	05/08/2001	RADIUM-228	1.18	0.759	PCI/G
SC-41910-S	05/08/2001	RADIUM-228	1.59	0.781	PCI/G
SC-41911-S	05/08/2001	RADIUM-228	0.895	1.79	PCI/G
SC-41912-S	05/08/2001	RADIUM-228	1.11	0.716	PCI/G

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SC-41913-S	05/08/2001	RADIUM-228	1.16	0.502	PCI/G
SC-41915-S	05/08/2001	RADIUM-228	1.4	2.48	PCI/G
SC-41916-C	05/08/2001	RADIUM-228	1.21	0.71	PCI/G
SC-41916-S	05/08/2001	RADIUM-228	1.43	0.869	PCI/G
SC-41917-C	05/08/2001	RADIUM-228	1.23	1.39	PCI/G
SC-41918-C	05/08/2001	RADIUM-228	1.14	0.906	PCI/G
SC-41920-C	05/08/2001	RADIUM-228	1.08	0.647	PCI/G
SC-41921-C	05/08/2001	RADIUM-228	1.21	0.89	PCI/G
SC-41922-C	05/08/2001	RADIUM-228	1.38	0.448	PCI/G
SC-41928-U	05/08/2001	RADIUM-228	0.77	0.584	PCI/G
SC-41929-U	05/08/2001	RADIUM-228	0.864	0.559	PCI/G
SC-41930-U	05/08/2001	RADIUM-228	0.995	1.99	PCI/G
SC-41931-U	05/08/2001	RADIUM-228	1.35	0.652	PCI/G
SC-41932-U	05/08/2001	RADIUM-228	1.18	1.5	PCI/G
SC-41933-U	05/08/2001	RADIUM-228	1.05	0.901	PCI/G
SC-41934-U	05/08/2001	RADIUM-228	0.729	0.588	PCI/G
SC-41935-U	05/08/2001	RADIUM-228	1.11	1.36	PCI/G
SC-41936-U	05/08/2001	RADIUM-228	0.955	0.565	PCI/G
SC-42002-S	06/05/2001	RADIUM-228	0.946	0.55	PCI/G
SC-42003-S	06/05/2001	RADIUM-228	1.17	0.443	PCI/G
SC-42004-S	06/05/2001	RADIUM-228	1.03	0.546	PCI/G
SC-42007-S	06/05/2001	RADIUM-228	1.02	0.518	PCI/G
SC-42008-S	06/05/2001	RADIUM-228	1.1	0.363	PCI/G
SC-42009-S	06/05/2001	RADIUM-228	1.24	0.608	PCI/G
SC-42010-S	06/05/2001	RADIUM-228	1.32	0.268	PCI/G
SC-42011-S	06/05/2001	RADIUM-228	1.19	0.245	PCI/G
SC-42015-S	06/05/2001	RADIUM-228	1.08	0.288	PCI/G
SC-42016-S	06/05/2001	RADIUM-228	1.25	0.749	PCI/G
SC-42017-S	06/05/2001	RADIUM-228	1.36	0.418	PCI/G
SC-42018-S	06/05/2001	RADIUM-228	1.14	0.543	PCI/G
SC-42019-S	06/05/2001	RADIUM-228	1.08	0.787	PCI/G
SC-42020-S	06/05/2001	RADIUM-228	1.38	0.838	PCI/G
SC-42021-S	06/05/2001	RADIUM-228	0.395	0.533	PCI/G
SC-42024-S	06/05/2001	RADIUM-228	0.935	0.83	PCI/G
SC-42025-S	06/05/2001	RADIUM-228	0.807	0.718	PCI/G
SC-42026-S	06/05/2001	RADIUM-228	0.78	0.881	PCI/G
SC-42027-S	06/05/2001	RADIUM-228	1.12	0.893	PCI/G
SC-42028-S	06/05/2001	RADIUM-228	0.87	0.801	PCI/G
SC-42029-S	06/05/2001	RADIUM-228	1.23	0.426	PCI/G
SC-42030-S	06/05/2001	RADIUM-228	0.892	0.764	PCI/G
SC-42031-S	06/05/2001	RADIUM-228	0.756	0.722	PCI/G
SC-42034-S	06/05/2001	RADIUM-228	0.886	0.786	PCI/G
SC-42035-S	06/05/2001	RADIUM-228	1.21	1.21	PCI/G
SC-42036-S	06/05/2001	RADIUM-228	1.09	0.65	PCI/G
SC-42037-S	06/05/2001	RADIUM-228	1.15	0.881	PCI/G
SC-42038-S	06/05/2001	RADIUM-228	1.01	0.375	PCI/G
SC-42042-S	06/05/2001	RADIUM-228	0.803	0.638	PCI/G
SC-42043-S	06/05/2001	RADIUM-228	0.81	0.927	PCI/G
SC-42044-S	06/05/2001	RADIUM-228	0.6	1.2	PCI/G
SC-42045-S	06/25/2001	RADIUM-228	0.267	0.116	PCI/G
SC-42046-S	06/25/2001	RADIUM-228	0.295	0.067	PCI/G
SC-421002-S	06/24/2002	RADIUM-228	1.12	1.16	PCI/G
SC-421003-S	06/24/2002	RADIUM-228	1.53	0.825	PCI/G

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SC-421004-S	06/24/2002	RADIUM-228	0.755	0.699	PCI/G
SC-421005-S	06/24/2002	RADIUM-228	0.92	0.745	PCI/G
SC-421007-S	06/24/2002	RADIUM-228	1.31	1.52	PCI/G
SC-421008-S	06/24/2002	RADIUM-228	1.19	0.873	PCI/G
SC-421009-S	06/24/2002	RADIUM-228	0.927	0.859	PCI/G
SC-421010-S	06/24/2002	RADIUM-228	1.27	0.867	PCI/G
SC-421012-S	06/24/2002	RADIUM-228	1.1	0.806	PCI/G
SC-421013-S	06/24/2002	RADIUM-228	1.56	0.938	PCI/G
SC-421014-S	06/24/2002	RADIUM-228	1.005	2.01	PCI/G
SC-421015-S	06/24/2002	RADIUM-228	1	0.746	PCI/G
SC-421019-S	06/24/2002	RADIUM-228	1.02	0.669	PCI/G
SC-421020-S	06/24/2002	RADIUM-228	0.935	1.87	PCI/G
SC-421021-U	07/11/2002	RADIUM-228	0.895	0.851	PCI/G
SC-421022-U	07/11/2002	RADIUM-228	1.53	1.32	PCI/G
SC-421023-U	07/11/2002	RADIUM-228	1.3	0.659	PCI/G
SC-421024-U	07/11/2002	RADIUM-228	1.28	1	PCI/G
SC-421025-U	07/11/2002	RADIUM-228	1.03	1.23	PCI/G
SC-421026-U	07/11/2002	RADIUM-228	0.975	0.567	PCI/G
SC-421027-U	07/15/2002	RADIUM-228	0.75	1.5	PCI/G
SC-421028-U	07/15/2002	RADIUM-228	1.17	1.34	PCI/G
SC-421029-U	06/27/2002	RADIUM-228	0.802	0.275	PCI/G
SC-421030-U	06/27/2002	RADIUM-228	0.803	0.329	PCI/G
SC-421031-U	07/11/2002	RADIUM-228	1.12	0.588	PCI/G
SC-41101-S	08/14/2000	THORIUM-230	2.17	0.135	PCI/G
SC-41102-S	08/14/2000	THORIUM-230	3.13	0.137	PCI/G
SC-41103-S	08/14/2000	THORIUM-230	1.31	0.141	PCI/G
SC-41104-S	08/14/2000	THORIUM-230	1.27	0.107	PCI/G
SC-41107-S	08/14/2000	THORIUM-230	4.43	0.144	PCI/G
SC-41108-S	08/14/2000	THORIUM-230	3.27	0.153	PCI/G
SC-41109-S	08/14/2000	THORIUM-230	4.76	0.147	PCI/G
SC-41110-S	08/14/2000	THORIUM-230	2.6	0.191	PCI/G
SC-41111-S	08/14/2000	THORIUM-230	3.92	0.425	PCI/G
SC-41112-S	08/14/2000	THORIUM-230	3.12	0.133	PCI/G
SC-41113-S	08/14/2000	THORIUM-230	77.9	0.152	PCI/G
SC-41114-S	08/14/2000	THORIUM-230	40	0.097	PCI/G
SC-41116-S	08/14/2000	THORIUM-230	16.5	0.169	PCI/G
SC-41117-S	08/14/2000	THORIUM-230	4.9	0.155	PCI/G
SC-41118-S	08/14/2000	THORIUM-230	10.6	0.183	PCI/G
SC-41119-S	08/14/2000	THORIUM-230	2.27	0.461	PCI/G
SC-41120-S	08/14/2000	THORIUM-230	2.62	0.101	PCI/G
SC-41122-S	08/14/2000	THORIUM-230	3.78	0.431	PCI/G
SC-41123-S	08/14/2000	THORIUM-230	2.03	0.894	PCI/G
SC-41124-S	08/14/2000	THORIUM-230	4.69	0.389	PCI/G
SC-41125-S	08/14/2000	THORIUM-230	2.82	0.234	PCI/G
SC-41127-S	08/14/2000	THORIUM-230	8.81	0.176	PCI/G
SC-41127-S-RS	08/25/2000	THORIUM-230	13.1	0.64	PCI/G
SC-41128-S	08/14/2000	THORIUM-230	3.46	0.868	PCI/G
SC-41129-S	08/14/2000	THORIUM-230	5.78	0.213	PCI/G
SC-41131-S	08/14/2000	THORIUM-230	7.13	0.512	PCI/G
SC-41131-S-RS	08/25/2000	THORIUM-230	27.5	0.65	PCI/G
SC-41132-S	08/14/2000	THORIUM-230	2.5	0.428	PCI/G
SC-41133-S	08/14/2000	THORIUM-230	3.78	0.394	PCI/G
SC-41135-S	08/14/2000	THORIUM-230	2.06	0.292	PCI/G

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SC-41136-S	08/14/2000	THORIUM-230	2.46	0.506	PCI/G
SC-41202-S	07/25/2000	THORIUM-230	23.1 1	0.19	PCI/G
SC-41202-S-RS	08/09/2000	THORIUM-230	1.59	0.177	PCI/G
SC-41203-S	07/25/2000	THORIUM-230	5.74	0.228	PCI/G
SC-41204-S	07/25/2000	THORIUM-230	31.7 2	0.712	PCI/G
SC-41204-S-RS	08/09/2000	THORIUM-230	1.6	0.23	PCI/G
SC-41205-S	07/25/2000	THORIUM-230	42.6 3	0.194	PCI/G
SC-41205-S-RS	08/09/2000	THORIUM-230	4.26	0.465	PCI/G
SC-41206-S	07/25/2000	THORIUM-230	32 4	0.245	PCI/G
SC-41206-S-RS	08/09/2000	THORIUM-230	2.33	1.58	PCI/G
SC-41207-S	07/25/2000	THORIUM-230	114 5	0.113	PCI/G
SC-41207-S-RS	08/09/2000	THORIUM-230	4.1	0.253	PCI/G
SC-41209-S	07/25/2000	THORIUM-230	18.9 6	0.245	PCI/G
SC-41209-S-RS	08/09/2000	THORIUM-230	2.61	0.231	PCI/G
SC-41210-S	07/25/2000	THORIUM-230	6.75	0.169	PCI/G
SC-41211-S	07/25/2000	THORIUM-230	3.34	0.265	PCI/G
SC-41212-S	07/25/2000	THORIUM-230	8.41	0.312	PCI/G
SC-41213-C	07/25/2000	THORIUM-230	20.6 7	0.248	PCI/G
SC-41213-S	07/25/2000	THORIUM-230	5.32	0.295	PCI/G
SC-41213-C-RS	08/09/2000	THORIUM-230	3	0.261	PCI/G
SC-41214-S	07/25/2000	THORIUM-230	30.8 8	0.895	PCI/G
SC-41214-S-RS	08/09/2000	THORIUM-230	4.28	0.236	PCI/G
SC-41215-S	07/25/2000	THORIUM-230	3.77	0.414	PCI/G
SC-41218-S	07/25/2000	THORIUM-230	13.2	0.27	PCI/G
SC-41219-S	07/25/2000	THORIUM-230	3.92	0.189	PCI/G
SC-41220-S	07/25/2000	THORIUM-230	3.54	0.31	PCI/G
SC-41220-C	07/25/2000	THORIUM-230	4.22	0.218	PCI/G
SC-41221-C	07/25/2000	THORIUM-230	4.14	0.32	PCI/G
SC-41221-S	07/25/2000	THORIUM-230	1.93	0.202	PCI/G
SC-41222-C	07/25/2000	THORIUM-230	4.66	0.224	PCI/G
SC-41226-S	07/25/2000	THORIUM-230	2.01	0.235	PCI/G
SC-41226-C	07/25/2000	THORIUM-230	2.48	0.133	PCI/G
SC-41227-S	07/25/2000	THORIUM-230	2.79	0.18	PCI/G
SC-41227-C	07/25/2000	THORIUM-230	2.62	0.142	PCI/G
SC-41301-S	07/20/2000	THORIUM-230	0.78	0.65	PCI/G
SC-41302-S	07/20/2000	THORIUM-230	1.12	0.62	PCI/G
SC-41303-S	07/20/2000	THORIUM-230	1.23	0.64	PCI/G
SC-41304-S	07/20/2000	THORIUM-230	1.19	0.64	PCI/G
SC-41305-S	07/20/2000	THORIUM-230	1.24	0.65	PCI/G
SC-41306-S	07/20/2000	THORIUM-230	1.13	0.64	PCI/G
SC-41307-S	07/20/2000	THORIUM-230	1.11	0.65	PCI/G
SC-41308-S	07/20/2000	THORIUM-230	1.11	0.62	PCI/G
SC-41309-S	07/20/2000	THORIUM-230	1.3	0.64	PCI/G
SC-41310-S	07/20/2000	THORIUM-230	2.85	0.64	PCI/G
SC-41311-S	07/20/2000	THORIUM-230	2.11	0.65	PCI/G
SC-41312-S	07/20/2000	THORIUM-230	1.88	0.62	PCI/G
SC-41313-S	07/20/2000	THORIUM-230	1.1	0.64	PCI/G
SC-41314-S	07/20/2000	THORIUM-230	1.42	0.64	PCI/G
SC-41315-S	07/20/2000	THORIUM-230	3.01	0.65	PCI/G
SC-41316-S	07/20/2000	THORIUM-230	1.68	0.62	PCI/G
SC-41317-S	07/20/2000	THORIUM-230	1.29	0.64	PCI/G
SC-41318-S	07/20/2000	THORIUM-230	2.17	0.64	PCI/G
SC-41319-S	07/20/2000	THORIUM-230	2.25	0.65	PCI/G

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SC-41320-S	07/20/2000	THORIUM-230	1.52	0.62	PCI/G
SC-41321-S	07/20/2000	THORIUM-230	1.22	0.64	PCI/G
SC-41322-S	07/20/2000	THORIUM-230	1.13	0.64	PCI/G
SC-41323-S	07/20/2000	THORIUM-230	2.26	0.65	PCI/G
SC-41324-S	07/20/2000	THORIUM-230	1.12	0.62	PCI/G
SC-41325-S	07/20/2000	THORIUM-230	1.29	0.64	PCI/G
SC-41326-S	07/20/2000	THORIUM-230	1.42	0.64	PCI/G
SC-41327-S	07/20/2000	THORIUM-230	1.68	0.64	PCI/G
SC-41328-S	07/20/2000	THORIUM-230	1.86	0.64	PCI/G
SC-41329-S	07/20/2000	THORIUM-230	16.8	0.65	PCI/G
SC-41330-S	07/20/2000	THORIUM-230	1.19	0.62	PCI/G
SC-41331-S	07/20/2000	THORIUM-230	1.52	0.64	PCI/G
SC-41332-S	07/20/2000	THORIUM-230	4.63	0.64	PCI/G
SC-41333-S	07/20/2000	THORIUM-230	0.93	0.65	PCI/G
SC-41334-S	07/20/2000	THORIUM-230	17.7	0.62	PCI/G
SC-41335-S	07/20/2000	THORIUM-230	11.9	0.64	PCI/G
SC-41601-U	07/25/2000	THORIUM-230	2.6	0.09	PCI/G
SC-41602-U	07/25/2000	THORIUM-230	3.1	0.217	PCI/G
SC-41603-U	04/19/2001	THORIUM-230	1.35	0.18	PCI/G
SC-41604-U	04/19/2001	THORIUM-230	1.17	0.354	PCI/G
SC-41605-U	07/24/2000	THORIUM-230	2.35	0.082	PCI/G
SC-41606-U	07/24/2000	THORIUM-230	2.27	0.06	PCI/G
SC-41607-U	07/22/2000	THORIUM-230	2.49	0.058	PCI/G
SC-41608-U	07/22/2000	THORIUM-230	1.75	0.153	PCI/G
SC-41609-U	07/22/2000	THORIUM-230	5.48	0.076	PCI/G
SC-41610-U	07/22/2000	THORIUM-230	3	0.081	PCI/G
SC-41611-U	07/21/2000	THORIUM-230	3.46	0.513	PCI/G
SC-41612-U	07/21/2000	THORIUM-230	1.95	0.294	PCI/G
SC-41613-U	07/21/2000	THORIUM-230	1.84	0.272	PCI/G
SC-41614-U	07/21/2000	THORIUM-230	1.02	0.597	PCI/G
SC-41615-U	07/20/2000	THORIUM-230	2.29	0.157	PCI/G
SC-41616-U	07/20/2000	THORIUM-230	2.06	0.151	PCI/G
SC-41617-U	07/19/2000	THORIUM-230	2.16	0.265	PCI/G
SC-41618-U	07/19/2000	THORIUM-230	1.56	0.109	PCI/G
SC-41619-U	08/03/2000	THORIUM-230	1.07	0.65	PCI/G
SC-41620-U	08/03/2000	THORIUM-230	1.3	0.62	PCI/G
SC-41621-U	08/09/2000	THORIUM-230	1.94	0.261	PCI/G
SC-41622-U	08/09/2000	THORIUM-230	2.45	0.203	PCI/G
SC-41623-U	08/09/2000	THORIUM-230	2.51	0.305	PCI/G
SC-41624-U	08/09/2000	THORIUM-230	2.24	0.283	PCI/G
SC-41625-U	08/09/2000	THORIUM-230	1.98	0.2	PCI/G
SC-41701-S	07/25/2000	THORIUM-230	3.03	0.095	PCI/G
SC-41702-S	07/25/2000	THORIUM-230	2.52	0.296	PCI/G
SC-41703-S	07/25/2000	THORIUM-230	2.63	0.229	PCI/G
SC-41704-S	07/25/2000	THORIUM-230	1.09	0.102	PCI/G
SC-41705-S	07/25/2000	THORIUM-230	1.69	0.149	PCI/G
SC-41706-S	07/25/2000	THORIUM-230	0.859	0.241	PCI/G
SC-41707-S	07/25/2000	THORIUM-230	3.09	0.484	PCI/G
SC-41708-S	07/25/2000	THORIUM-230	2.03	0.16	PCI/G
SC-41709-S	07/25/2000	THORIUM-230	1.23	0.145	PCI/G
SC-41710-S	07/25/2000	THORIUM-230	1.7	0.175	PCI/G
SC-41711-S	07/25/2000	THORIUM-230	1.2	0.146	PCI/G
SC-41712-S	07/25/2000	THORIUM-230	1.62	0.191	PCI/G

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SC-41713-S	07/25/2000	THORIUM-230	1.28	0.151	PCI/G
SC-41714-S	07/25/2000	THORIUM-230	1.2	0.163	PCI/G
SC-41715-S	07/25/2000	THORIUM-230	0.981	0.163	PCI/G
SC-41716-S	07/25/2000	THORIUM-230	1.37	0.258	PCI/G
SC-41717-S	07/25/2000	THORIUM-230	1.09	0.148	PCI/G
SC-41718-S	07/25/2000	THORIUM-230	1.3	0.116	PCI/G
SC-41719-S	07/25/2000	THORIUM-230	2.63	0.0584	PCI/G
SC-41720-S	07/25/2000	THORIUM-230	1.47	0.125	PCI/G
SC-41721-S	07/25/2000	THORIUM-230	1.33	0.155	PCI/G
SC-41722-S	07/25/2000	THORIUM-230	1.58	0.0843	PCI/G
SC-41723-S	07/25/2000	THORIUM-230	1.68	0.131	PCI/G
SC-41724-S	07/25/2000	THORIUM-230	2.64	0.105	PCI/G
SC-41725-S	07/25/2000	THORIUM-230	1.9	0.0559	PCI/G
SC-41802-S	04/26/2001	THORIUM-230	1.13	0.113	PCI/G
SC-41803-S	04/26/2001	THORIUM-230	0.82	0.166	PCI/G
SC-41804-S	04/26/2001	THORIUM-230	1.18	0.118	PCI/G
SC-41805-S	04/26/2001	THORIUM-230	0.899	0.177	PCI/G
SC-41806-S	04/26/2001	THORIUM-230	0.901	0.11	PCI/G
SC-41808-S	04/26/2001	THORIUM-230	1.22	0.161	PCI/G
SC-41809-S	04/26/2001	THORIUM-230	0.896	0.1	PCI/G
SC-41810-S	04/26/2001	THORIUM-230	0.948	0.202	PCI/G
SC-41811-S	04/26/2001	THORIUM-230	1.23	0.125	PCI/G
SC-41812-S	04/26/2001	THORIUM-230	0.996	0.175	PCI/G
SC-41816-S	04/26/2001	THORIUM-230	2.14	0.172	PCI/G
SC-41819-U	04/19/2001	THORIUM-230	1.12	0.226	PCI/G
SC-41820-U	04/19/2001	THORIUM-230	0.597	0.323	PCI/G
SC-41821-U	04/19/2001	THORIUM-230	1.59	0.233	PCI/G
SC-41822-U	04/26/2001	THORIUM-230	1.47	0.093	PCI/G
SC-41823-U	04/26/2001	THORIUM-230	0.978	0.119	PCI/G
SC-41824-U	04/19/2001	THORIUM-230	1.13	0.23	PCI/G
SC-41825-U	04/19/2001	THORIUM-230	2.43	0.443	PCI/G
SC-41826-U	04/19/2001	THORIUM-230	0.783	0.257	PCI/G
SC-41827-U	04/19/2001	THORIUM-230	1.38	0.214	PCI/G
SC-41828-U	04/26/2001	THORIUM-230	1.89	0.218	PCI/G
SC-41829-U	04/26/2001	THORIUM-230	1.33	0.142	PCI/G
SC-41830-U	04/19/2001	THORIUM-230	1.32	0.192	PCI/G
SC-41831-U	04/19/2001	THORIUM-230	2.75	0.252	PCI/G
SC-41832-U	04/19/2001	THORIUM-230	1.08	0.192	PCI/G
SC-41833-U	04/19/2001	THORIUM-230	1.58	0.408	PCI/G
SC-41834-U	04/19/2001	THORIUM-230	0.927	0.246	PCI/G
SC-41902-S	05/08/2001	THORIUM-230	1.24	0.393	PCI/G
SC-41906-S	05/08/2001	THORIUM-230	1.69	0.435	PCI/G
SC-41907-S	05/08/2001	THORIUM-230	0.716	0.28	PCI/G
SC-41908-S	05/08/2001	THORIUM-230	1.09	0.34	PCI/G
SC-41910-S	05/08/2001	THORIUM-230	1.59	0.394	PCI/G
SC-41911-S	05/08/2001	THORIUM-230	0.766	0.271	PCI/G
SC-41912-S	05/08/2001	THORIUM-230	1.09	0.352	PCI/G
SC-41913-S	05/08/2001	THORIUM-230	1.57	0.27	PCI/G
SC-41915-S	05/08/2001	THORIUM-230	1.43	0.417	PCI/G
SC-41916-C	05/08/2001	THORIUM-230	2.7	0.411	PCI/G
SC-41916-S	05/08/2001	THORIUM-230	1.57	0.333	PCI/G
SC-41917-C	05/08/2001	THORIUM-230	0.841	0.487	PCI/G
SC-41918-C	05/08/2001	THORIUM-230	1.85	0.726	PCI/G

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SC-41920-C	05/08/2001	THORIUM-230	1.03	0.408	PCI/G
SC-41921-C	05/08/2001	THORIUM-230	1.94	0.444	PCI/G
SC-41922-C	05/08/2001	THORIUM-230	0.97	0.572	PCI/G
SC-41928-U	05/08/2001	THORIUM-230	1.25	0.246	PCI/G
SC-41929-U	05/08/2001	THORIUM-230	0.912	0.524	PCI/G
SC-41930-U	05/08/2001	THORIUM-230	2.01	0.23	PCI/G
SC-41931-U	05/08/2001	THORIUM-230	1.32	0.238	PCI/G
SC-41932-U	05/08/2001	THORIUM-230	1.37	0.391	PCI/G
SC-41933-U	05/08/2001	THORIUM-230	1.06	0.386	PCI/G
SC-41934-U	05/08/2001	THORIUM-230	1.72	0.476	PCI/G
SC-41935-U	05/08/2001	THORIUM-230	0.772	0.395	PCI/G
SC-41936-U	05/08/2001	THORIUM-230	0.976	0.384	PCI/G
SC-42002-S	06/05/2001	THORIUM-230	1.11	0.119	PCI/G
SC-42003-S	06/05/2001	THORIUM-230	0.944	0.054	PCI/G
SC-42004-S	06/05/2001	THORIUM-230	2.29	0.089	PCI/G
SC-42007-S	06/05/2001	THORIUM-230	1.7	0.129	PCI/G
SC-42008-S	06/05/2001	THORIUM-230	1.5	0.083	PCI/G
SC-42009-S	06/05/2001	THORIUM-230	1.41	0.085	PCI/G
SC-42010-S	06/05/2001	THORIUM-230	1.06	0.13	PCI/G
SC-42011-S	06/05/2001	THORIUM-230	1.73	0.136	PCI/G
SC-42015-S	06/05/2001	THORIUM-230	1.69	0.148	PCI/G
SC-42016-S	06/05/2001	THORIUM-230	1.58	0.103	PCI/G
SC-42017-S	06/05/2001	THORIUM-230	1.91	0.08	PCI/G
SC-42018-S	06/05/2001	THORIUM-230	1.41	0.087	PCI/G
SC-42019-S	06/05/2001	THORIUM-230	1.82	0.271	PCI/G
SC-42020-S	06/05/2001	THORIUM-230	1.59	0.092	PCI/G
SC-42021-S	06/05/2001	THORIUM-230	1.69	0.084	PCI/G
SC-42024-S	06/05/2001	THORIUM-230	2	0.098	PCI/G
SC-42025-S	06/05/2001	THORIUM-230	1.01	0.054	PCI/G
SC-42026-S	06/05/2001	THORIUM-230	0.574	0.084	PCI/G
SC-42027-S	06/05/2001	THORIUM-230	0.301	0.053	PCI/G
SC-42028-S	06/05/2001	THORIUM-230	0.953	0.056	PCI/G
SC-42029-S	06/05/2001	THORIUM-230	1.19	0.1	PCI/G
SC-42030-S	06/05/2001	THORIUM-230	0.618	0.118	PCI/G
SC-42031-S	06/05/2001	THORIUM-230	0.922	0.078	PCI/G
SC-42034-S	06/05/2001	THORIUM-230	0.905	0.114	PCI/G
SC-42035-S	06/05/2001	THORIUM-230	0.141	0.114	PCI/G
SC-42036-S	06/05/2001	THORIUM-230	0.902	0.134	PCI/G
SC-42037-S	06/05/2001	THORIUM-230	1.04	0.114	PCI/G
SC-42038-S	06/05/2001	THORIUM-230	1.25	0.074	PCI/G
SC-42042-S	06/05/2001	THORIUM-230	1.15	0.151	PCI/G
SC-42043-S	06/05/2001	THORIUM-230	1.06	0.07	PCI/G
SC-42044-S	06/05/2001	THORIUM-230	3.53	0.159	PCI/G
SC-42045-S	06/25/2001	THORIUM-230	0.865	0.076	PCI/G
SC-42046-S	06/25/2001	THORIUM-230	0.944	0.057	PCI/G
SC-421002-S	06/24/2002	THORIUM-230	0.572	0.496	PCI/G
SC-421003-S	06/24/2002	THORIUM-230	0.247	0.442	PCI/G
SC-421004-S	06/24/2002	THORIUM-230	0.363	0.434	PCI/G
SC-421005-S	06/24/2002	THORIUM-230	0.721	0.477	PCI/G
SC-421007-S	06/24/2002	THORIUM-230	0.361	0.449	PCI/G
SC-421008-S	06/24/2002	THORIUM-230	0.569	0.398	PCI/G
SC-421009-S	06/24/2002	THORIUM-230	0.375	0.469	PCI/G
SC-421010-S	06/24/2002	THORIUM-230	0.412	0.457	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-421012-S	06/24/2002	THORIUM-230	0.52	0.484	PCI/G
SC-421013-S	06/24/2002	THORIUM-230	0.19	0.472	PCI/G
SC-421014-S	06/24/2002	THORIUM-230	0.598	0.537	PCI/G
SC-421015-S	06/24/2002	THORIUM-230	0.379	0.487	PCI/G
SC-421019-S	06/24/2002	THORIUM-230	0.702	0.449	PCI/G
SC-421020-S	06/24/2002	THORIUM-230	2.76	0.42	PCI/G
SC-421021-U	07/11/2002	THORIUM-230	0.513	0.4	PCI/G
SC-421022-U	07/11/2002	THORIUM-230	0.442	0.359	PCI/G
SC-421023-U	07/11/2002	THORIUM-230	0.569	0.381	PCI/G
SC-421024-U	07/11/2002	THORIUM-230	0.513	0.429	PCI/G
SC-421025-U	07/11/2002	THORIUM-230	0.539	0.427	PCI/G
SC-421026-U	07/11/2002	THORIUM-230	0.832	0.395	PCI/G
SC-421027-U	07/15/2002	THORIUM-230	0.253	0.412	PCI/G
SC-421028-U	07/15/2002	THORIUM-230	0.641	0.417	PCI/G
SC-421029-U	06/27/2002	THORIUM-230	0.795	0.153	PCI/G
SC-421030-U	06/27/2002	THORIUM-230	0.534	0.165	PCI/G
SC-421031-U	07/11/2002	THORIUM-230	0.386	0.36	PCI/G
SC-41101-S	08/14/2000	URANIUM-238	0.28	2.63	PCI/G
SC-41102-S	08/14/2000	URANIUM-238	1.61	3.01	PCI/G
SC-41103-S	08/14/2000	URANIUM-238	1.27	2.54	PCI/G
SC-41104-S	08/14/2000	URANIUM-238	1.65	1.65	PCI/G
SC-41107-S	08/14/2000	URANIUM-238	0.96	3.09	PCI/G
SC-41108-S	08/14/2000	URANIUM-238	1.8	3.6	PCI/G
SC-41109-S	08/14/2000	URANIUM-238	1.76	3.17	PCI/G
SC-41110-S	08/14/2000	URANIUM-238	2.25	1.75	PCI/G
SC-41111-S	08/14/2000	URANIUM-238	1.23	2.16	PCI/G
SC-41112-S	08/14/2000	URANIUM-238	0.85	2.32	PCI/G
SC-41113-S	08/14/2000	URANIUM-238	2.74	5.48	PCI/G
SC-41114-S	08/14/2000	URANIUM-238	3.91	3.77	PCI/G
SC-41116-S	08/14/2000	URANIUM-238	3.53	1.83	PCI/G
SC-41117-S	08/14/2000	URANIUM-238	2.44	2.97	PCI/G
SC-41118-S	08/14/2000	URANIUM-238	1.08	2.79	PCI/G
SC-41119-S	08/14/2000	URANIUM-238	1.36	2.54	PCI/G
SC-41120-S	08/14/2000	URANIUM-238	2.56	2.27	PCI/G
SC-41122-S	08/14/2000	URANIUM-238	1.68	3.7	PCI/G
SC-41123-S	08/14/2000	URANIUM-238	2.27	1.73	PCI/G
SC-41124-S	08/14/2000	URANIUM-238	1.46	2.46	PCI/G
SC-41125-S	08/14/2000	URANIUM-238	1.87	3.74	PCI/G
SC-41127-S	08/14/2000	URANIUM-238	0.994	1.5	PCI/G
SC-41128-S	08/14/2000	URANIUM-238	0.584	2.45	PCI/G
SC-41129-S	08/14/2000	URANIUM-238	2.17	3.05	PCI/G
SC-41131-S	08/14/2000	URANIUM-238	1.91	1.84	PCI/G
SC-41132-S	08/14/2000	URANIUM-238	0.522	2.31	PCI/G
SC-41133-S	08/14/2000	URANIUM-238	0.899	3.12	PCI/G
SC-41135-S	08/14/2000	URANIUM-238	1.295	2.59	PCI/G
SC-41136-S	08/14/2000	URANIUM-238	1.86	2.78	PCI/G
SC-41202-S	07/25/2000	URANIUM-238	3.17	4.48	PCI/G
SC-41203-S	07/25/2000	URANIUM-238	2.15	2.19	PCI/G
SC-41204-S	07/25/2000	URANIUM-238	5.86	3.59	PCI/G
SC-41205-S	07/25/2000	URANIUM-238	9.71	3.09	PCI/G
SC-41206-S	07/25/2000	URANIUM-238	8.56	5.7	PCI/G
SC-41207-S	07/25/2000	URANIUM-238	10.1	2.59	PCI/G
SC-41209-S	07/25/2000	URANIUM-238	0.842	2.38	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41210-S	07/25/2000	URANIUM-238	5.33	4.15	PCI/G
SC-41211-S	07/25/2000	URANIUM-238	5.23	2.25	PCI/G
SC-41212-S	07/25/2000	URANIUM-238	2.2	3.29	PCI/G
SC-41213-S	07/25/2000	URANIUM-238	3.35	2.1	PCI/G
SC-41213-C	07/25/2000	URANIUM-238	3.25	4.31	PCI/G
SC-41214-S	07/25/2000	URANIUM-238	3.97	4.76	PCI/G
SC-41215-S	07/25/2000	URANIUM-238	3.15	3.21	PCI/G
SC-41218-S	07/25/2000	URANIUM-238	3.68	2.28	PCI/G
SC-41219-S	07/25/2000	URANIUM-238	0.888	3.44	PCI/G
SC-41220-C	07/25/2000	URANIUM-238	3.28	4.99	PCI/G
SC-41220-S	07/25/2000	URANIUM-238	6.7	4.43	PCI/G
SC-41221-C	07/25/2000	URANIUM-238	2.73	2.79	PCI/G
SC-41221-S	07/25/2000	URANIUM-238	0.498	5.67	PCI/G
SC-41222-C	07/25/2000	URANIUM-238	3.73	6.71	PCI/G
SC-41226-C	07/25/2000	URANIUM-238	1.13	3.37	PCI/G
SC-41226-S	07/25/2000	URANIUM-238	1.915	3.83	PCI/G
SC-41227-C	07/25/2000	URANIUM-238	4.03	2.12	PCI/G
SC-41227-S	07/25/2000	URANIUM-238	2.09	4.18	PCI/G
SC-41301-S	07/20/2000	URANIUM-238	1.12	2.24	PCI/G
SC-41302-S	07/20/2000	URANIUM-238	1.085	2.17	PCI/G
SC-41303-S	07/20/2000	URANIUM-238	1.145	2.29	PCI/G
SC-41304-S	07/20/2000	URANIUM-238	1.025	2.05	PCI/G
SC-41305-S	07/20/2000	URANIUM-238	0.97	1.94	PCI/G
SC-41306-S	07/20/2000	URANIUM-238	1.09	2.18	PCI/G
SC-41307-S	07/20/2000	URANIUM-238	0.945	1.89	PCI/G
SC-41308-S	07/20/2000	URANIUM-238	1.08	2.16	PCI/G
SC-41309-S	07/20/2000	URANIUM-238	1.095	2.19	PCI/G
SC-41310-S	07/20/2000	URANIUM-238	1.015	2.03	PCI/G
SC-41311-S	07/20/2000	URANIUM-238	1.02	2.04	PCI/G
SC-41312-S	07/20/2000	URANIUM-238	1.485	2.97	PCI/G
SC-41313-S	07/20/2000	URANIUM-238	1.095	2.19	PCI/G
SC-41314-S	07/20/2000	URANIUM-238	1.105	2.21	PCI/G
SC-41315-S	07/20/2000	URANIUM-238	1.055	2.11	PCI/G
SC-41316-S	07/20/2000	URANIUM-238	1	2	PCI/G
SC-41317-S	07/20/2000	URANIUM-238	0.89	1.78	PCI/G
SC-41318-S	07/20/2000	URANIUM-238	1.235	2.47	PCI/G
SC-41319-S	07/20/2000	URANIUM-238	0.98	1.96	PCI/G
SC-41320-S	07/20/2000	URANIUM-238	0.995	1.99	PCI/G
SC-41321-S	07/20/2000	URANIUM-238	0.975	1.95	PCI/G
SC-41322-S	07/20/2000	URANIUM-238	1.025	2.05	PCI/G
SC-41323-S	07/20/2000	URANIUM-238	0.85	1.7	PCI/G
SC-41324-S	07/20/2000	URANIUM-238	1.01	2.02	PCI/G
SC-41325-S	07/20/2000	URANIUM-238	1.035	2.07	PCI/G
SC-41326-S	07/20/2000	URANIUM-238	1.145	2.29	PCI/G
SC-41327-S	07/20/2000	URANIUM-238	1.165	2.33	PCI/G
SC-41328-S	07/20/2000	URANIUM-238	1.04	2.08	PCI/G
SC-41329-S	07/20/2000	URANIUM-238	0.975	1.95	PCI/G
SC-41330-S	07/20/2000	URANIUM-238	1.075	2.15	PCI/G
SC-41331-S	07/20/2000	URANIUM-238	0.945	1.89	PCI/G
SC-41332-S	07/20/2000	URANIUM-238	1.13	2.26	PCI/G
SC-41333-S	07/20/2000	URANIUM-238	0.96	1.92	PCI/G
SC-41334-S	07/20/2000	URANIUM-238	1.08	2.16	PCI/G
SC-41335-S	07/20/2000	URANIUM-238	0.99	1.98	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-41601-U	07/25/2000	URANIUM-238	0.858	2.76	PCI/G
SC-41602-U	07/25/2000	URANIUM-238	1.42	2.78	PCI/G
SC-41603-U	04/19/2001	URANIUM-238	0.941	1.8	PCI/G
SC-41604-U	04/19/2001	URANIUM-238	0.496	2.43	PCI/G
SC-41605-U	07/24/2000	URANIUM-238	1.07	2.33	PCI/G
SC-41606-U	07/24/2000	URANIUM-238	2.14	4.35	PCI/G
SC-41607-U	07/22/2000	URANIUM-238	1.18	3.58	PCI/G
SC-41608-U	07/22/2000	URANIUM-238	1.58	3.16	PCI/G
SC-41609-U	07/22/2000	URANIUM-238	1.73	3.91	PCI/G
SC-41610-U	07/22/2000	URANIUM-238	1.46	4.38	PCI/G
SC-41611-U	07/21/2000	URANIUM-238	1.78	1.69	PCI/G
SC-41612-U	07/21/2000	URANIUM-238	0.072	3.93	PCI/G
SC-41613-U	07/21/2000	URANIUM-238	1.48	1.57	PCI/G
SC-41614-U	07/21/2000	URANIUM-238	0.675	4.9	PCI/G
SC-41615-U	07/20/2000	URANIUM-238	1.97	1.81	PCI/G
SC-41616-U	07/20/2000	URANIUM-238	1.18	2.36	PCI/G
SC-41617-U	07/19/2000	URANIUM-238	1.54	3.05	PCI/G
SC-41618-U	07/19/2000	URANIUM-238	1.67	3.34	PCI/G
SC-41619-U	08/03/2000	URANIUM-238	1.08	2.16	PCI/G
SC-41620-U	08/03/2000	URANIUM-238	1.135	2.27	PCI/G
SC-41621-U	08/09/2000	URANIUM-238	1.27	2.54	PCI/G
SC-41622-U	08/09/2000	URANIUM-238	1.685	3.37	PCI/G
SC-41623-U	08/09/2000	URANIUM-238	1.42	1.66	PCI/G
SC-41624-U	08/09/2000	URANIUM-238	2.56	3.09	PCI/G
SC-41625-U	08/09/2000	URANIUM-238	1.75	1.84	PCI/G
SC-41701-S	07/25/2000	URANIUM-238	4.29	2.38	PCI/G
SC-41702-S	07/25/2000	URANIUM-238	2.04	3.33	PCI/G
SC-41703-S	07/25/2000	URANIUM-238	1.38	2.76	PCI/G
SC-41704-S	07/25/2000	URANIUM-238	0.533	3.58	PCI/G
SC-41705-S	07/25/2000	URANIUM-238	2.58	2.39	PCI/G
SC-41706-S	07/25/2000	URANIUM-238	0.821	3.48	PCI/G
SC-41707-S	07/25/2000	URANIUM-238	3.18	4.1	PCI/G
SC-41708-S	07/25/2000	URANIUM-238	1.51	1.7	PCI/G
SC-41709-S	07/25/2000	URANIUM-238	1.74	1.55	PCI/G
SC-41710-S	07/25/2000	URANIUM-238	2.13	0.855	PCI/G
SC-41711-S	07/25/2000	URANIUM-238	0.641	1.33	PCI/G
SC-41712-S	07/25/2000	URANIUM-238	2.1	0.871	PCI/G
SC-41713-S	07/25/2000	URANIUM-238	3.67	0.935	PCI/G
SC-41714-S	07/25/2000	URANIUM-238	0.473	1.3	PCI/G
SC-41715-S	07/25/2000	URANIUM-238	1.28	1.09	PCI/G
SC-41716-S	07/25/2000	URANIUM-238	1.27	0.917	PCI/G
SC-41717-S	07/25/2000	URANIUM-238	1.24	0.873	PCI/G
SC-41718-S	07/25/2000	URANIUM-238	1.44	0.883	PCI/G
SC-41719-S	07/25/2000	URANIUM-238	2.17	0.817	PCI/G
SC-41720-S	07/25/2000	URANIUM-238	1.01	1.24	PCI/G
SC-41721-S	07/25/2000	URANIUM-238	1.46	0.949	PCI/G
SC-41722-S	07/25/2000	URANIUM-238	1.8	0.923	PCI/G
SC-41723-S	07/25/2000	URANIUM-238	1.14	1.02	PCI/G
SC-41724-S	07/25/2000	URANIUM-238	1.46	0.913	PCI/G
SC-41725-S	07/25/2000	URANIUM-238	1.23	0.962	PCI/G
SC-41802-S	04/26/2001	URANIUM-238	1.37	1.18	PCI/G
SC-41803-S	04/26/2001	URANIUM-238	2.39	1.39	PCI/G
SC-41804-S	04/26/2001	URANIUM-238	1.55	1.66	PCI/G

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SC-41805-S	04/26/2001	URANIUM-238	1.54	1.26	PCI/G
SC-41806-S	04/26/2001	URANIUM-238	1.43	0.819	PCI/G
SC-41808-S	04/26/2001	URANIUM-238	1.82	1.09	PCI/G
SC-41809-S	04/26/2001	URANIUM-238	0.99	1.33	PCI/G
SC-41810-S	04/26/2001	URANIUM-238	1.64	0.55	PCI/G
SC-41811-S	04/26/2001	URANIUM-238	1.94	1.35	PCI/G
SC-41812-S	04/26/2001	URANIUM-238	1.39	1.12	PCI/G
SC-41816-S	04/26/2001	URANIUM-238	2.62	1.09	PCI/G
SC-41819-U	04/19/2001	URANIUM-238	2.81	2.53	PCI/G
SC-41820-U	04/19/2001	URANIUM-238	0.955	1.74	PCI/G
SC-41821-U	04/19/2001	URANIUM-238	2.01	1.66	PCI/G
SC-41822-U	04/26/2001	URANIUM-238	2.09	1.07	PCI/G
SC-41823-U	04/26/2001	URANIUM-238	1.38	1.37	PCI/G
SC-41824-U	04/19/2001	URANIUM-238	1.03	1.58	PCI/G
SC-41825-U	04/19/2001	URANIUM-238	2.7	1.56	PCI/G
SC-41826-U	04/19/2001	URANIUM-238	1.03	1.18	PCI/G
SC-41827-U	04/19/2001	URANIUM-238	1.51	1.48	PCI/G
SC-41828-U	04/26/2001	URANIUM-238	1.63	0.748	PCI/G
SC-41829-U	04/26/2001	URANIUM-238	1.74	0.533	PCI/G
SC-41830-U	04/19/2001	URANIUM-238	1.57	1.5	PCI/G
SC-41831-U	04/19/2001	URANIUM-238	3.12	3.09	PCI/G
SC-41832-U	04/19/2001	URANIUM-238	1.73	1.38	PCI/G
SC-41833-U	04/19/2001	URANIUM-238	2.28	1.06	PCI/G
SC-41834-U	04/19/2001	URANIUM-238	1.32	0.796	PCI/G
SC-41902-S	05/08/2001	URANIUM-238	0.559	5.16	PCI/G
SC-41906-S	05/08/2001	URANIUM-238	3.09	2.74	PCI/G
SC-41907-S	05/08/2001	URANIUM-238	2.11	5.11	PCI/G
SC-41908-S	05/08/2001	URANIUM-238	2.11	4.22	PCI/G
SC-41910-S	05/08/2001	URANIUM-238	0.964	1.98	PCI/G
SC-41911-S	05/08/2001	URANIUM-238	3.3	5.56	PCI/G
SC-41912-S	05/08/2001	URANIUM-238	2.31	4.04	PCI/G
SC-41913-S	05/08/2001	URANIUM-238	1.46	1.98	PCI/G
SC-41915-S	05/08/2001	URANIUM-238	0.932	3.98	PCI/G
SC-41916-C	05/08/2001	URANIUM-238	2.065	4.13	PCI/G
SC-41916-S	05/08/2001	URANIUM-238	0.871	2.22	PCI/G
SC-41917-C	05/08/2001	URANIUM-238	1.43	3.85	PCI/G
SC-41918-C	05/08/2001	URANIUM-238	2.33	4.66	PCI/G
SC-41920-C	05/08/2001	URANIUM-238	1.25	1.83	PCI/G
SC-41921-C	05/08/2001	URANIUM-238	2.1	4.27	PCI/G
SC-41922-C	05/08/2001	URANIUM-238	1.475	2.95	PCI/G
SC-41928-U	05/08/2001	URANIUM-238	3.87	3.26	PCI/G
SC-41929-U	05/08/2001	URANIUM-238	1.47	1.75	PCI/G
SC-41930-U	05/08/2001	URANIUM-238	2.02	4.04	PCI/G
SC-41931-U	05/08/2001	URANIUM-238	1.8	1.84	PCI/G
SC-41932-U	05/08/2001	URANIUM-238	0.805	4.23	PCI/G
SC-41933-U	05/08/2001	URANIUM-238	2.19	4.38	PCI/G
SC-41934-U	05/08/2001	URANIUM-238	1.01	2.47	PCI/G
SC-41935-U	05/08/2001	URANIUM-238	1.58	3.43	PCI/G
SC-41936-U	05/08/2001	URANIUM-238	2	1.27	PCI/G
SC-42002-S	06/05/2001	URANIUM-238	1.82	1.45	PCI/G
SC-42003-S	06/05/2001	URANIUM-238	1.61	1.13	PCI/G
SC-42004-S	06/05/2001	URANIUM-238	3.41	3.82	PCI/G
SC-42007-S	06/05/2001	URANIUM-238	2.23	1.64	PCI/G

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SC-42008-S	06/05/2001	URANIUM-238	2.01	1.45	PCI/G
SC-42009-S	06/05/2001	URANIUM-238	1.79	1.28	PCI/G
SC-42010-S	06/05/2001	URANIUM-238	1.69	0.769	PCI/G
SC-42011-S	06/05/2001	URANIUM-238	2.83	0.866	PCI/G
SC-42015-S	06/05/2001	URANIUM-238	1.35	0.988	PCI/G
SC-42016-S	06/05/2001	URANIUM-238	3.3	2.6	PCI/G
SC-42017-S	06/05/2001	URANIUM-238	2.52	2.49	PCI/G
SC-42018-S	06/05/2001	URANIUM-238	2.31	1.34	PCI/G
SC-42019-S	06/05/2001	URANIUM-238	1.35	3.93	PCI/G
SC-42020-S	06/05/2001	URANIUM-238	1.59	2.35	PCI/G
SC-42021-S	06/05/2001	URANIUM-238	1.885	3.77	PCI/G
SC-42024-S	06/05/2001	URANIUM-238	1.495	2.99	PCI/G
SC-42025-S	06/05/2001	URANIUM-238	2.155	4.31	PCI/G
SC-42026-S	06/05/2001	URANIUM-238	1.36	1.75	PCI/G
SC-42027-S	06/05/2001	URANIUM-238	2.09	2.17	PCI/G
SC-42028-S	06/05/2001	URANIUM-238	2.3	3.29	PCI/G
SC-42029-S	06/05/2001	URANIUM-238	0.828	1.51	PCI/G
SC-42030-S	06/05/2001	URANIUM-238	1.14	4.12	PCI/G
SC-42031-S	06/05/2001	URANIUM-238	1.34	2.68	PCI/G
SC-42034-S	06/05/2001	URANIUM-238	14.5	3.48	PCI/G
SC-42035-S	06/05/2001	URANIUM-238	1.95	3.71	PCI/G
SC-42036-S	06/05/2001	URANIUM-238	2.035	4.07	PCI/G
SC-42037-S	06/05/2001	URANIUM-238	2.31	4.62	PCI/G
SC-42038-S	06/05/2001	URANIUM-238	1.83	2.12	PCI/G
SC-42042-S	06/05/2001	URANIUM-238	1.95	3.9	PCI/G
SC-42043-S	06/05/2001	URANIUM-238	1.33	2.62	PCI/G
SC-42044-S	06/05/2001	URANIUM-238	7.79	4.74	PCI/G
SC-42045-S	06/25/2001	URANIUM-238	2.46	0.58	PCI/G
SC-42046-S	06/25/2001	URANIUM-238	2.59	0.304	PCI/G
SC-421002-S	06/24/2002	URANIUM-238	1.985	3.97	PCI/G
SC-421003-S	06/24/2002	URANIUM-238	2.515	5.03	PCI/G
SC-421004-S	06/24/2002	URANIUM-238	0.461	1.86	PCI/G
SC-421005-S	06/24/2002	URANIUM-238	0.335	2.58	PCI/G
SC-421007-S	06/24/2002	URANIUM-238	1.855	3.71	PCI/G
SC-421008-S	06/24/2002	URANIUM-238	1.53	2.23	PCI/G
SC-421009-S	06/24/2002	URANIUM-238	1.27	2.54	PCI/G
SC-421010-S	06/24/2002	URANIUM-238	1.81	3.33	PCI/G
SC-421012-S	06/24/2002	URANIUM-238	1.28	2.56	PCI/G
SC-421013-S	06/24/2002	URANIUM-238	1.32	2.64	PCI/G
SC-421014-S	06/24/2002	URANIUM-238	0.805	3.07	PCI/G
SC-421015-S	06/24/2002	URANIUM-238	2.19	4.54	PCI/G
SC-421019-S	06/24/2002	URANIUM-238	1.63	2.14	PCI/G
SC-421020-S	06/24/2002	URANIUM-238	1.02	2.26	PCI/G
SC-421021-U	07/11/2002	URANIUM-238	1.2	2.4	PCI/G
SC-421022-U	07/11/2002	URANIUM-238	0.368	2.46	PCI/G
SC-421023-U	07/11/2002	URANIUM-238	1.635	3.27	PCI/G
SC-421024-U	07/11/2002	URANIUM-238	0.28	1.77	PCI/G
SC-421025-U	07/11/2002	URANIUM-238	0.375	2.17	PCI/G
SC-421026-U	07/11/2002	URANIUM-238	1.67	3.34	PCI/G
SC-421027-U	07/15/2002	URANIUM-238	1.76	3.52	PCI/G
SC-421028-U	07/15/2002	URANIUM-238	2.05	4.1	PCI/G
SC-421029-U	06/27/2002	URANIUM-238	1.54	1.66	PCI/G
SC-421030-U	06/27/2002	URANIUM-238	0.74	0.895	PCI/G

WSSRAP_ID	DATE SAMPLED	PARAMETER	CONC	DL	UNITS
SC-421031-U	07/11/2002	URANIUM-238	1.87	3.74	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-41612-U-DU	7/21/2000	RADIUM-226	1.15	0.514	PCI/G
SC-41612-U-DU	7/21/2000	RADIUM-228	1.62	1.33	PCI/G
SC-41612-U-DU	7/21/2000	THORIUM-228	(1.02)	1.09	PCI/G
SC-41612-U-DU	7/21/2000	THORIUM-230	1.82	0.956	PCI/G
SC-41612-U-DU	7/21/2000	THORIUM-232	3.12	0.436	PCI/G
SC-41612-U-DU	7/21/2000	URANIUM-238	(1.81)	2.78	PCI/G
SC-41612-U-EB	7/27/2000	RADIUM-226	(0.017)	0.167	PCI/L
SC-41612-U-EB	7/27/2000	RADIUM-228	ND	0.469	PCI/L
SC-41612-U-EB	7/27/2000	THORIUM-228	(0.081)	0.102	PCI/L
SC-41612-U-EB	7/27/2000	THORIUM-230	0.823	0.194	PCI/L
SC-41612-U-EB	7/27/2000	THORIUM-232	0.306	0.044	PCI/L
SC-41612-U-EB	7/27/2000	URANIUM-234	1.01	0.254	PCI/L
SC-41612-U-EB	7/27/2000	URANIUM-235	(0.040)	0.168	PCI/L
SC-41612-U-EB	7/27/2000	URANIUM-238	0.262	0.193	PCI/L
SC-41612-U-FR	7/21/2000	RADIUM-226	1.01	0.487	PCI/G
SC-41612-U-FR	7/21/2000	RADIUM-228	1.74	1.00	PCI/G
SC-41612-U-FR	7/21/2000	THORIUM-228	0.844	0.214	PCI/G
SC-41612-U-FR	7/21/2000	THORIUM-230	1.61	0.103	PCI/G
SC-41612-U-FR	7/21/2000	THORIUM-232	1.11	0.103	PCI/G
SC-41612-U-FR	7/21/2000	URANIUM-238	(1.46)	2.99	PCI/G
SC-41612-U-MS	7/21/2000	THORIUM-228	5.01	0.157	PCI/G
SC-41612-U-MS	7/21/2000	THORIUM-232	5.82	0.071	PCI/G
SC-41623-U-DU	8/9/2000	RADIUM-226	0.857	0.605	PCI/G
SC-41623-U-DU	8/9/2000	RADIUM-228	2.07	1.24	PCI/G
SC-41623-U-DU	8/9/2000	THORIUM-230	1.61	0.141	PCI/G
SC-41623-U-DU	8/9/2000	URANIUM-238	(1.55)	2.68	PCI/G
SC-41623-U-FR	8/9/2000	RADIUM-226	0.977	0.410	PCI/G
SC-41623-U-FR	8/9/2000	RADIUM-228	1.58	0.388	PCI/G
SC-41623-U-FR	8/9/2000	THORIUM-230	4.25	0.820	PCI/G
SC-41623-U-FR	8/9/2000	URANIUM-238	ND	2.92	PCI/G
SC-41623-U-MS	8/9/2000	THORIUM-230	3.45	0.195	PCI/G
SC-41701-S-DU	7/25/2000	RADIUM-226	1.40	0.740	PCI/G
SC-41701-S-DU	7/25/2000	RADIUM-228	1.19	0.944	PCI/G
SC-41701-S-DU	7/25/2000	THORIUM-230	2.79	0.100	PCI/G
SC-41701-S-DU	7/25/2000	URANIUM-238	3.95	3.22	PCI/G
SC-41701-S-EB	7/27/2000	RADIUM-226	ND	0.215	PCI/L
SC-41701-S-EB	7/27/2000	RADIUM-228	ND	0.469	PCI/L
SC-41701-S-EB	7/27/2000	THORIUM-228	0.510	0.131	PCI/L
SC-41701-S-EB	7/27/2000	THORIUM-230	0.632	0.619	PCI/L
SC-41701-S-EB	7/27/2000	THORIUM-232	0.780	0.154	PCI/L
SC-41701-S-EB	7/27/2000	URANIUM-234	0.458	0.312	PCI/L
SC-41701-S-EB	7/27/2000	URANIUM-235	(0.167)	0.223	PCI/L
SC-41701-S-EB	7/27/2000	URANIUM-238	(0.146)	0.243	PCI/L
SC-41701-S-FR	7/25/2000	RADIUM-226	1.04	0.785	PCI/G
SC-41701-S-FR	7/25/2000	RADIUM-228	ND	1.59	PCI/G
SC-41701-S-FR	7/25/2000	THORIUM-230	2.78	0.284	PCI/G
SC-41701-S-FR	7/25/2000	URANIUM-238	(2.08)	3.46	PCI/G
SC-41701-S-MS	7/25/2000	THORIUM-230	2.75	0.087	PCI/G

SC-41725-S-DU	7/25/2000	RADIUM-226	0.668	0.103	PCI/G
SC-41725-S-DU	7/25/2000	RADIUM-228	0.836	0.146	PCI/G
SC-41725-S-DU	7/25/2000	THORIUM-228	1.07	0.177	PCI/G
SC-41725-S-DU	7/25/2000	THORIUM-230	1.43	0.0462	PCI/G
SC-41725-S-DU	7/25/2000	THORIUM-232	1.01	0.112	PCI/G
SC-41725-S-DU	7/25/2000	URANIUM-238	1.55	0.943	PCI/G
SC-41725-S-EB	7/27/2000	RADIUM-226	(0.024)	0.227	PCI/L
SC-41725-S-EB	7/27/2000	RADIUM-228	ND	0.469	PCI/L
SC-41725-S-EB	7/27/2000	THORIUM-228	ND	0.398	PCI/L
SC-41725-S-EB	7/27/2000	THORIUM-230	0.610	0.185	PCI/L
SC-41725-S-EB	7/27/2000	THORIUM-232	(0.016)	0.185	PCI/L
SC-41725-S-EB	7/27/2000	URANIUM-234	0.590	0.177	PCI/L
SC-41725-S-EB	7/27/2000	URANIUM-235	0.203	0.198	PCI/L
SC-41725-S-EB	7/27/2000	URANIUM-238	0.332	0.154	PCI/L
SC-41725-S-FR	7/25/2000	RADIUM-226	0.639	0.109	PCI/G
SC-41725-S-FR	7/25/2000	RADIUM-228	0.768	0.227	PCI/G
SC-41725-S-FR	7/25/2000	THORIUM-228	1.05	0.101	PCI/G
SC-41725-S-FR	7/25/2000	THORIUM-230	1.13	0.101	PCI/G
SC-41725-S-FR	7/25/2000	THORIUM-232	0.987	0.0418	PCI/G
SC-41725-S-FR	7/25/2000	URANIUM-238	(0.855)	1.01	PCI/G
SC-41725-S-MS	7/25/2000	THORIUM-228	5.96	0.155	PCI/G
SC-41725-S-MS	7/25/2000	THORIUM-230	6.63	0.115	PCI/G
SC-41725-S-MS	7/25/2000	THORIUM-232	5.48	0.167	PCI/G
SC-41820-U-DU	4/19/2001	RADIUM-226	0.943	0.298	PCI/G
SC-41820-U-DU	4/19/2001	RADIUM-228	1.40	0.514	PCI/G
SC-41820-U-DU	4/19/2001	THORIUM-228	0.416	0.114	PCI/G
SC-41820-U-DU	4/19/2001	THORIUM-230	1.25	0.239	PCI/G
SC-41820-U-DU	4/19/2001	THORIUM-232	0.625	0.159	PCI/G
SC-41820-U-DU	4/19/2001	URANIUM-238	(0.781)	1.98	PCI/G
SC-41820-U-MS	4/19/2001	THORIUM-228	9.83	0.118	PCI/G
SC-41820-U-MS	4/19/2001	THORIUM-230	2.54	0.185	PCI/G
SC-41820-U-MS	4/19/2001	THORIUM-232	10.0	0.171	PCI/G
SC-41911-S-DU	5/8/2001	RADIUM-226	0.592	0.359	PCI/G
SC-41911-S-DU	5/8/2001	RADIUM-228	(0.531)	0.548	PCI/G
SC-41911-S-DU	5/8/2001	THORIUM-228	0.436	0.114	PCI/G
SC-41911-S-DU	5/8/2001	THORIUM-230	1.16	0.307	PCI/G
SC-41911-S-DU	5/8/2001	THORIUM-232	0.349	0.171	PCI/G
SC-41911-S-DU	5/8/2001	URANIUM-238	(1.63)	1.72	PCI/G
SC-41911-S-MS	5/8/2001	THORIUM-228	7.72	0.259	PCI/G
SC-41911-S-MS	5/8/2001	THORIUM-230	1.64	0.328	PCI/G
SC-41911-S-MS	5/8/2001	THORIUM-232	8.33	0.337	PCI/G
SC-42004-S-DU	6/5/2001	RADIUM-226	0.907	0.123	PCI/G
SC-42004-S-DU	6/5/2001	RADIUM-228	1.33	0.265	PCI/G
SC-42004-S-DU	6/5/2001	THORIUM-228	0.497	0.064	PCI/G
SC-42004-S-DU	6/5/2001	THORIUM-230	1.28	0.082	PCI/G
SC-42004-S-DU	6/5/2001	THORIUM-232	0.596	0.082	PCI/G
SC-42004-S-DU	6/5/2001	URANIUM-238	1.27	0.569	PCI/G
SC-42004-S-FR	6/5/2001	RADIUM-226	0.756	0.200	PCI/G
SC-42004-S-FR	6/5/2001	RADIUM-228	1.10	0.391	PCI/G
SC-42004-S-FR	6/5/2001	THORIUM-228	0.510	0.066	PCI/G
SC-42004-S-FR	6/5/2001	THORIUM-230	0.866	0.086	PCI/G
SC-42004-S-FR	6/5/2001	THORIUM-232	0.498	0.086	PCI/G

SC-42004-S-FR	6/5/2001	URANIUM-238	1.75	0.915	PCI/G
SC-42004-S-MS	6/5/2001	THORIUM-228	9.07	0.057	PCI/G
SC-42004-S-MS	6/5/2001	THORIUM-230	2.36	0.086	PCI/G
SC-42004-S-MS	6/5/2001	THORIUM-232	8.59	0.074	PCI/G
SC-42036-S-DU	6/5/2001	RADIUM-226	0.648	0.377	PCI/G
SC-42036-S-DU	6/5/2001	RADIUM-228	ND	1.68	PCI/G
SC-42036-S-DU	6/5/2001	THORIUM-228	0.600	0.165	PCI/G
SC-42036-S-DU	6/5/2001	THORIUM-230	1.66	0.189	PCI/G
SC-42036-S-DU	6/5/2001	THORIUM-232	0.684	0.222	PCI/G
SC-42036-S-DU	6/5/2001	URANIUM-238	7.97	3.11	PCI/G
SC-42036-S-FR	6/5/2001	RADIUM-226	0.831	0.492	PCI/G
SC-42036-S-FR	6/5/2001	RADIUM-228	1.40	1.01	PCI/G
SC-42036-S-FR	6/5/2001	THORIUM-228	0.234	0.051	PCI/G
SC-42036-S-FR	6/5/2001	THORIUM-230	1.17	0.072	PCI/G
SC-42036-S-FR	6/5/2001	THORIUM-232	0.289	0.072	PCI/G
SC-42036-S-FR	6/5/2001	URANIUM-238	(1.59)	1.93	PCI/G
SC-42036-S-MS	6/5/2001	THORIUM-228	10.4	0.070	PCI/G
SC-42036-S-MS	6/5/2001	THORIUM-230	2.27	0.078	PCI/G
SC-42036-S-MS	6/5/2001	THORIUM-232	10.4	0.067	PCI/G
SC-42045-S-DU	6/25/2001	RADIUM-226	0.243	0.066	PCI/G
SC-42045-S-DU	6/25/2001	RADIUM-228	0.301	0.102	PCI/G
SC-42045-S-DU	6/25/2001	THORIUM-228	0.399	0.031	PCI/G
SC-42045-S-DU	6/25/2001	THORIUM-230	1.21	0.044	PCI/G
SC-42045-S-DU	6/25/2001	THORIUM-232	0.337	0.035	PCI/G
SC-42045-S-DU	6/25/2001	URANIUM-238	2.98	0.882	PCI/G
SC-42045-S-FR	6/25/2001	RADIUM-226	0.264	0.060	PCI/G
SC-42045-S-FR	6/25/2001	RADIUM-228	0.266	0.131	PCI/G
SC-42045-S-FR	6/25/2001	THORIUM-228	0.354	0.074	PCI/G
SC-42045-S-FR	6/25/2001	THORIUM-230	0.697	0.107	PCI/G
SC-42045-S-FR	6/25/2001	THORIUM-232	0.351	0.074	PCI/G
SC-42045-S-FR	6/25/2001	URANIUM-238	2.17	0.987	PCI/G
SC-42045-S-MS	6/25/2001	THORIUM-228	9.69	0.053	PCI/G
SC-42045-S-MS	6/25/2001	THORIUM-230	2.24	0.047	PCI/G
SC-42045-S-MS	6/25/2001	THORIUM-232	9.90	0.061	PCI/G
SC-421031-U-DU	7/11/2002	RADIUM-226	0.575	0.272	PCI/G
SC-421031-U-DU	7/11/2002	RADIUM-228	0.691	0.577	PCI/G
SC-421031-U-DU	7/11/2002	THORIUM-228	0.324	0.072	PCI/G
SC-421031-U-DU	7/11/2002	THORIUM-230	(0.184)	0.360	PCI/G
SC-421031-U-DU	7/11/2002	THORIUM-232	0.438	0.106	PCI/G
SC-421031-U-DU	7/11/2002	URANIUM-238	ND	3.00	PCI/G
SC-421031-U-MS	7/11/2002	THORIUM-228	4.52	0.118	PCI/G
SC-421031-U-MS	7/11/2002	THORIUM-230	5.53	0.441	PCI/G
SC-421031-U-MS	7/11/2002	THORIUM-232	4.80	0.164	PCI/G

APPENDIX C
Interoffice Correspondence

MORRISON KNUDSEN CORPORATION
Environmental/Government Group

INTER-OFFICE CORRESPONDENCE

DATE: **July 19, 2000**

TO: **Distribution**

FROM: **Rebecca Cato** RCC 7/19/00

SUBJECT: **Addition of New Confirmation Unit (CU 416) to the Quarry Proper (RU 027)**

A new confirmation unit has been created to confirm the contaminated utility trenches being removed under WP-505X. The following utility lines are contained in CU 416:

- Drain lines (2) from the Transfer Station to the Quarry Sump
- Quarry Sump discharge line to the Equalization Basin
- Overflow drain line from the Equalization Basin to the Quarry Sump
- Overflow drain line from Effluent Pond #2 to the Quarry Sump

Due to safety concerns regarding entry into the excavation areas, the field survey and sampling approach for this confirmation unit will be modified from that presented in the *Quarry Proper Confirmation Plan* (Rev. 0). After removal of the piping and the 1-ft envelope of soil and/or sand bedding material, the bottom of the trench will be clean of loose soil or bedding material using the excavator bucket. At each confirmation sampling location, a 6-inch lift of soil will be removed using the excavator and will be scanned using the 2-in x 2-in NaI scintillation detector. If the survey indicates levels greater than 1.5 times site-specific background levels, additional soils will be removed from the trench. If the levels are at or below 1.5 time background, this soil will be used as the confirmation sample. The excavator bucket will be decontaminated and verified clean by ES&H field representatives prior to collection of soil samples.

In order to attain at least 25 samples in this confirmation unit, samples will be collected along the bottom of the trench as shown on Figure 1 (attached). Locations 41605 through 41620 represent samping beneath pipes sited at tow different depths, but within the same trench excavation. Samples will not be collected from the locations where bedrock is encountered at the base of the excavation. Bedrock will likely be encountered at the base of the drain lines from the transfer station to the quarry sump and the western portions of the overflow drain lines from the quarry water treatment plant to the quarry sump. Sample locations have been designated for these portions of the trenches, but likely will not be collected unless soil is encountered at the base of the trench. If 25 samples have not been collected, alternative locations will be designated in the field.

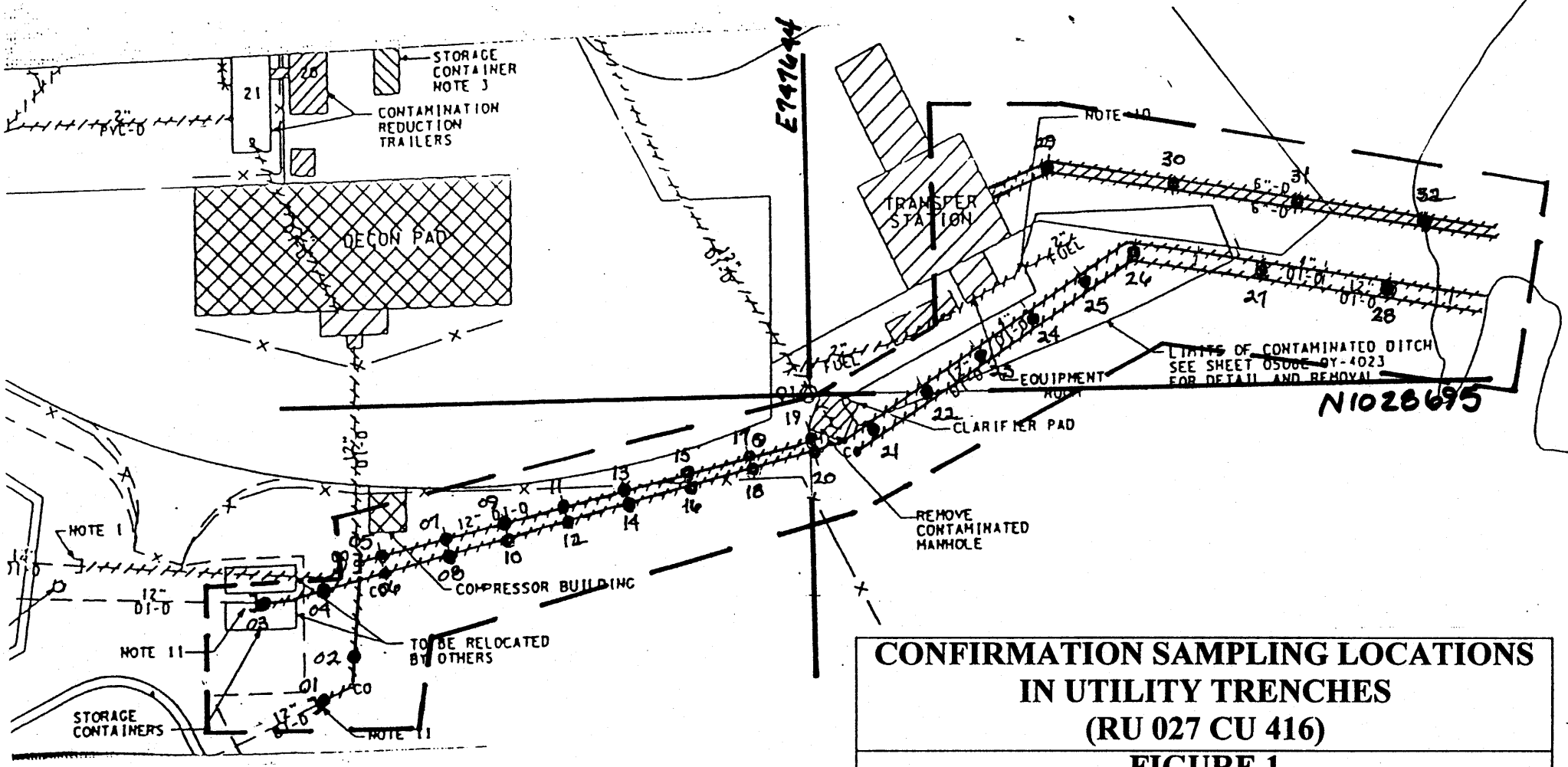
A summary of the proposed sampling locations with respective sample Ids and coordinates is provided in Table 1 (attached). All samples will be analyzed for Ra-226, Ra-228, Th-230, and U-238 and evaluated as outlined in the *Quarry Proper Confirmation Plan* (Rev. 0). Subsurface criteria have been selected for the utility trenches because these area will be backfilled with more than 2-ft of clean fill material at the completion of restoration activities.

If you have any questions or comments, please contact myself at extension 3507.

Attachments: as stated

Distribution:

Gene Valett	Melissa Lutz	Linda Broody
Steve Warren	Eric Ripp	Lee Koehmstedt
Dave Hixson	Clark Oberlag	



CONFIRMATION SAMPLING LOCATIONS IN UTILITY TRENCHES (RU 027 CU 416)	
FIGURE 1	
SCALE: 1 in = 60 ft	7/20/00

QUARRY PROPER CONFIRMATION
CU 416 – WP-505X Utility Trenches

Location	Northing	Easting
SC-41601-U	1028605	747489
SC-41602-U	1028618	747500
SC-41603-U	1028635	747472
SC-41604-U	1028638	747491
SC-41605-U	1028648	747509
SC-41606-U	1028643	747510
SC-41607-U	1028653	747529
SC-41608-U	1028648	747530
SC-41609-U	1028657	747548
SC-41610-U*	1028653	747549
SC-41611-U	1028662	747567
SC-41612-U	1028657	747568
SC-41613-U	1028667	747586
SC-41614-U	1028662	747587
SC-41615-U	1028671	747606
SC-41616-U	1028667	747607
SC-41617-U	1028675	747624
SC-41618-U	1028672	747625
SC-41619-U	1028680	747645
SC-41620-U	1028677	747646
SC-41621-U	1028683	747664
SC-41622-U	1028695	747681
SC-41623-U	1028705	747698
SC-41624-U	1028717	747714
SC-41625-U	1028728	747731
SC-41626-U*	1028737	747746
SC-41627-U*	1028730	747787
SC-41628-U*	1028723	747827
SC-41629-U*	1028765	747719
SC-41630-U*	1028759	747759
SC-41631-U*	1028751	747798
SC-41632-U*	1028745	747838

* It is assumed that piping was trenched into bedrock. Samples will only be collected if soil is present.

MORRISON KNUDSEN CORPORATION
Environmental/Government Group

INTER-OFFICE CORRESPONDENCE

DATE: **July 28, 2000**

TO: **Distribution**

FROM: **Rebecca Cato** RC 7/28/00

SUBJECT: **Addition of New Confirmation Unit (CU 417) to the Quarry Proper (RU 027)**

A new confirmation unit has been created to confirm soil under the clarifier pad (Figure 1). The pad was removed as contaminated material under WP-505X. Walkovers performed after removal of the concrete pad identified two areas exceeding 1.5 times site-specific background.

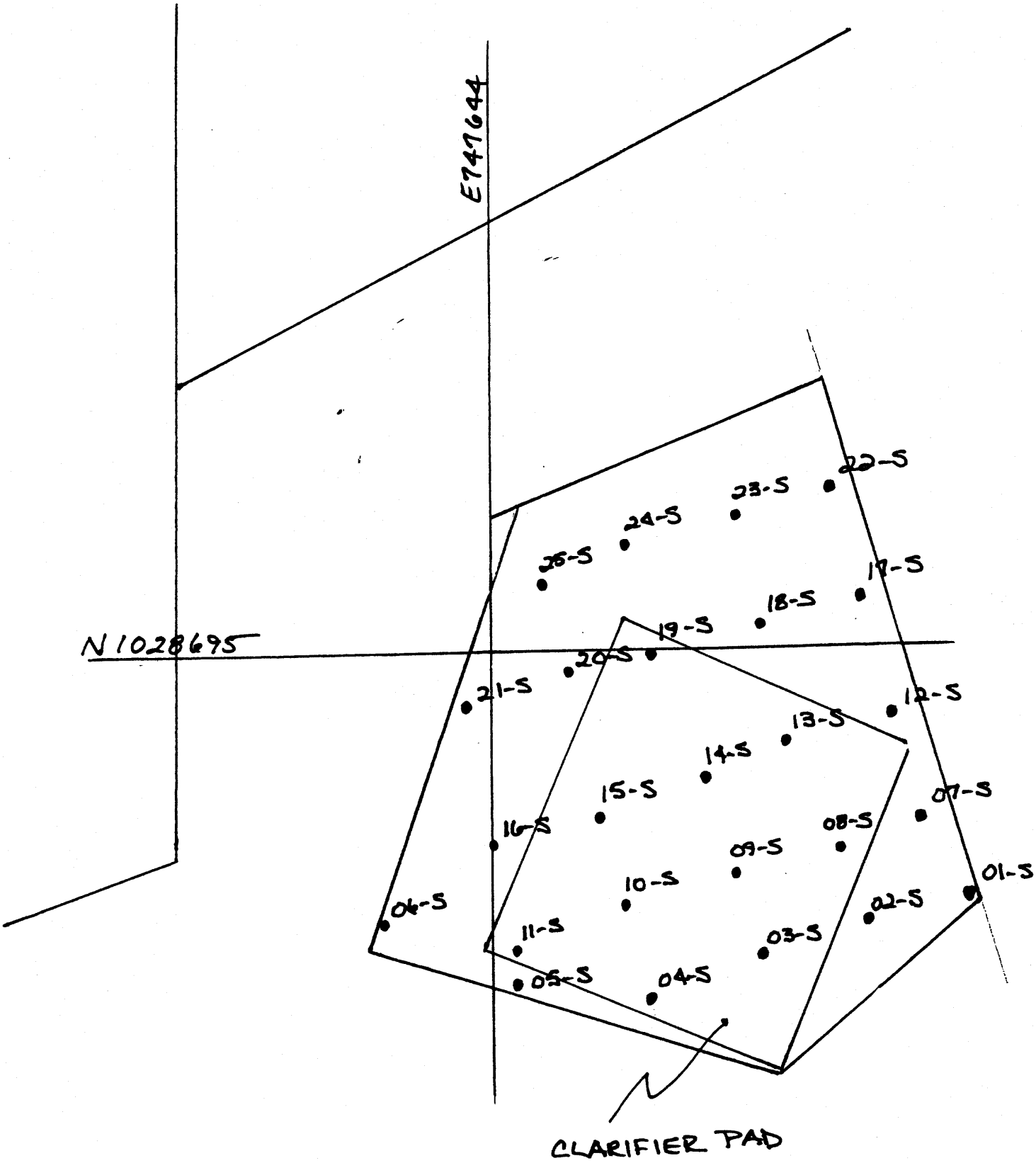
A summary of the sampling locations with respective sample Ids and coordinates is provided in Table 1. All samples will be analyzed for Ra-226, Ra-228, Th-230, and U-238 and evaluated as outlined in the *Quarry Proper Confirmation Plan* (Rev. 0). Subsurface criteria have been selected for the clarifier pad because these area will be backfilled with more than 2-ft of clean fill material at the completion of restoration activities.

If you have any questions or comments, please contact myself at extension 3507.

Attachments: as stated

Distribution:

Gene Valett	Melissa Lutz	Linda Broody
Steve Warren	Eric Ripp	Lee Koehmstedt
Dave Hixson	Clark Oberlag	



CONFIRMATION SAMPLING LOCATIONS IN THE CLARIFIER PAD AREA (RU 027 CU 417)	
FIGURE 1	
SCALE: 1 in = 5 ft	7/28/00

QUARRY PROPER CONFIRMATION
CU 417 – WP-505X Clarifier Pad

Location	Northing	Easting
SC-41701-S	1028686.42	747661.94
SC-41702-S	1028684.74	747658.46
SC-41703-S	1028683.77	747654.34
SC-41704-S	1028682.86	747650.37
SC-41705-S	1028683.22	747645.92
SC-41706-S	1028685.16	747640.63
SC-41707-S	1028689.85	747660.85
SC-41708-S	1028688.40	747657.20
SC-41709-S	1028687.36	747653.28
SC-41710-S	1028686.15	747649.47
SC-41711-S	1028684.86	747645.70
SC-41712-S	1028693.77	747659.58
SC-41713-S	1028692.29	747655.97
SC-41714-S	1028691.20	747652.07
SC-41715-S	1028689.98	747648.27
SC-41716-S	1028688.90	747644.39
SC-41717-S	1028697.39	747658.53
SC-41718-S	1028696.11	747654.77
SC-41719-S	1028694.98	747650.90
SC-41720-S	1028693.77	747647.10
SC-41721-S	1028692.82	747643.14
SC-41722-S	1028701.08	747657.43
SC-41723-S	1028700.01	747653.52
SC-41724-S	1028698.83	747649.68
SC-41725-S	1028697.64	747645.75

MORRISON KNUDSEN CORPORATION
MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: April 27, 1999

TO: Dan Hoffman

FROM: Dave Cowell DC

SUBJECT: RA-226 RECOUNTS

In an effort to eliminate repetitive work, the on-site lab performed a study to determine if recounts 30 days after sealing sample cans was necessary for samples that have background or near background Ra-226 concentrations. As a result of the study, the lab will now only perform Ra-226 recounts for samples that fail the Radium ALARA preliminary calculation.

This calculation will involve multiplying the Ra-226 result by a correction factor of 2.27 (established in an IOC dated 11/17/95) and adding it to the Ra-228 result. If this result is greater than 5 pCi/g then that sample will be held and recounted 30 days later with the intention of reducing the final reported value.

This approach is conservative because the correction factor of 2.27 was established using samples with concentrations of up to 8 pCi/g. Samples having near background concentrations of Ra-226 do not ingrow to that level. Additionally, the correction factor was intended identify samples with Ra-226 levels that could exceed 5 pCi/g and did not account for the contribution from Ra-228, which we will include in this new calculation.

The attached page is included to illustrate the results of the study.

DC/jn

Attachment

Cc: Jim Meier
Steve Warren
Dave Hixson
John Coniglio
Melissa Lutz
Randy Thompson

MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: November 20, 1995

TO: ALARA Committee

FROM: Richard Machado/Michelle French MF

SUBJECT: TH232 DETERMINATION FOR SITE CONFIRMATION SAMPLES

Th232 can occur in two forms at the site: (1) naturally and (2) processed to purify Th232. Both of these forms are subject to the same transformation equation. Given a Th232 half life of 1.39×10^{10} years and a Ra228 half life of 5.75 years, a condition known as secular equilibrium occurs. Secular equilibrium occurs when the half life of the parent is very much greater than that of the daughter. If an initially pure parent (Th232) is formed, its radioactive transformation will result in accumulation of the daughter (Ra228). Since the daughter (Ra228) decays very much faster than the parent (Th232), a point is soon reached at which the amount of parent (Th232) present is equal to that of the daughter (Ra228).

The equation that represents this condition of secular equilibrium is:

$$Q_B = Q_A (1 - e^{-\lambda_B t})$$

where Q_A=parent (Th232) activity, Q_B=daughter (Ra228) activity, t=time since placement of material, and λ_B=decay constant for daughter (Ra228). Therefore, the fraction of daughter activity to parent activity

$$\left(\frac{A\,(RA\text{-}228)}{A\,(Th\text{-}232)}\right)$$

present at the WSSRAP in 1995 can be calculated.

Assume that production ceased at the site on January 1, 1965, and that all Th232 was produced on that very last day (t=30.9 years). Given a half life for Ra228 of 5.75 years, the decay constant would equal

$$(\lambda_B = 0.121\ Y^{-1})$$

Given this information, the ratio of Ra228 activity to Th232 activity can be calculated as follows:

$$\frac{Q_2}{Q_1} = \frac{A\,(Ra\text{-}228)}{A\,(Th\text{-}232)} = 1 - e^{-\lambda_2 t}$$

$$\frac{A\,(Ra228)}{A\,(Th232)} = 1 - e^{-(0.121Y^{-1})\,(30.9Y)} = 1 - 0.024 = 0.976$$

$$\therefore \frac{A\,(Ra\text{-}228)}{A\,(Th\text{-}232)} = 0.976 \quad or \quad A\,(Th\text{-}232) = 1.025\,A\,(Ra\text{-}228)$$

This representation will be true for both naturally occurring Th232 and processed Th232. The other situation to be addressed includes the circumstance when Ra228 and associated decay products were placed as a waste material after purification of Th232. In this situation, the amount of Ra228 present will be much greater than the Th232 present. This information is illustrated in a previous assessment of the ratio of Ra228 concentrations to that of Th232 in raffinate pit wastes. The average ratio was reported as 7.02 in the *Concentration Ratios of Radionuclides* in the U238, U235, and Th232 *Decay Series* (DOE/OR/21548-250), indicating that the average activity concentration for Th232 is 0.14 of the activity concentration for Ra228.

The Record of Decision states that if Th232 and Ra228 are present and not in secular equilibrium, the cleanup criteria apply for the radionuclide with the higher concentration. Thus, for determination of successful cleanup, the use of a Ra-228 ALARA goal of 4.88 pCi/g and a criteria of 6.05 pCi/g will result in removing Th232 to within 5 pCi/g (ALARA) and 6.2 pCi/g (criteria), respectively.

Given this practice, it is recommended that the on-site radiological analyses for Ra-228 concentrations in soil be used to determine attainment of Th-232 cleanup. It is also recommended that 2% of the samples (1 of every 50) that are independently analyzed via an off-site facility be used as a quality check for all radionuclides of interest (U238, Th230, Th232, Ra228, and Ra226). In addition, these numbers should be summarized in post remediation reports for each work package to support the decision to use Ra228 to determine successful cleanup of Th232.

RM/MF/jn

<u>Distribution</u>: ALARA Committee

Steve Warren
Ken Meyer
Ken Greenwell
Jim Meier

Alternates:
Marj Wesley
Jack Cooney
Dan Hoffman
Melissa Lutz

MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: November 17, 1995

TO: ALARA Committee

FROM: Michelle French/Richard Machado

SUBJECT: **RA-226 DETERMINATION FOR SITE CONFIRMATION SAMPLES**

Background

The issue surrounding Ra-226 analysis via gamma spectroscopy arises due to the fact that the Ra-226 soil concentration is determined by using the following energy peaks: 295 keV and 352 keV for Pb-214; and 609 keV, 1120 keV, and 1764 keV for Bi-214. These radionuclides are both short-lived daughters of Rn-222. The drying and grinding processes are known to drive off Rn-222 that is trapped in the soil pores and moisture held in the soil. In order to quantitatively identify Ra-226 using gamma spectroscopy, Rn-222 and its short-lived progeny must be allowed to grow into secular equilibrium following such sample preparation techniques. The following alternatives were evaluated for estimating the Ra-226 concentration in soil given gamma spectroscopy analysis within five working days of sample collection.

Alternative 1

Send all samples requiring Ra-226 analysis to an offsite laboratory. At offsite facilities, Ra-226 is typically analyzed through alpha spectroscopy which does not rely on the Ra-222 daughter products to provide a quantitative result. The minimum turnaround time that can be provided for alpha spectroscopy analysis for Ra-226 is four days. At one and two day turnaround times, the method for analysis is modified to use Gas Flow Proportional Counting for total alpha counting yielding a total radium number with no separation of isotopic contributions. Given the four day turnaround time and an estimate of 750 samples (WP-253 and WP-420), the total analytical costs will be $95,250.

The major disadvantage in this approach is the tight schedule involved with sample collection, packaging, shipping, data receipt, data review, and ALARA committee action. It may be impossible to accomplish this within five working days given the four day turnaround requirement.

Alternative 2

As stated above, the drying and grinding processes are known to drive off radon that is trapped in the soil matrix. However, the amount of radon removed from these processes is not quantified. If you were to assume that all the radon is removed during these processes and the time of final preparation was recorded, a correction factor can be applied based upon the secular equilibrium condition equation. For example, the following table summarizes the ratio of activity of Rn-222 to the activity of Ra-226.

A(Rn-222)/A(Ra-226)	Time Post Canning (Days)
0.167	1
0.306	2
0.422	3
0.665	6
0.807	9
0.888	12
0.935	15
0.963	18
0.978	21
0.987	24
0.993	27
0.996	30

Thus, if the samples were counted three days post canning, a correction factor of 0.422 would be used to determine the estimated final Ra-226 concentration. Given this approach, any concentration determined three days post preparation would be divided by 0.422 to arrive at the final concentration. For a 5 pCi/g ALARA goal, any result above 2.1 pCi/g would be rejected.

The major limitation with this approach is the assumption that the drying and grinding processes remove 100% of the radon. Samples that have been analyzed within one day of preparation have never yielded results much below expected background concentrations (0.8-1.0 pCi/g).

Thus, the use of a correction factor on the order of 0.167 could result in a very conservative approach for estimating the final Ra-226 soil concentration in background soils (in fact all samples analyzed one day after canning would equal or exceed 5 pCi/g).

Alternative 3

All samples that are collected to support confirmation can be analyzed as wet samples to virtually eliminate the radon removal that occurs during sample preparation. However, there are numerous considerations, such as sample homogeneity, particle size, moisture content variability, etc., that can produce error in such analyses. If the samples are analyzed wet, they would also be prepared and analyzed to provide final concentrations for each radionuclide of interest for the sample. This dry evaluation would require an analysis within the confirmation cleanup turnaround period and a second analysis within 20-30 days later to finalize Ra-226 concentrations to an acceptable quality level. This approach would involve three analyses of every sample. The initial wet analysis can be used to estimate the final Ra-226 concentration. However, this estimate must be made on a case by case basis through moisture corrections, etc.

The major limitation for this approach is the reduction in lab productivity as an extra canning effort would be needed to generate a wet and a dry sample for each sample and count time for each sample would increase by a factor of three.

Alternative 4

Over the last several months, the onsite radiological laboratory has been recounting samples that were analyzed during the months of April - September 1995. These reanalyses were done in order to support final analyses of SE Drainage and Quarry characterization samples. The graph on the attached page illustrates a portion of the recount results versus the initial results. The graph includes those samples that had initial Ra-226 results < 5 pCi/g. As illustrated, the background - 2.2 pCi/g sample range had 100% of all sample recounts fall less than 5 pCi/g. For those in the range of 2.2 - 3.2 pCi/g, the likelihood of exceeding 5 pCi/g was approximately 50%. All of the samples with initial results greater than 3.2 pCi/g had final Ra-226 results > 5 pCi/g.

This information can be used to establish a criteria about which samples can be said to meet the ALARA goal of 5 pCi/g within the five working day turnaround window.

Given the current study findings, it is recommended that any sample with an initial Ra-226 result > 2.2 pCi/g be expected to exceed the ALARA goal of 5 pCi/g. In addition, the estimated final Ra-226 soil concentration should be found by multiplying the initial result by 2.27 (2.2 pCi/g x 2.27 = 5 pCi/g). This correction factor is very close to the maximum increase from initial results to recount results (e.g., 2.56) in the background to 2.2 pCi/g concentration range. The average increase from initial results to recount results for this range was 1.51. However, use of a value closer to the maximum value affords less risk in exceeding expected confirmation goals. The laboratory will work to refine these numbers to further minimize the risk as they continue to recount samples collected over the last few months. The major limitation with this alternative is the potential to over excavate, increasing disposal costs.

Alternative 5

This alternative involves a combination of alternatives 3 and 4. Samples that do not have elevated direct survey results via a 2x2 NaI or a 44-9 survey should be prepared and evaluated in accordance with alternative 4. Samples that do have above background survey results will be analyzed wet and evaluated accordingly to determine the estimated final Ra-226 concentration. The sample will then be prepared and analyzed a second time to provide quality level data for the other radionuclides of interest. In addition, each prepared sample would be analyzed within 30 days after preparation to finalize the Ra-226 concentration to an acceptable quality level.

The major limitation with this approach is the loss in productivity as a result of the double canning needs and increased count times for a portion of the samples.

Recommendation

The Onsite Radiological Laboratory recommends the use of alternative 4. This alternative minimizes risk of failing to meet expected cleanup ALARA goals and provides for maximum efficiency/productivity within the laboratory. The second favorable alternative is number 5. This alternative would increase the workload in the laboratory, but would further reduce the risk of over excavation and failure to meet desired cleanup objectives.

In all of the above alternatives, the estimated final Ra-226 concentration will be used in conjunction with the measured Ra-228 concentration as follows to determine if the mixture rule for the ALARA goals as described in the Record of Decision is achieved.

$$\frac{\text{Est. Final Ra-226 (pCi/g)}}{5\ \text{pCi/g}} + \frac{\text{Ra-228 (pCi/g)}}{5\ \text{pCi/g}} = \text{Mixture Ratio}$$

If mixture ratio <= 1, then the sample meets cleanup confirmation design. If mixture ratio > 1, then the sample must be considered by the ALARA committee.

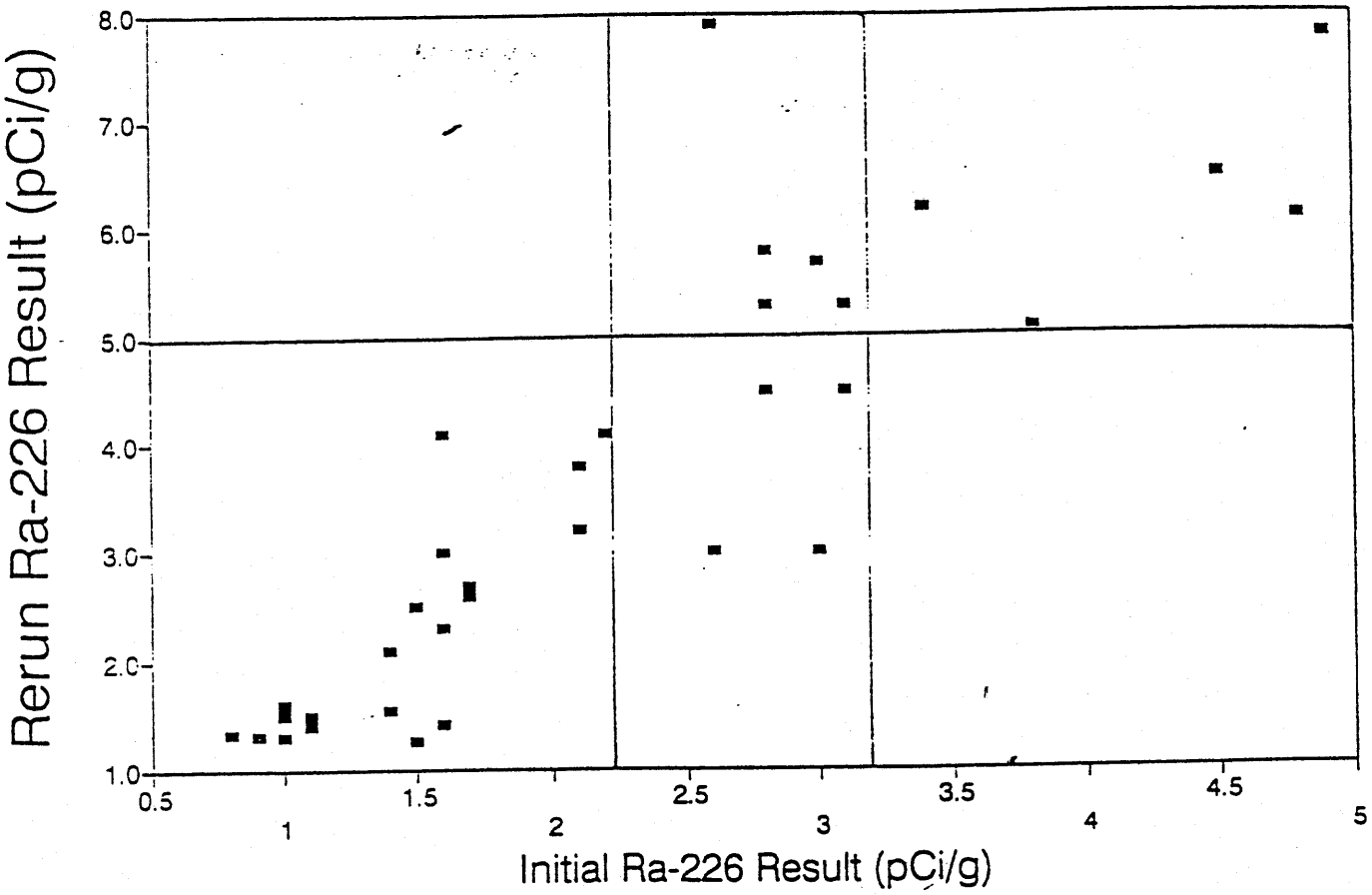
MLF/RM/pr

Attachment

Distribution:

Ken Meyer	Alternates:	Marj Wesley
Steve Warren		Jack Cooney
Ken Greenwell		Dan Hoffman
Jim Meier		

cc: Melissa Lutz

Ra226 Concentration Range

Background - 5.0 pCi/g