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CONTRACT NO. DE-AC05-86OR21548

POST REMEDIAL ACTION REPORT FOR THE ASBESTOS STORAGE AREA (WP-437/RU017)

WELDON SPRING SITE REMEDIAL ACTION PROJECT
WELDON SPRING, MISSOURI

MARCH 2001 **REV. 0**

RECORD

U.S. Department of Energy
Oak Ridge Operations Office
Weldon Spring Site Remedial Action Project

Prepared by MK-Ferguson Company and Jacobs Engineering Group

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MORRISON KNUDSEN CORPORATION MK-FERGUSON GROUP Weldon Spring Site Remedial Action Project Contract No DE-AC05-86OR21548	
	Rev. No. 0
PLAN TITLE: Post Remedial Action Report for the Asbestos Storage Area (WP-437-RU017)	

APPROVALS

Environmental Safety and Health Manager	03/02/01 Date
Data Administration Coordinator	3/5/01 Date
Engineering Manager	3-20-01 Date
Project Quality Manager	3/21/2001 Date
Deputy Project Director	3/22/01 Date

DOE/OR/21548-877

Weldon Spring Site Remedial Action Project

EXECUTIVE SUMMARY

Post Remedial Action Report for the Asbestos Storage Area (WP-437/RU017)

Revision 0

March 2001

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Prepared for

U.S. DEPARTMENT OF ENERGY
Oak Ridge Operations office
Under Contract DE-AC05-86OR21548

EXECUTIVE SUMMARY

Work Package-437 (WP-437) consists of 12 work zones, and due to the magnitude of the work package, separate Post-Remedial Action Reports will address each zone. This report refers specifically to activities in the Asbestos Storage Area (ASA) Work Zone.

Remediation of the Asbestos Storage Area (ASA) was conducted as part of the WP-437 activities. The ASA work zone, designated as RU017, consisted of a 3-acre gravel pad where Sea-Land and roll-off boxes were stored. These boxes had contained both contaminated and uncontaminated materials. RU017 was subdivided into five confirmation units (CUs).

The objective of this remedial action was to ensure that contaminated areas within the ASA work zone (RU017) were remediated to meet the cleanup criteria specified in the ROD. Walkover surveys were conducted and confirmation samples were collected to ensure that remediation of the contaminated areas was complete. Confirmation soil sampling methodology was developed to ensure adequate remediation of contaminants of concern (COCs). COC lists were developed for each CU using characterization sample results and historical process knowledge. COCs identified for RU017 included Radium-226, Radium-228, Thorium-230, Thorium-232, Uranium-238, PAHs, PCBs, arsenic, chromium, lead, and thallium.

Remedial activities for each CU included excavation of a predetermined amount of contaminated soil, radiological walkover surveys, removal of additional soil if necessary, and confirmation sampling. Additional soil was excavated and confirmation samples were collected until preliminary results indicated that remediation activities were completed and COC concentrations were below the cleanup standards. The CU was then released for final grading. Once final analytical results were received, the data were compared to preliminary results to verify that the established cleanup standards were achieved. Independent verification was also conducted by Oak Ridge Institute of Science and Education (ORISE).

A summary of final analytical results for RU017 is presented below. The table was generated using data sets compiled from all samples representing soils left in place.

Summary Totals for RU017

CONTAMINANTS	NO. OF SAMPLES	CONC RANGE	AVERAGE CONC	SURFACE ALARA	SURFACE CRITERIA	RESULTS > ALARA
Arsenic (mg/kg)	11	3.9 – 15.5	8.41	45	75	0
Chromium (mg/kg)	10	11.8 – 18.7	14.1	90	110	0
Lead (mg/kg)	10	7.2 – 18.7	11.86	240	450	0
Thallium (mg/kg)	5	All results < D.L.	N/A	16	20	0
PAHs (mg/kg)	76	0 – 6.65	0.21	0.44	5.6	1
PCBs (mg/kg)	10	0 – 0.51	0.07	0.65	8	0
Ra-226 (pCi/g)	82	0.38 – 2.48	1.29	5	6 2	0
Ra-228 (pCi/g)	82	0.34 – 1.62	1.11	5	6 2	0
Radium, total (pCi/g)	82	1.24 – 3.67	2.39	5	6.2	0
Th-230 (pCi/g)	11	0.32 – 4.24	1.41	5	6.2	0
Th-232 (pCi/g)	11	0.30 – 1.35	0.82	5	6.2	0
U-238 (pCi/g)	110	1.2 – 75.2	5.01	30	120	2

Analytical results generated from remedial activities indicated that average concentrations in RU017 for each COC were below the As Low As Reasonably Achievable (ALARA) goal. For each of the five CUs within RU017, COC averages were also below ALARA with only one exception. The PAH average for CU275 exceeded ALARA, but was below criteria. All 100 m^2 averages were less than criteria.

Remedial activities were completed for RU017. Based on analytical results presented above, all CUs were released in accordance with the cleanup standards stated in the *Chemical Plant Area Cleanup Attainment Confirmation Plan.*

DOE/OR/21548-877

Weldon Spring Site Remedial Action Project

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Revision 0

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ABSTRACT

Work Package-437 (WP-437) has been divided into 12 work zones. This report details confirmation field activities and analytical results for contaminated soil removal at the Asbestos Storage Area portion of WP-437. This 3-acre work zone is further subdivided into five confirmation units.

The Asbestos Storage Area stored primarily asbestos containing materials such as firebrick, filters, tiles, and insulation contained in bags or drums. These materials were contained in closed Sea-Land and roll-off boxes. A structure known as the sand filter was located in the eastern portion of the work zone. This structure was associated with pilot scale operations in Buildings 403 and 404.

Soil characterization results determined that areas within the work zone contained contaminant concentrations that exceeded ALARA goals established in the *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site*. Remediation was designed to achieve surface ALARA goals, and confirmation of soil remediation was required to meet ROD cleanup standards. Final confirmation data verify that the established goals and standards were achieved.

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1. INTRODUCTION

1.1 Purpose

Work Package-437 (WP-437) has been divided into 12 work zones, 11 of which are identified in Figure 1-1. In addition, there is the Vicinity Property DA-6 work zone located off site just west of the Ash Pond work zone. This report details the confirmation field activities and analytical results for contaminated soil removal at the Asbestos Storage Area (ASA) portion of WP-437. The 3-acre ASA work zone is further subdivided into five confirmation units (CUs) that are collectively known as remedial unit (RU) 017 and can be found in Figure 1-2.

The ASA stored primarily asbestos containing materials such as firebrick, filters, tiles, and insulation contained in bags or drums. These materials were contained in closed Sea-Land and roll-off boxes. A structure known as the sand filter was located in the eastern portion of the work zone. This structure was associated with pilot scale operations in Building 403 and 404.

Soil characterization results determined that areas within the work zone contained contaminant concentrations that exceeded the As Low As Reasonably Achievable (ALARA) goals established in the *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site* (ROD) (Ref. 1). Remediation was designed to achieve surface ALARA goals, and confirmation of soil remediation to the ROD cleanup standards was required.

1.2 Scope

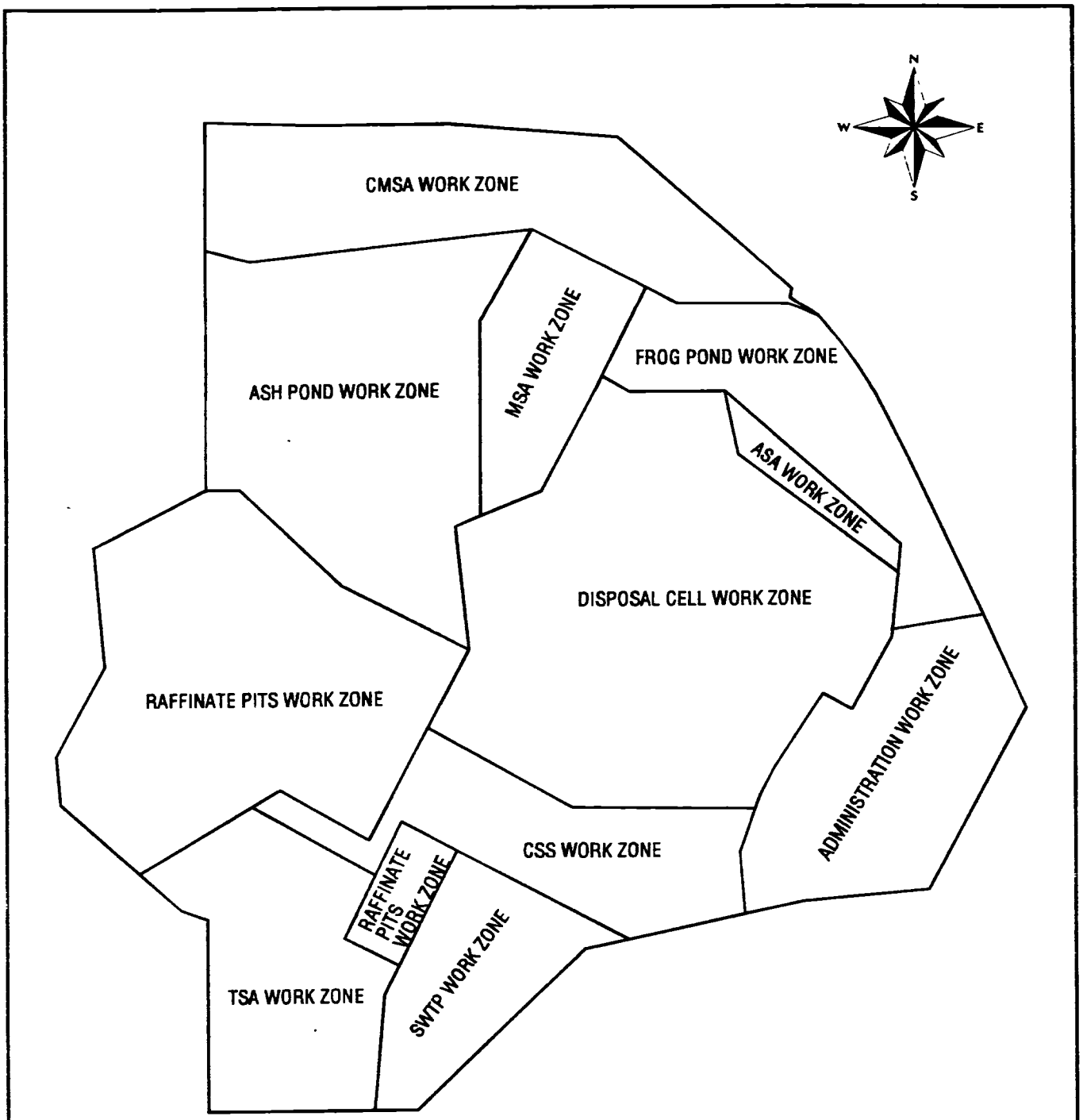
This report describes only the remedial activities and confirmation surveying and sampling conducted on contaminated soils within RU017. Confirmation walkovers and soil sampling were conducted in accordance with the *Confirmation Sampling Plan Details for the Disposal Cell Facility (WP-437)* (Ref. 2). This plan was developed to ensure that the objectives identified in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 3) were accomplished, and to ensure that established remediation requirements of the ROD were met.

1.3 Remediation and Confirmation Process

This report details the activities conducted to remediate the ASA portion of WP-437, which consists of CUs 272 through 276. Remediation consisted of excavation of contaminated soils and debris. Following the remediation activities, walkovers were conducted and confirmation samples were collected to ensure that all contaminated materials had been remediated.

The entire remediation process included characterization sampling, historical data review, contaminants of concern (COC) identification, confirmation plan development, contaminated soil excavation, radiological walkover surveys, confirmation soil sampling, preliminary and final

data review, completion of disposition forms, quality assurance/quality control (QA/QC) review, summary of findings and conclusions, and closure report preparation.



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WP-437 WORK ZONE DESIGNATIONS

Figure: 1-1

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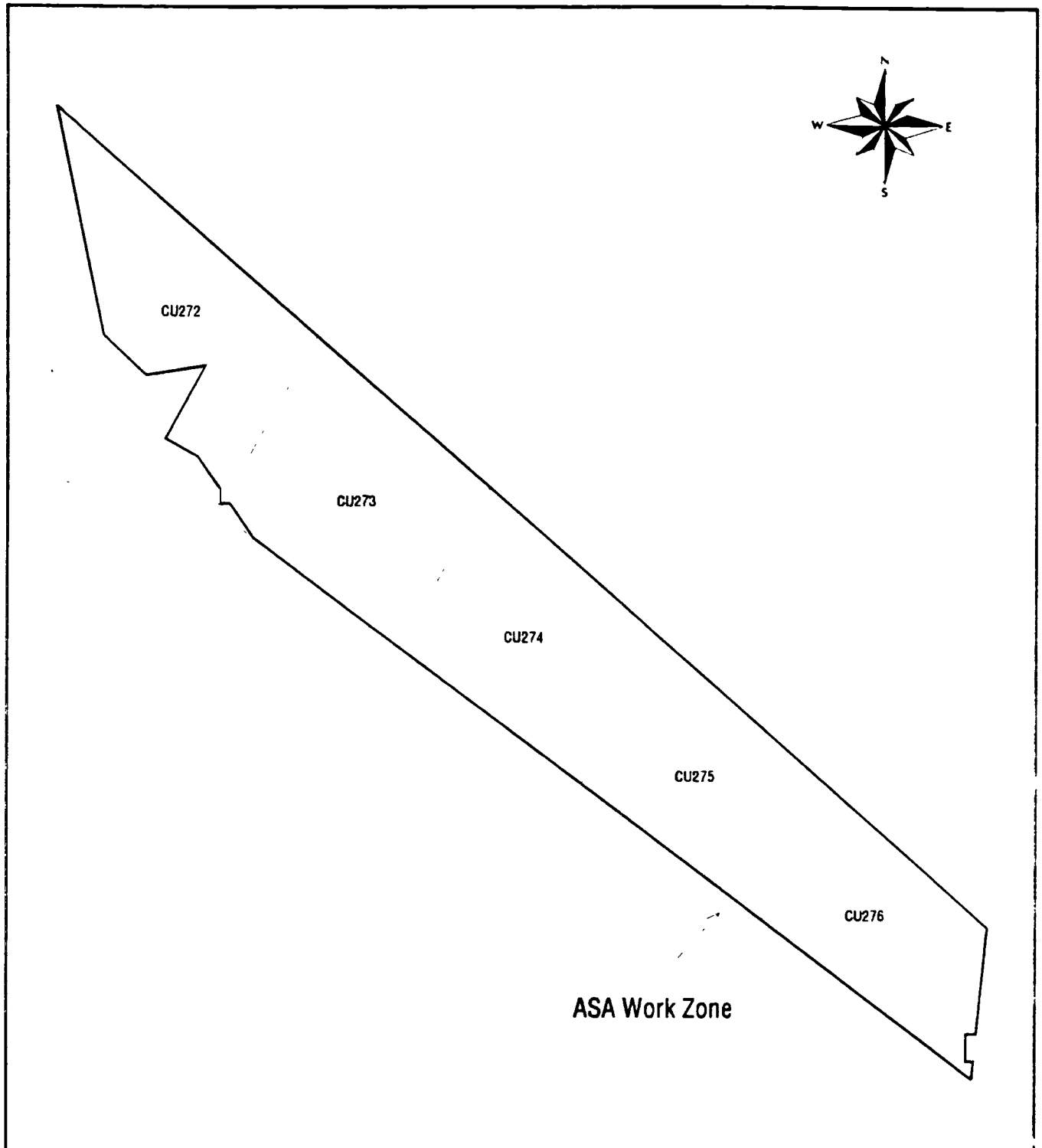

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Confirmation Units in Remedial Unit 017

Figure: 1-2

REPORT NO	EXHIBIT NO	
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ORIGINATOR	DRAWN BY	DATE
MGL	WSSRAP GIS	01 17 01

2. PRE-REMEDIATION ACTIVITIES

2.1 Review of Characterization Data

Contaminants of concern (COCs) were identified for each confirmation unit by reviewing results of characterization data. The full process for identifying COCs is detailed in the *Confirmation Sampling Plan Details for the Disposal Cell Facility (WP-437)* (Ref. 2). Radiological COCs identified for RU017 were Radium-226 (Ra-226), Radium-228 (Ra-228), Thorium-230 (Th-230), Thorium-232 (Th-232), and Uranium-238 (U-238). Chemical COCs were arsenic, chromium, lead, thallium, polychlorinated biphenyls (PCBs), and polynuclear aromatic hydrocarbons (PAHs).

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 the WP-437 work zones were designed in accordance with DQOs stated in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 3).

2.3 Cleanup Standards

The objective of the Department of Energy (DOE) ALARA process is to reduce exposures and risks associated with residual contamination. The ROD (Ref. 1) established two different sets of cleanup standards: risk-based cleanup criteria and As Low As Reasonably Achievable (ALARA) goals. Remedial activities for WP-437 were designed to remove soil where the COC concentrations were found by characterization or during remediation activities to be above ALARA goals. Table 2-1 summarizes the cleanup criteria and ALARA goals established in the ROD that are applicable for COCs in the ASA work zone. Throughout the remedial activities at RU017, 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 at the WP-437 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

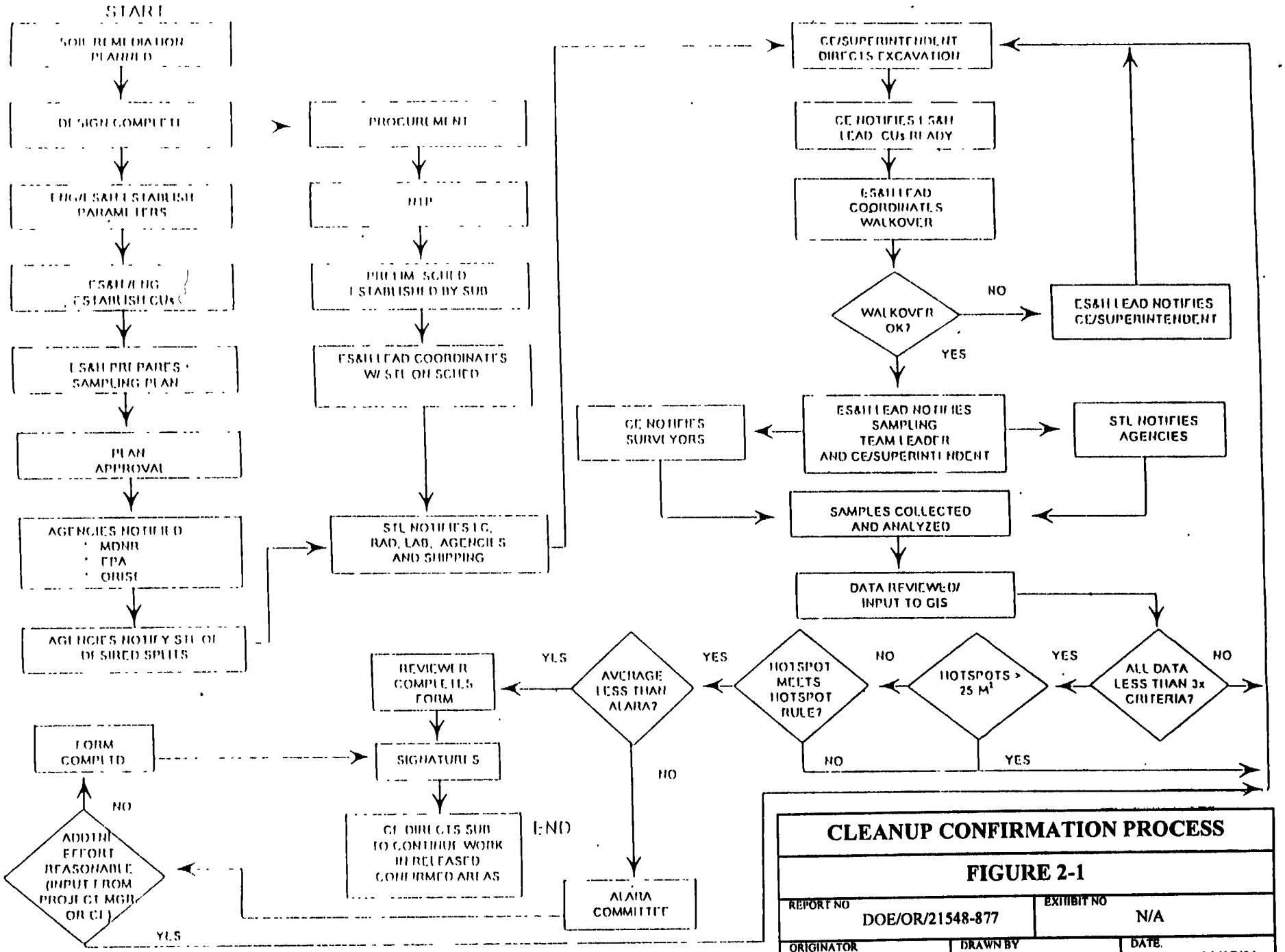
	SURFACE [a]		SUBSURFACE [b]	
RADIONUCLIDE (pCi/g)	ALARA	CRITERIA	ALARA	CRITERIA
Ra-226	5.0	6.2	5.0	16.2
Ra-228	5.0	6.2	5.0	16.2
Total Radium	5.0	6.2	5.0	16.2
Th-230	5 0	6.2	5.0	16.2
Th-232	5.0	6.2	5.0	6.2
U-238	30.0	120	30.0	120.0
Chemical (mg/kg)				
Arsenic	45	75	75	750
Chromium	90	100	100	1000
Lead	240	450	450	4,500
Thallium	16	20	20	200
PAH	0.44	5.6	5.6	~~26~~ 56
PCB	0.65	8	8	80
~~TNT~~	~~14~~	~~140~~	~~140~~	~~1,400~~

Dele

(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 1)



CLEANUP CONFIRMATION PROCESS

FIGURE 2-1

REPORT NO	EXHIBIT NO
DOE/OR/21548-877	N/A

ORIGINATOR	DRAWN BY	DATE
MGL	N/A	01/17/01

3. REMEDIAL ACTIVITIES

3.1 Excavation Activities

Contaminated soils and other debris from the asbestos storage area (ASA) work zone were first excavated to design depth as detailed in the ASA work zone specifications (Ref. 6). After the initial excavation was complete, radiological walkover surveys were conducted to evaluate the need for additional excavation. The walkover surveys were conducted using a 2 in. x 2 in. sodium iodide (NaI) scintillation detector. When the surveys indicated no additional excavation was needed, confirmation soil samples were collected.

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.

3.2 Field Activities

Field activities completed during remediation, such as walkover surveys and soil sampling, were conducted in accordance with procedures specified in the *Confirmation Sampling Plan Details for the Disposal Cell Facility (WP-437)* (Ref. 2). Field activities were conducted to achieve and document sampling objectives specified in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 3). 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.

3.2.1 Walkover Surveys

Radiological walkover surveys were conducted after excavation was completed to determine if confirmation sample collection could begin. The surveys were conducted using a 2 in. x 2 in. NaI scintillation detector. The survey readings were within an acceptable range (less than 1.5 times background) throughout the entire work zone. The ranges for each CU are listed in the CU Summary Forms in Section 4 of this report.

3.2.2 Soil Sampling

Once the walkovers were completed, soil sampling was conducted as part of the confirmation process. The sampling locations for CUs in RU017 are shown in the figures in Section 4. Analytical suites for the CUs were dependant upon the COC list developed from historical information and characterization data, as discussed in Section 2.

Four radiological hot spots were identified during confirmation of this RU. All four locations were further remediated in accordance with the guidelines established in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 3). The subsequent survey and confirmation sample results indicated that contaminants were below cleanup standards and the averages were less than ALARA. One PAH hot spot was identified and met the hot spot rule; therefore, no further remediation was required. One CU, CU275, had a PAH average which exceeded ALARA.

Disposition forms were completed following receipt of preliminary analytical data for all CUs within the ASA work zone.

3.3 Laboratory Activities

Radiological analyses for RU017 were conducted at the on-site laboratory in accordance with the *Project Management Contractor Quality Assurance Program* (Ref. 4) and the *Environmental Quality Assurance Project Plan* (EQAjP) (Ref. 5). Chemical analyses were conducted at subcontracted off-site laboratories using Contract Laboratory Program (CLP) methodologies. Summaries of the final 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.

3.4 Verification Activities

The Oak Ridge Institute for Science and Education (ORISE) was contracted by the DOE to verify confirmation soil sampling in the chemical plant area. Verification activities included independent walkover radiological surveys and collection and analysis of soil samples to verify proper disposition of CUs. Field verification activities were conducted in accordance with ORISE's final survey plan (Ref. 7). ORISE verification indicated no hot spots were associated with RU017.

4. CONFIRMATION UNIT RESULTS SUMMARY

This section summarizes the analytical results for the five confirmation units (CUs) within RU017. In total, 110 locations were sampled between July and November 1998. Average concentrations for each contaminant of concern (COC) remained below the As Low As Reasonably Achievable (ALARA) goals with the exception of the PAH average in CU275. The ALARA committee met on August 8, 1998, and decided that since overall (site-wide) PAH levels were well below ALARA levels, and because PAH concentrations in CU275 did not exceed the criteria level, no further soil excavation was warranted. Details regarding hot spots can be found in the following tables. All 100 m^2 averages were less than criteria.

After preliminary data were reviewed, disposition forms were completed and signed by authorized reviewers. Based on these preliminary data, all CUs in RU017 were fully released using surface cleanup standards.

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 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 had been completed. The final results met the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 3) for all CUs in RU017. Tables 4-1 through 4-5 and associated figures provide the confirmation details for each CU. Copies of the final walkover forms are in Appendix A. The final data are in Appendix B. The list of coordinates is in Appendix C.

Table 4-1 Summary of CU272

CU 272 **RU** 17

COC

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

Reference Figure: 4-1

DATE RELEASED FOR UNRESTRICTED USE: 11/09/98

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU was located along the western portion of the ASA work zone.*

WALKOVER SURVEY INFORMATION

BACKGROUND: *9,500 - 12,000* cpm

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

DATE(S) SCANNED: *07/16/98; 07/20/98; 09/03/98*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 18

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

TOTAL # OF UTILITY SAMPLES : N/A

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

GENERAL COMMENTS - *(1)The western portion of this CU was removed since it had been previously confirmed under WP399.*
(2)Ra-226, Ra-228, and PAHs were added due to the presence of cinders.
(3) SC-27315-S was offset to represent insitu excavation ASAX-1.

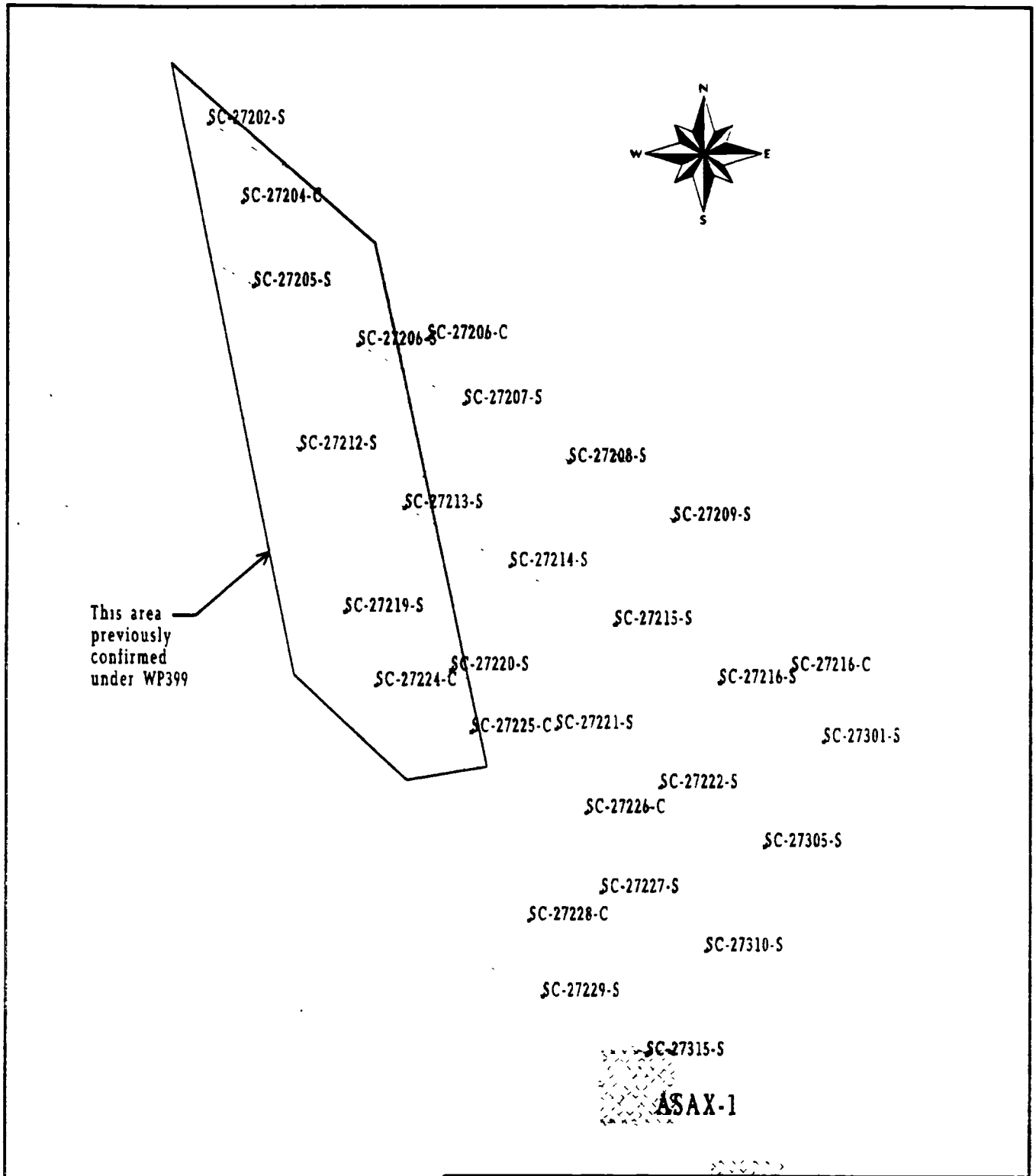
ORISE ACTION - *Visit made 07/23/98 - 07/24/98. No hotspots identified.*

ALARA COMMITTEE ACTION - *None*

CU FINAL RESULTS SUMMARY DATA

Ra-226	16	0.76 - 1.62	1.2	5	6.2	0	0
Ra-228	16	0.51 - 1.41	1.1	5	6.2	0	0
Total Radium	16	1.27 - 3.03	2.3	5	6.2	0	0
U-238	18	1.20 - 15.90	2.72	30	120	0	0
PAH	16	Results less than D.L.	N/A	0.44	5.6	0	0

NOTE Radiological contaminants are listed in pCi/g. Chemical contaminants are mg/kg.



150 75 0 150 FEET

50 25 0 50 METERS

Sample Locations in Remedial Unit RU017
Confirmation Unit CU272

Figure: 4-1

REPORT NO: DOE/OR/21548-877		EXHIBIT NO	
ORIGINATOR MGL	DRAWN BY: LGB	DATE 1/15/01	

Table 4-2 Summary of CU273

CU	273	RU	17

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

Reference Figure: 4-2

DATE RELEASED FOR UNRESTRICTED USE: 09/10/98

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU was located within the ASA work zone.*

WALKOVER SURVEY INFORMATION

BACKGROUND: *9,500 - 12,000* cpm

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

DATE(S) SCANNED: *07/16/98; 07/20/98; 09/03/98*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS: *31*

TOTAL # OF UTILITY SAMPLES: *N/A*

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

ADDITIONAL EXCAVATION REQUIRED? [X] YES [ ] NO

GENERAL COMMENTS - *(1) Sample location SC-27321-C was added to confirm ASAX-3 insitu area. (2) One radium hotspot was identified during confirmation at SC-27414-S (9.3 pCi/g). The area was excavated and resampled. Results were less than ALARA. Ra-226, Ra-228, and PAHs were added due to the presence of cinders (3) SC-27315-S represents the ASAX-1 insitu excavation and SC-27321-C was added to represent the ASAX-3 insitu excavation.*

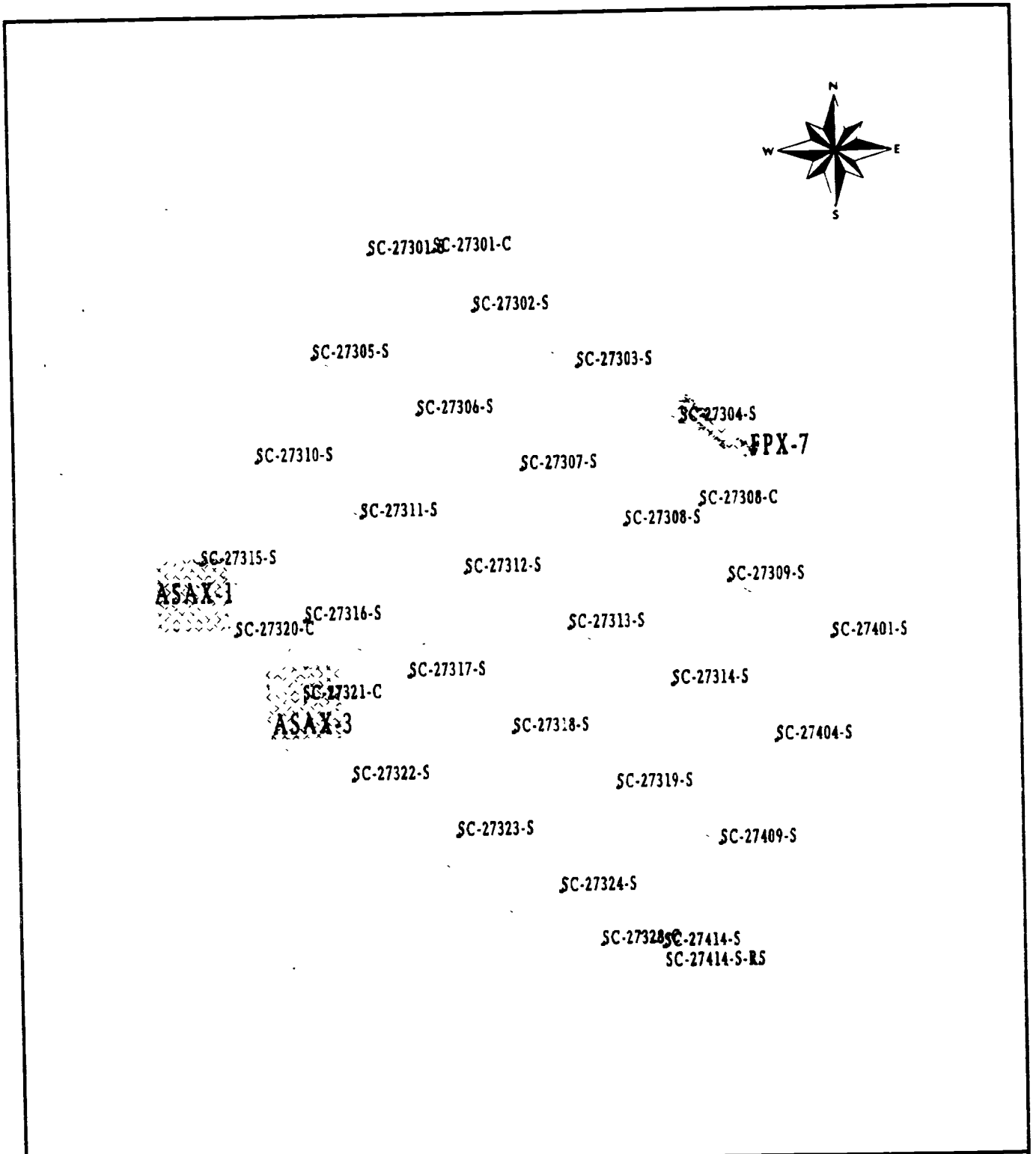
ORISE ACTION - *Visit made 07/23/98 - 07/24/98. No hotspots identified.*

ALARA COMMITTEE ACTION - *None*

CU FINAL RESULTS SUMMARY DATA

Ra-226	31	0.38 - 1.70	1.24	5	6.2	0	0
Ra-228	31	0.62 - 1.62	1.2	5	6.2	0	0
Total Radium	31	1.83 - 2.93	2.44	5	6.2	0	0
U-238	31	1.25 - 8.46	3.12	30	120	0	0
PAH	31	0 - 0.295	0.016	0.44	5.6	0	0

NOTE Radiological contaminants are listed in pCi/g. Chemical contaminants are mg/kg.



150 75 0 150 FEET

50 25 0 50 METERS

Sample Locations in Remedial Unit RU017 Confirmation Unit CU273

Figure: 4-2

REPORT NO: DOE/OR/21548-877		EXHIBIT NO	
ORIGINATOR MGL	DRAWN BY: LGB	DATE 1/15/01	

Table 4-3 Summary of CU274

CU	274	RU	17

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

Reference Figure: 4-3

DATE RELEASED FOR UNRESTRICTED USE: 09/11/98

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU was located within the ASA work zone.*

WALKOVER SURVEY INFORMATION

BACKGROUND: *9,500 - 12,000* cpm

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

DATE(S) SCANNED: *07/17/98; 07/20/98; 09/03/98*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS: 28

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [X] YES [ ] NO

TOTAL # OF UTILITY SAMPLES: N/A

ADDITIONAL EXCAVATION REQUIRED? [X] YES [ ] NO

GENERAL COMMENTS - *(1) A PAH hotspot was identified at SC-27407-C which meets the hotspot rule Concentration = 9 19 mg/kg. Hotspot size < 25 sq m. No additional excavation was required. (2) One radium hotspot was identified during confirmation at SC-27414-S (9.3 pCi/g). The area was excavated and resampled. Results < ALARA. (3) Ra-226, Ra-228, and PAHs were added due to the presence of cinders*

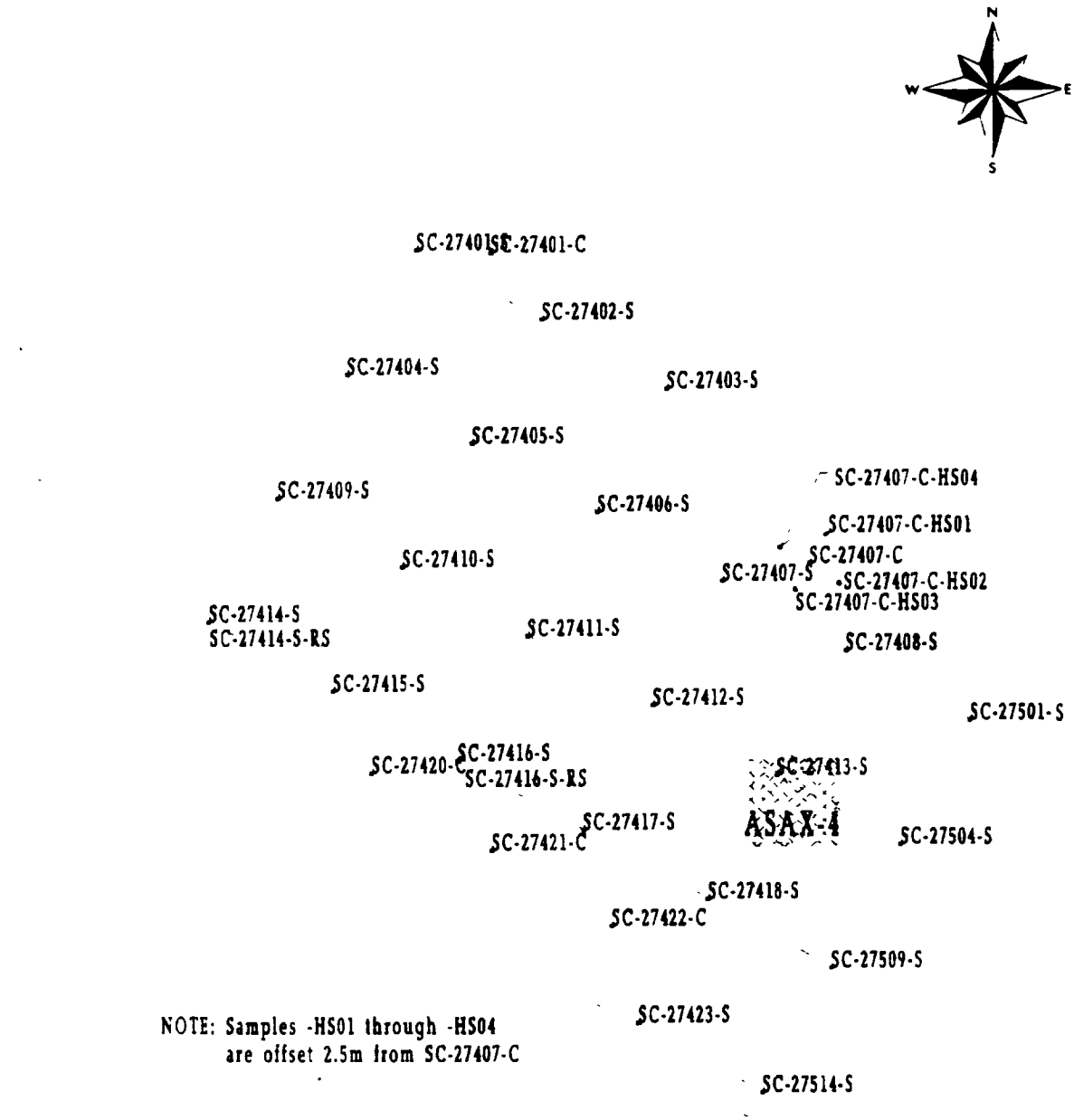
ORISE ACTION - *Visit made 07/23/98 - 07/24/98 No hotspots identified.*

ALARA COMMITTEE ACTION - *None*

CU FINAL RESULTS SUMMARY DATA

Ra-226	28	0.86 - 2.11	1.35	5	6.2	0	0
Ra-228	28	0.34 - 1.50	1.09	5	6.2	0	0
Total Radium	28	1.24 - 3.50	2.43	5	6.2	0	0
U-238	28	1.35 - 9.13	3.4	30	120	0	0
PAH	28	0 - 6.65	0.43	0.44	5.6	3	1

NOTE Radiological contaminants are listed in pCi/g. Chemical contaminants are mg/kg.



NOTE: Samples -HS01 through -HS04 are offset 2.5m from SC-27407-C

150 75 0 150 FEET

50 25 0 50 METERS

Sample Locations in Remedial Unit RU017 Confirmation Unit CU274

Figure: 4-3

REPORT NO: DOE/OR/21548-877		EXHIBIT NO	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE 1/15/01	

Table 4-4 Summary of CU275

CU 275 RU 17

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

Reference Figure: 4-4

DATE RELEASED FOR UNRESTRICTED USE: 09/11/98

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU was located within the ASA work zone.*

WALKOVER SURVEY INFORMATION

BACKGROUND: *12,000 - 14,000* cpm

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

DATE(S) SCANNED: *07/24/98; 09/03/98*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 25

AVERAGES < ALARA? [ ] YES [X] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

TOTAL # OF UTILITY SAMPLES : N/A

ADDITIONAL EXCAVATION REQUIRED? [X] YES [ ] NO

GENERAL COMMENTS - *(1) Five grid sample locations were relocated into a utility trench (see figure), no points were added. (2) SC-27506-S, SC-27507-C, and SC-27511-S were identified as radiological hotspots. All three were excavated and resampled. Results were all below ALARA. (3) Ra-226, Ra-228, and Th-230 added in areas where cinders were present.*

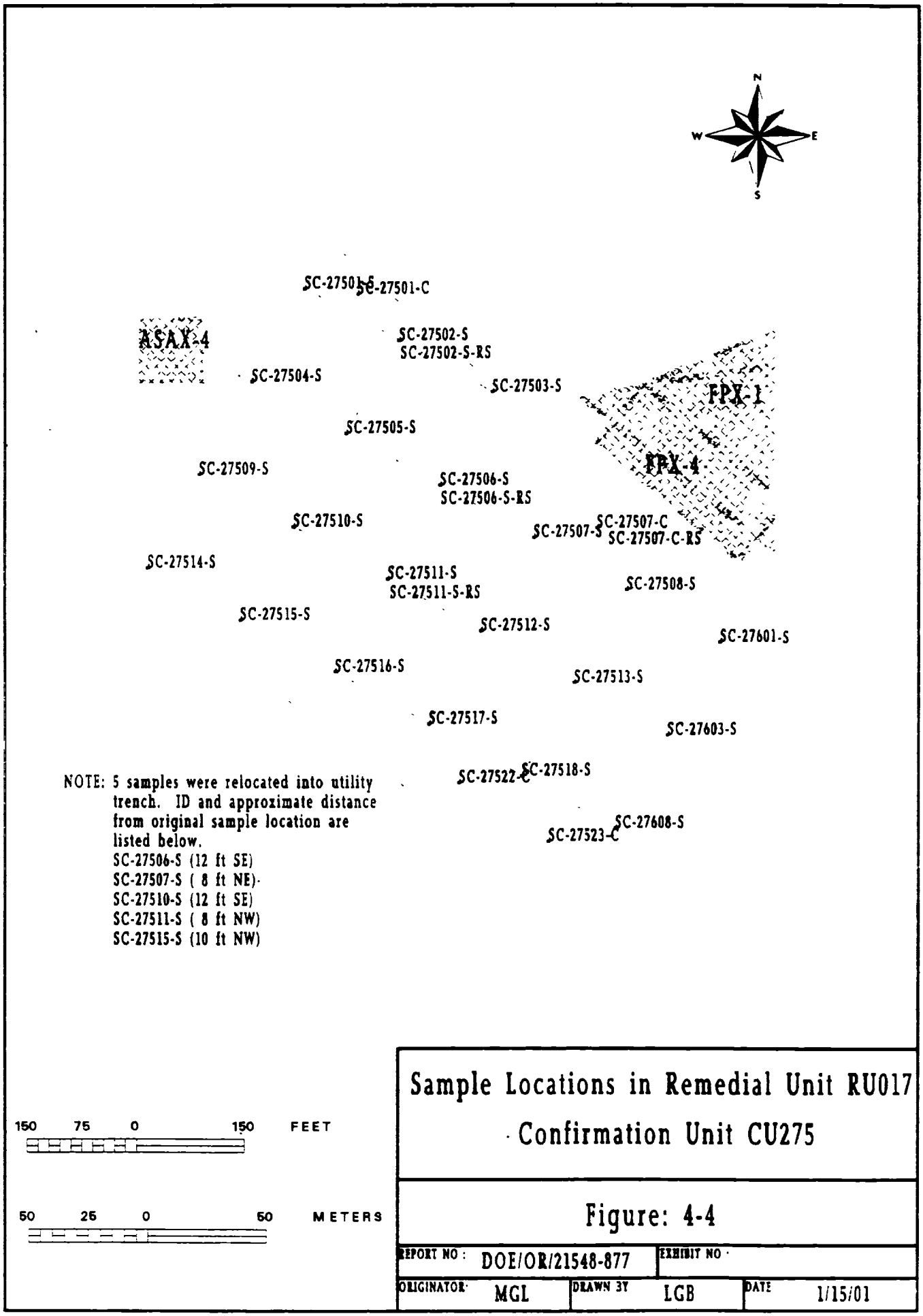
ORISE ACTION - *None.*

ALARA COMMITTEE ACTION - *ALARA committee met on 08/10/98 to review PAH results since average was above ALARA. To date, less than 10% of PAH results exceeded ALARA and CUs where PAHs were sampled, approx 83% had averages below ALARA. Based upon this information, no additional excavation required. CU was passed.*

CU FINAL RESULTS SUMMARY DATA

Ra-226	13	1.16 - 2.48	1.58	5	6.2	0	0
Ra-228	13	0.46 - 1.37	1.11	5	6.2	0	0
Total Radium	13	2.03 - 3.67	2.69	5	6.2	0	0
Th-230	5	0.97 - 4.24	1.9	5	6.2	0	0
Th-232	5	0.47 - 1.35	1.07	5	6.2	0	0
U-238	25	1.32 - 75.2	11.11	30	120	2	0
Arsenic	5	3.90 - 8.10	5.9	45	75	0	0
Chromium	5	12.4 - 18.70	14.66	90	110	0	0
Lead	5	7.20 - 12.00	9.2	240	450	0	0
Thallium	5	All results < D.L.	N/A	16	20	0	0
PAH	13	0.0 - 1.52	0.46	0.44	5.6	6	0
PCB	5	0.0 - 0.51	0.14	0.65	8	0	0

NOTE. Radiological contaminants are listed in pCi/g. Chemical contaminants are mg/kg.



NOTE: 5 samples were relocated into utility trench. ID and approximate distance from original sample location are listed below.
SC-27506-S (12 ft SE)
SC-27507-S (8 ft NE)
SC-27510-S (12 ft SE)
SC-27511-S (8 ft NW)
SC-27515-S (10 ft NW)

Sample Locations in Remedial Unit RU017
Confirmation Unit CU275

Figure: 4-4

REPORT NO: DOE/OR/21548-877		EXHIBIT NO:	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 1/15/01	

Table 4-5 Summary of CU276

CU 276 **RU** 17

COC

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

Reference Figure: 4-5

DATE RELEASED FOR UNRESTRICTED USE: 09/09/98

CLEANUP STANDARD [X] SURFACE [ ] SUBSURFACE

EACH 100m² < CRITERIA? [X] YES [ ] NO

LOCATION DESCRIPTION: *This CU was located within the ASA work zone.*

WALKOVER SURVEY INFORMATION

BACKGROUND: *10,500 - 11,000* cpm

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

DATE(S) SCANNED: *08/26/98; 08/27/98*

CONFIRMATION SAMPLING INFORMATION

TOTAL # OF SAMPLE LOCATIONS : 23

AVERAGES < ALARA? [X] YES [ ] NO

HOTSPOTS REMAINING? [ ] YES [X] NO

TOTAL # OF UTILITY SAMPLES . N/A

ADDITIONAL EXCAVATION REQUIRED? [ ] YES [X] NO

GENERAL COMMENTS - *(1) SC-27610-S, SC-27611-S, and SC-27615-C sample locations fell within the sand filter excavation. (2) SC-27606-S and SC-27606-C were relocated into the utility trench which ran from the sand filter to Frog Pond. SC-27618-S sample location fell within the FPX-2 excavation layback, but was relocated into the bottom of excavation*

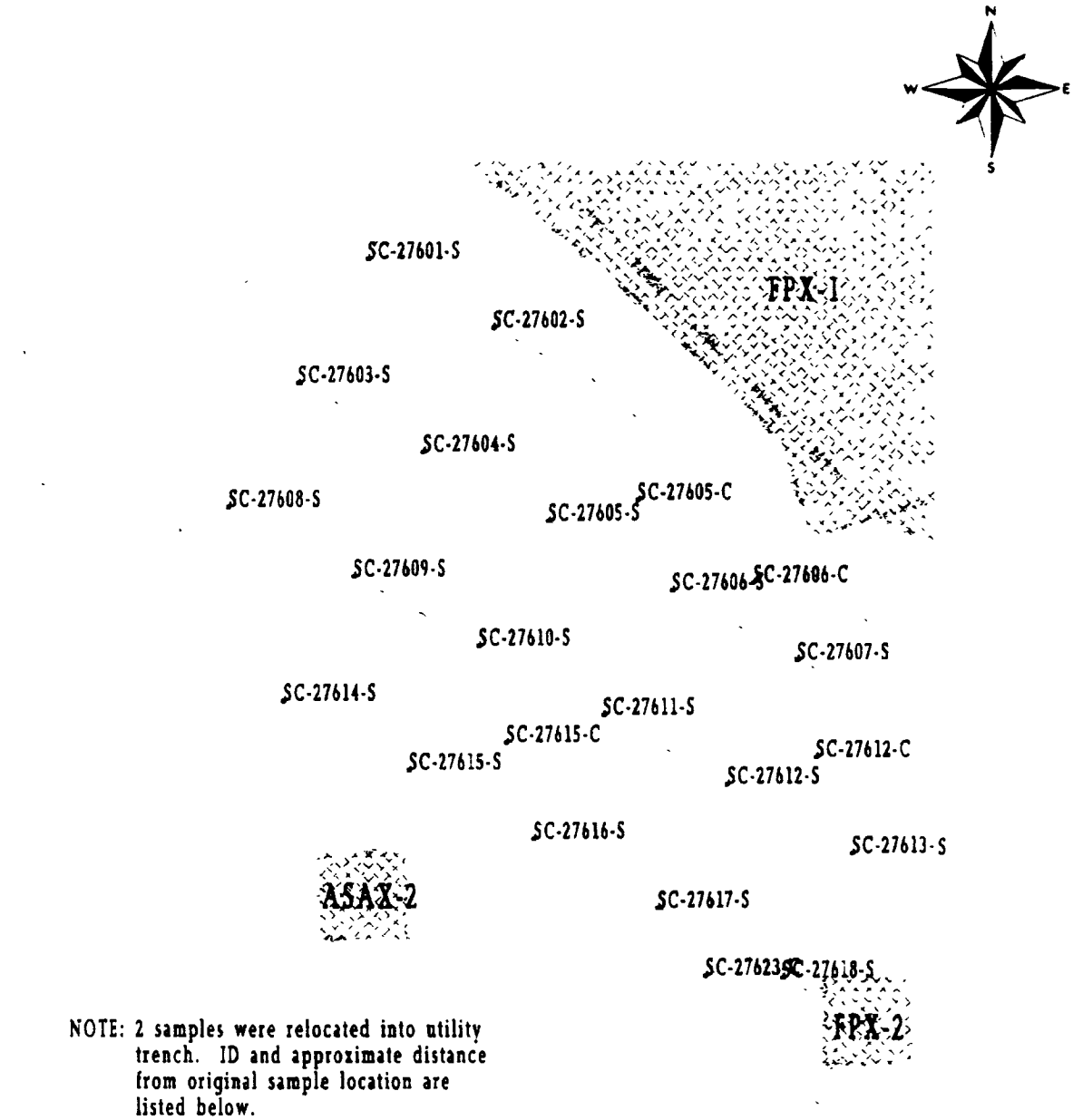
ORISE ACTION - *None*

ALARA COMMITTEE ACTION -

CU FINAL RESULTS SUMMARY DATA

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ra-226	6	0.67 - 1.24	0.88	5	6.2	0	0
Ra-228	6	0.68 - 1.27	0.95	5	6.2	0	0
Total Radium	6	1.43 - 2.51	1.83	5	6.2	0	0
Th-230	6	0.32 - 1.62	1	5	6.2	0	0
Th-232	6	0.30 - 0.87	0.62	5	6.2	0	0
U-238	23	1.52 - 8.49	3.83	30	120	0	0
Arsenic	6	7.0 - 15.5	10.5	45	75	0	0
Chromium	5	11.8 - 15.3	13.54	90	110	0	0
Lead	5	11.7 - 18.7	14.52	240	450	0	0
PCB	5	All results < D.L.	N/A	0.65	8	0	0

NOTE Radiological contaminants are listed in pCi/g. Chemical contaminants are mg/kg.



NOTE: 2 samples were relocated into utility trench. ID and approximate distance from original sample location are listed below.
SC-27606-C (13 ft SE)
SC-27606-S (14 ft SE)

150 75 0 150 FEET

50 25 0 50 METERS

Sample Locations in Remedial Unit RU017 Confirmation Unit CU276

Figure: 4-5

REPORT NO.: DOE/OR/21548-877		EXHIBIT NO	
ORIGINATOR MGL	DRAWN BY: LGB	DATE 1/15/01	

5. DATA EVALUATION

WP-437 final analytical data were evaluated to determine whether Data Quality Objectives (DQOs) 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* (QAP) (Ref. 4) and the *Environmental Quality Assurance Project Plan* (Ref. 5). The data evaluation process was completed by data verification, data review, data validation, and data management activities as stated in the *Chemical Plant Cleanup Attainment Confirmation Plan* (Ref. 3).

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 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

Data packages were reviewed to ensure that final data were properly identified, analyzed and reported, and that they met data quality requirements. The data were also reviewed to check for inconsistencies with the field quality control samples. Final analytical results were also compared with the preliminary results to identify any changes in data that would change the CUs release status.

During confirmation of WP-437 areas, which included RU17, soil samples were obtained in accordance with the details provided in the sampling plan (Ref. 2). The plan indicated that quality control samples were to be taken at a frequency of 1 per 20 samples or 5%. The quality control samples collected included duplicates, field replicates, secondary duplicates, matrix spikes/matrix spike duplicates, and equipment blanks. Since the 5% requirement was based upon all WP-437 confirmation sampling, the quality control data will be discussed in a separate report entitled *WP-437 Confirmation Quality Control Results Report.*

5.3 Data Validation

Data validation was performed on a minimum of 10% of all analytical data generated from the confirmation sampling activities. The validation was conducted in accordance with

ES&H 4.9.2, *Environmental Monitoring Data Validation*. Note that the validation of 10% of the data is based upon all confirmation data collected, not 10% of each RU. The percentage of confirmation validated will be discussed in the *WP-437 Confirmation Quality Control Results Report*

6. SUMMARY OF CLOSURE REPORT FINDINGS

The asbestos storage area (ASA) work zone portion of WP-437 consisted of the five confirmation units in Remedial Unit (RU) RU017.

6.1 Confirmation Unit Dispositions

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

6.2 Summary of WP-437 RU017 Confirmation Results

Table 6-1 provides a summary of the total number of samples collected and analyzed for each contaminant during remedial activities. The minimum, maximum, average, and number of results that exceeded As Low As Reasonably Achievable (ALARA) are provided for each contaminant. The table was generated using data sets compiled from all samples that represented soils left in place. Final data from all samples collected, such as results of hot spots prior to remediation, are in Appendix B.

Table 6-1 Summary Totals for RU017

CONTAMINANTS	NO. OF SAMPLES	CONC RANGE	AVERAGE CONC	SURFACE ALARA	SURFACE CRITERIA	RESULTS > ALARA
Arsenic (mg/kg)	11	3.9 – 15.5	8.41	45	75	0
Chromium (mg/kg)	10	11.8 – 18.7	14.1	90	110	0
Lead (mg/kg)	10	7.2 – 18.7	11.86	240	450	0
Thallium (mg/kg)	5	All results < D.L.	N/A	16	20	0
PAHs (mg/kg)	76	0 – 6.65	0.21	0.44	5.6	1
PCBs (mg/kg)	10	0 – 0.51	0.07	0.65	8	0
Ra-226 (pCi/g)	82	0.38 – 2.48	1.29	5	6.2	0
Ra-228 (pCi/g)	82	0.34 – 1.62	1.11	5	6.2	0
Radium, total (pCi/g)	82	1.24 – 3.67	2.39	5	6.2	0
Th-230 (pCi/g)	11	0.32 – 4.24	1.41	5	6.2	0
Th-232 (pCi/g)	11	0.30 – 1.35	0.82	5	6.2	0
U-238 (pCi/g)	110	1.2 – 75.2	5.01	30	120	2

Analytical results generated from remedial activities indicated that the RU017 average concentrations for each contaminant of concern (COC) were below the ALARA goal. For each of the five CUs within RU017, COC averages were also below ALARA with one exception. The

polynuclear aromatic hydrocarbon (PAH) average for CU275 exceeded ALARA, but was below criteria. All 100 m^2 averages were less than criteria.

6.3 Summary of Chemical Plant Confirmation Results

To meet the requirements of the *Record of Decision* (ROD) (Ref. 1), more than 50% of the results for each parameter had to be less than the ALARA goal. Table 6-2 summarizes the cumulative results to date.

Table 6-2 Summary Totals for Confirmation

CONTAMINANT	NO OF SAMPLES	MINIMUM CONCENTRATION	MAXIMUM CONCENTRATION	AVERAGE CONCENTERATION	RESULTS > ALARA
Arsenic (mg/kg)	875	0.48	34 10	7.44	0
Chromium (mg/kg)	1,286	3.80	41.60	14 10	0
Lead (mg/kg)	1,005	2.40	817	17.01	2
Thallium (mg/kg)	253	0.12	5.20	1.12	0
TNT (mg/kg)	77	0.0	34.00	0.93	1
PAH (mg/kg)	658	0.0	6.65	0.19	76
PCB (mg/kg)	1,448	0.0	6.0	0.04	20
Radium 226 (pCi/g)	2,214	0.33	9.43	1.34	3
Radium 228 (pCi/g)	2,023	0 30	6.60	1.26	2
Thorium 230 (pCi/g)	1,634	0.09	23.10	1 58	29
Thorium 232 (pCi/g)	1,858	0.31	6 77	1.30	2
Uranium 238 (pCi/g)	3,585	0.39	228	3.92	46
Toluene (mg/kg)	4	0.00	3.40	0.85	0

Note This table contains summary results from cumulative confirmation including WP-253, WP-399, WP-420, WP-458, WP-461, WP-471, and WP-437(RU17))

6.4 Comparison of Standard Deviations

This section compares the estimated standard deviations calculated following U.S. Environmental Protection Agency (EPA) guidance and presented in the *Attainment Plan* (Ref. 3) with deviations calculated using confirmation results. Since no existing remediation data were available to calculate sigma, the *Attainment Plan* estimated sigma using the range (the average concentration remaining after remediation will not exceed cleanup criteria) divided by six. To determine whether the specified level of precision was obtained, the estimated sigma and the calculated sigma were compared using the RU017 results.

The comparison indicated that the specified level of precision (a false positive = 0.05 and a false negative = 0.20) was obtained. With the exception of Th-230, all of the calculated sigmas were less than the estimated sigmas, indicating that the minimum specified precision was met. Table 6-3 presents the estimated sigma and calculated sigmas for each COC.

While the RU017 calculated sigma for Th-230 did not exceed the estimated sigma, the cumulative sigma exceeded the estimated sigma. This is a factor of hot spots left in place based upon subsurface criteria in previous CUs. The estimated standard deviation, recalculated for Th-230 using subsurface criteria, was 2.7. The cumulative sigma was less than the estimated subsurface sigma.

Table 6-3 Estimated Sigma and Calculated Sigma for Contaminants of Concern

CONTAMINANT	ESTIMATED SIGMA [a]	RU17 SIGMA [b]	CUMULATIVE SIGMA [c]
Arsenic	12.5	3.49	3.57
Chromium	18.3	1.97	4.99
Lead	75	3.88	30.51
Thallium	3.3	N/A	1.17
PAH	0.93	0.86	0.55
PCB	1.33	0.16	0.30
TNT	23.3	N/A	4.27
Ra-226	1.03	0.33	0.37
Ra-228	1.03	0.31	0.36
Th-230	1.03	1.03	1.36
Th-232	1.03	0.28	0.37
U-238	20	9.49	9.10

(a) Sigma estimated in the *Attainment Plan* (Ref. 3).
(b) Sigma calculated using only the WP-437 (RU17) confirmation results.
(c) Sigma calculated using cumulative confirmation results (WP-253, WP-399, WP-420, WP-458, WP-461, WP-471, and WP-437(RU17))

7. REFERENCES

1. U.S. Department of Energy. *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site*. Rev. 0. DOE/OR/21548-376. Oak Ridge Field Office. St. Charles, MO. September 1993.

2. MK-Ferguson Company and Jacobs Engineering Group. *Confirmation Sampling Plan Details for the Disposal Cell Facility (WP-437)*. Rev. 0. DOE/OR/21548-706. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. January 1998.

3. MK-Ferguson Company 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 Operations Office. St. Charles, MO. December 1995.

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

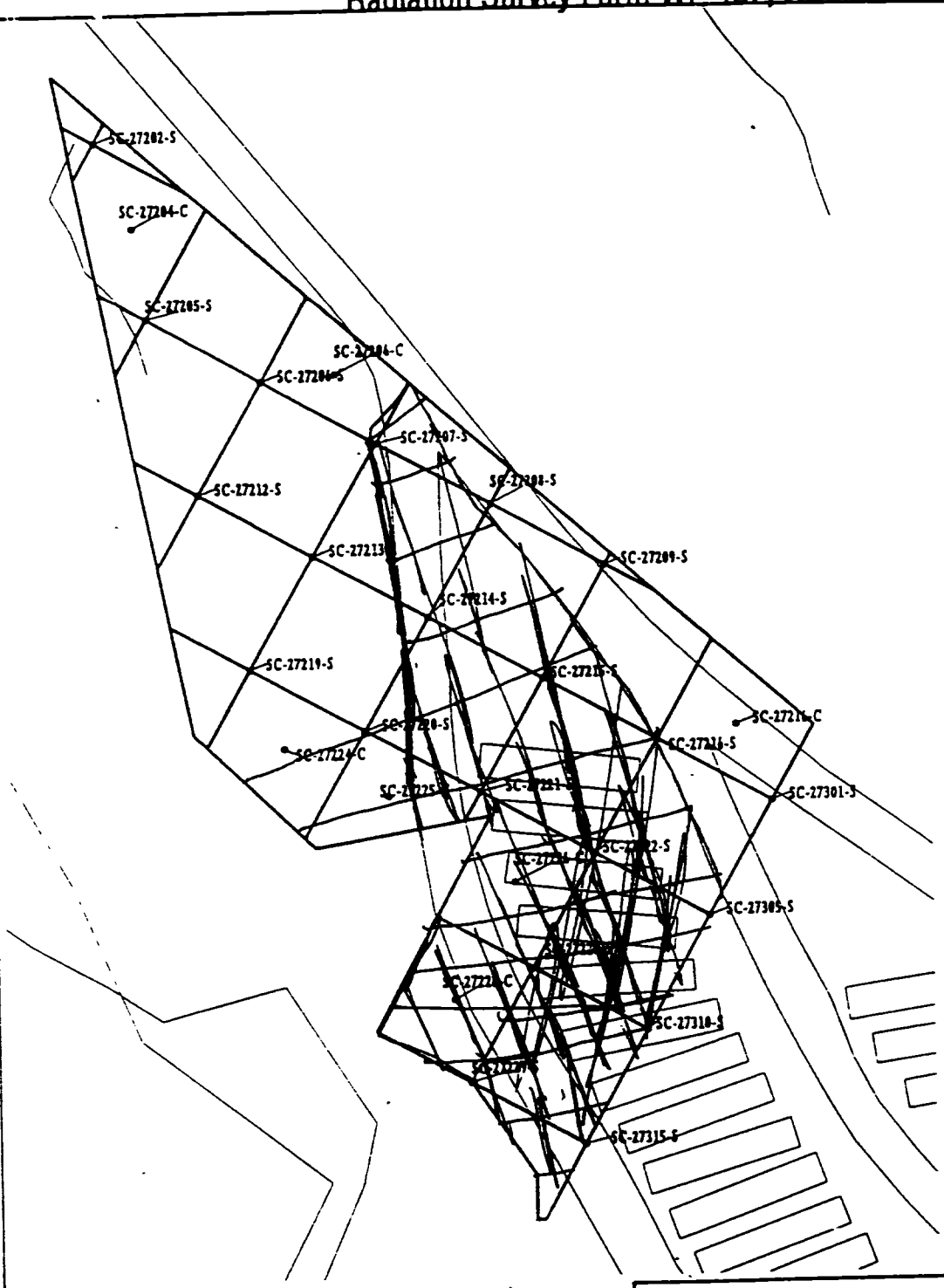
5. MK-Ferguson Company and Jacobs Engineering Group. *Environmental Quality Assurance Project Plan*. Rev. 5. DOE/OR/21548-352. Prepared for the U.S. Department of Energy. Oak Ridge Operations Office. St. Charles, MO. November 2000.

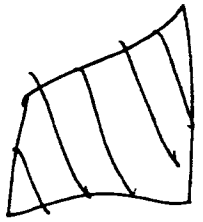
6. MK-Ferguson Company. *ASA Work Zone Specifications*. Rev. 8. Document No. 3840S-7-437-02306. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. August 1996.

7. Oak Ridge Institute for Science and Education. *Final Verification Survey Plan for the Chemical Plant Area Weldon Spring Site Remedial Action Project, Weldon Spring, Missouri*. Prepared by the Environmental Survey and Site Assessment Program, Energy/Environment Systems Division, for the U.S. Department of Energy. Weldon Spring, Missouri. December 7, 1995.

APPENDIX A
Final Walkover Forms

Radiation Survey Form WP 437, BU017 CU272





Surveyed Area

WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

N E S

Meter Model#: 2220-2221

Meter Serial#: 48407 - 127247

Calibration Due: 10-20-98 / 8-8-98

Survey Date/Time: 7/16/98.

Surveyor(s): C Hanner, Lead Hogoss

Detector Model#: 2x2 NaI G & J

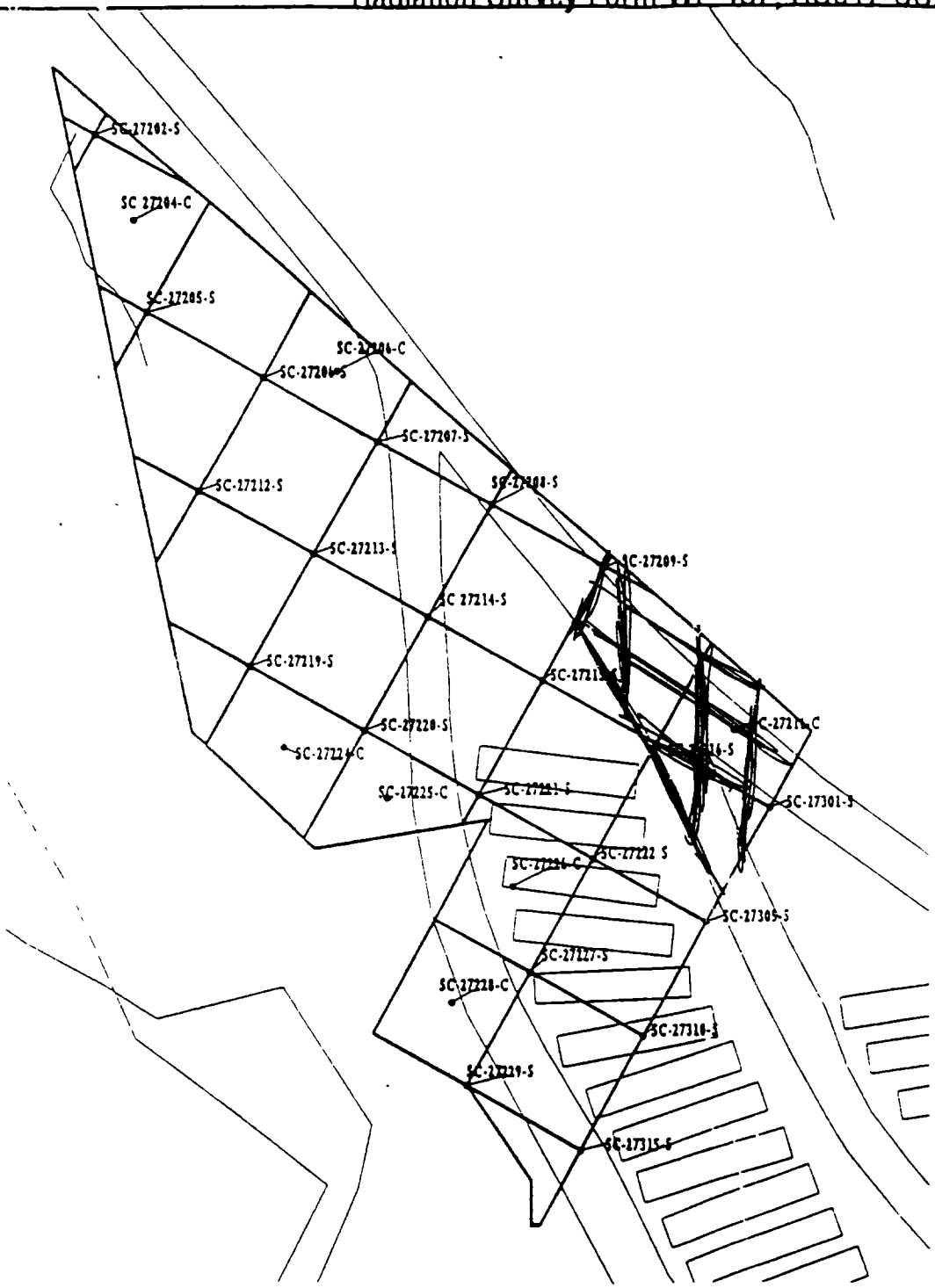
Detector Serial#: 122912 - 126402

Calibration Due: 11-17-98 / 11/22/99

Field Bkg.: 9,500 cpm

Comments: Area was surveyed and found to be less than 1.5 x BKGD.

Radiation Survey Form WP 437, RU017 CU272



Surveyed Area

WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2220 / 2221

Meter Serial#: 48407 / 89636

Calibration Due: 11-20-98 / 11-20-99

Survey Date/Time: 7/20/99

Surveyor(s): C. Hanner & J. Rankins

Detector Model#: 2x2 NaI GdK

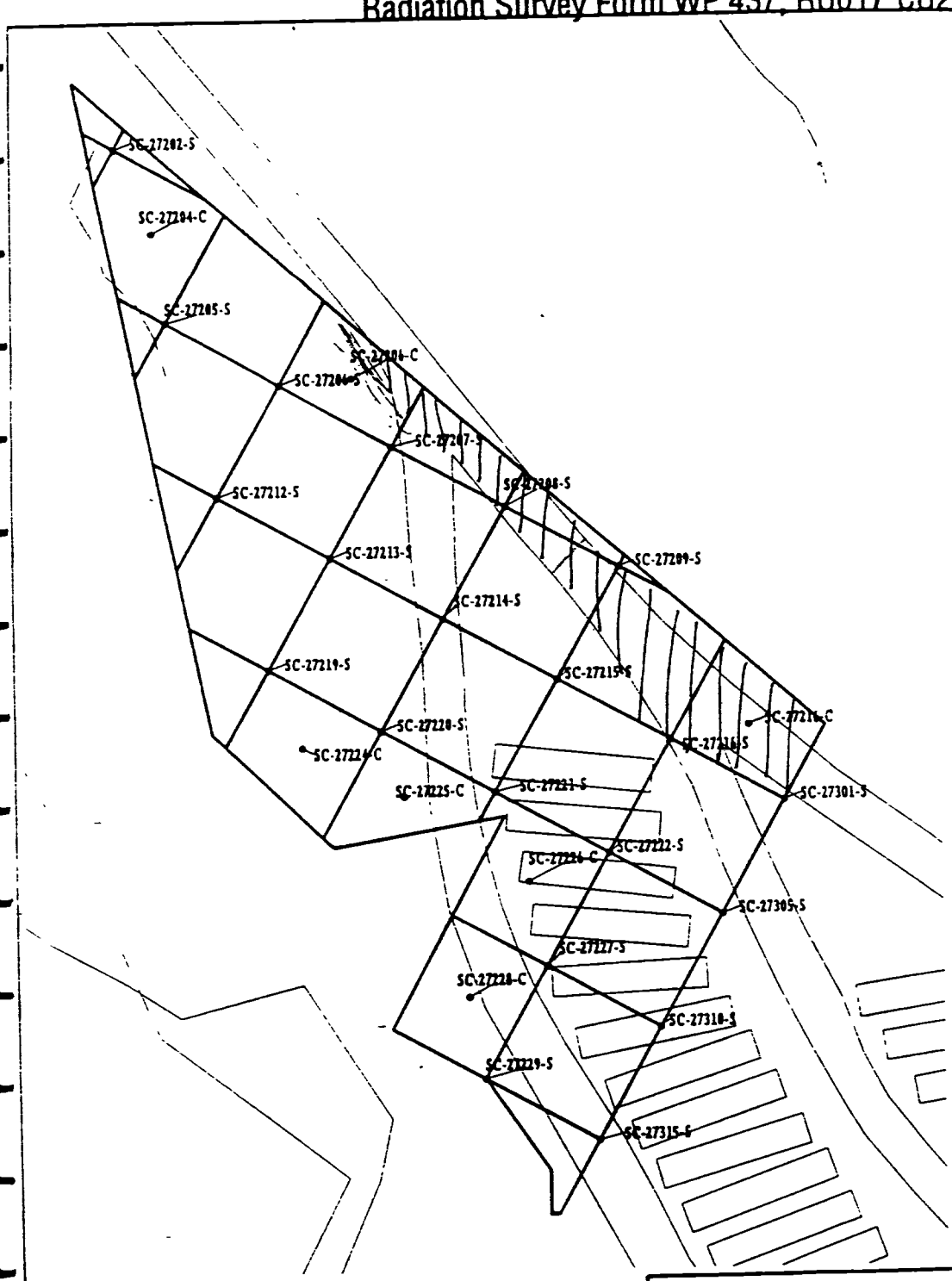
Detector Serial#: 122192 / 126403

Calibration Due: 11-17-98 / 1-21-99

Field Bkg.: 9500

Comments: area was surveyed and found to be below 5 times above background

Radiation Survey Form WP 437, BU017 CU272



WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

N E S

Meter Model#: 2221

Meter Serial#: 89636

Calibration Due: 11-20-98

Survey Date/Time: 9-3-98

Surveyor(s): C. Hanner & J. Rankins

Detector Model#: 2x2 NaI "K"

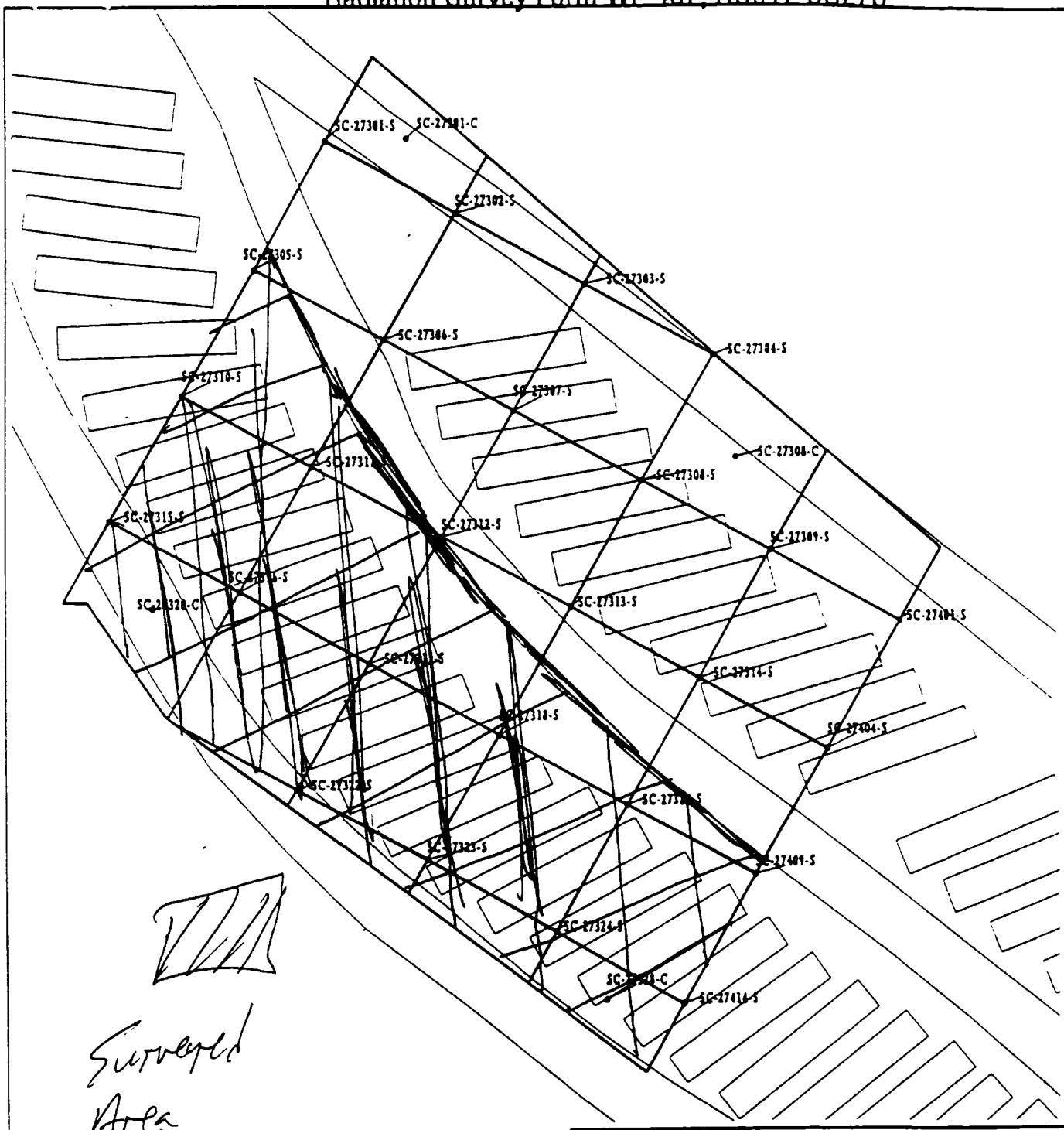
Detector Serial#: 126403

Calibration Due: 1-21-99

Field Bkg.: 12,000

Comments: Area was surveyed and found to be below 1.5 times background

Radiation Survey Form WP 437, RU017 CU273



WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

N W E S

Meter Model#: 2220/2221

Meter Serial#: 49407 / 127927

Calibration Due: 11-20-98 / 9-8-98

Survey Date/Time: 7/16/98

Detector Model#: 2x2 NaI 6/J

Detector Serial#: 122912 / 126402

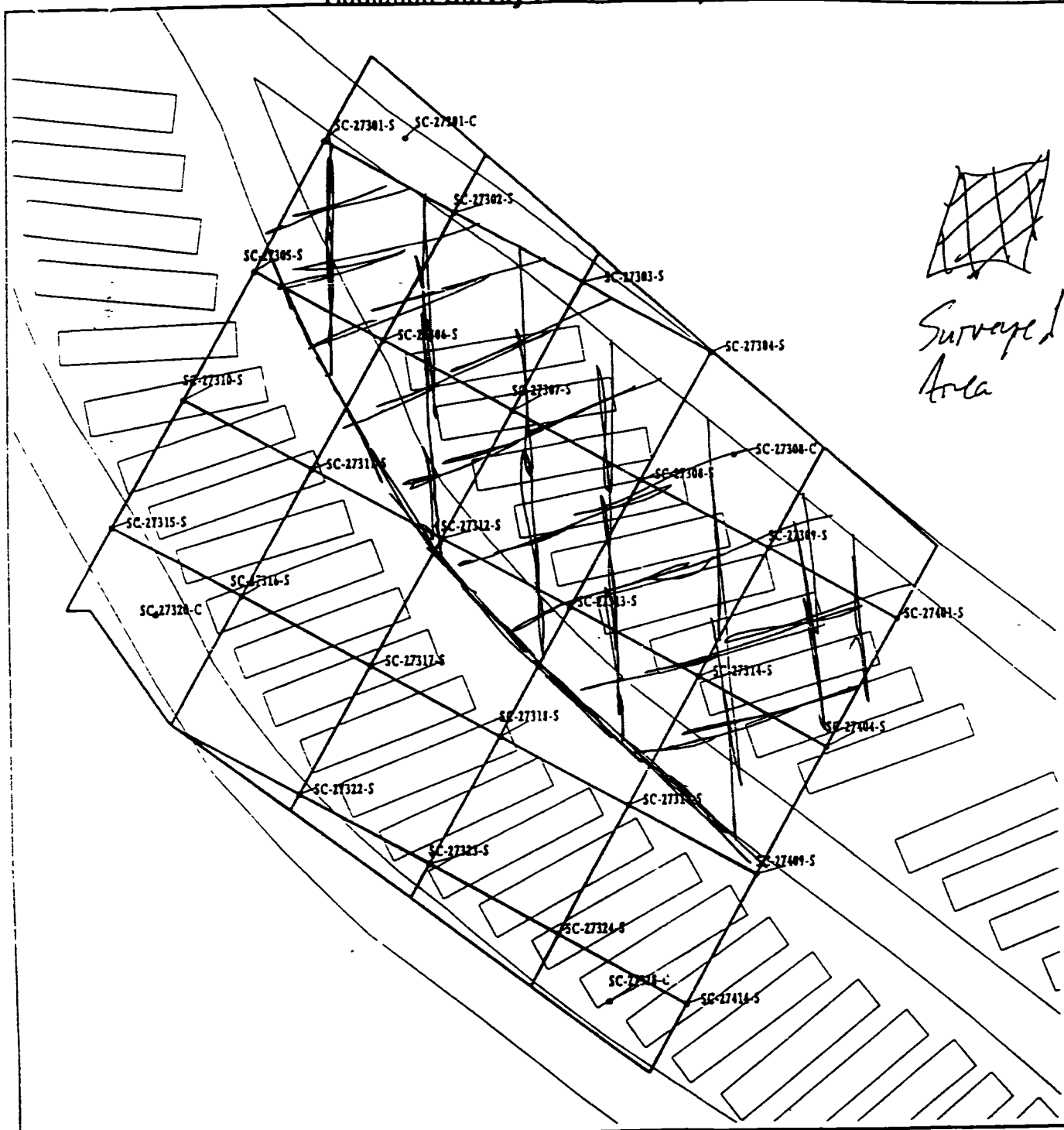
Calibration Due: 11-17-98 / 1-22-99

Field Bkg.: 9500

Surveyor(s): C. Hanner & L. Hagoss

Comments: Area Surveyed and found to be below 1½ times above background

Radiation Survey Form WP 437, BU017 CU273



WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: ~~220~~ 2220/2221

Meter Serial#: 48407/89636

Calibration Due: 11-20-98/11-20-99

Survey Date/Time: 7-20-99

Surveyor(s): C. Harner / Jon Rankins

Detector Model#: 2x2 NaI GLK

Detector Serial#: 122192/126403

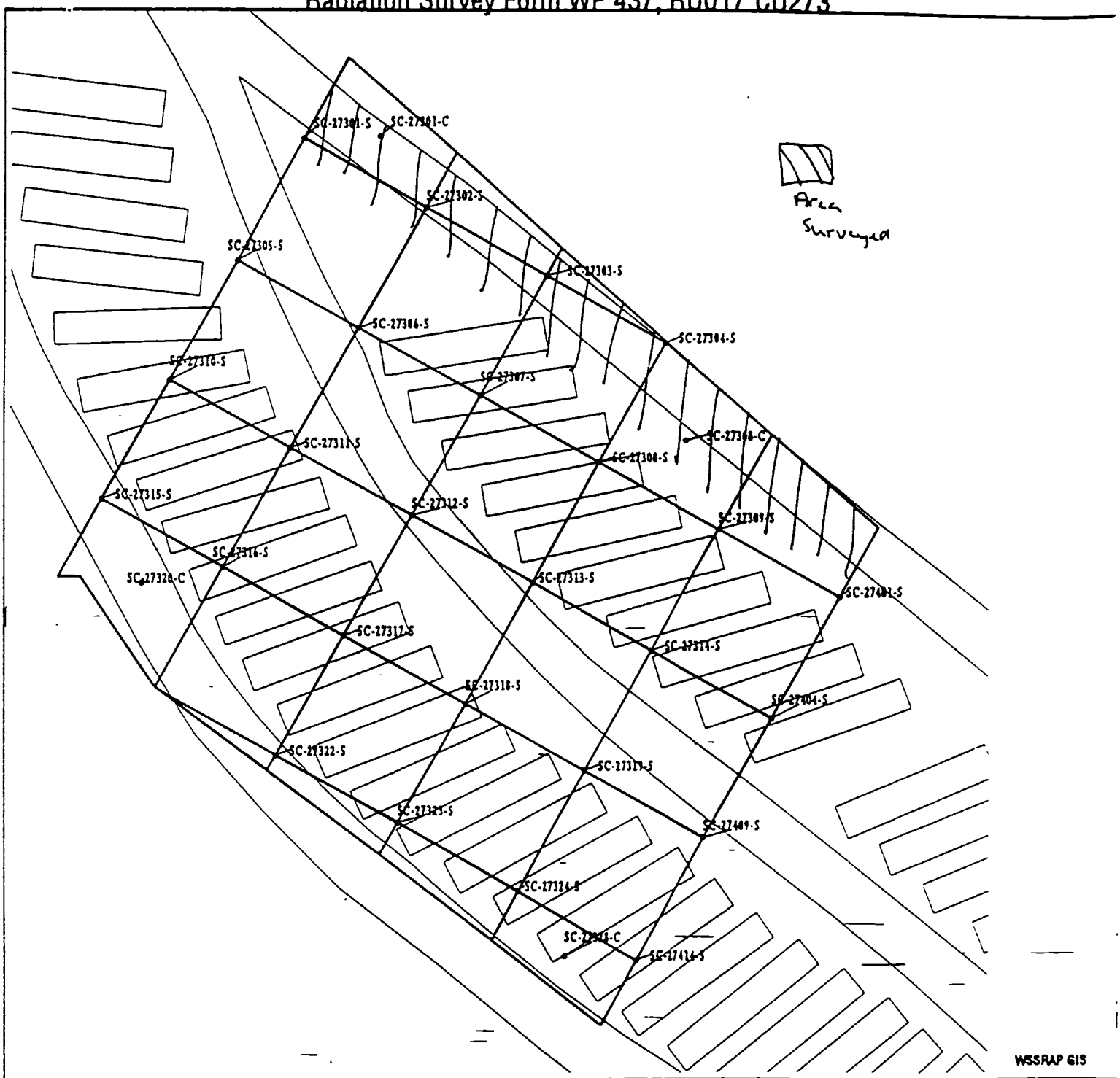
Calibration Due: 11-17-98/1-21-99

Field Bkg.: 9500

Comments: Area was surveyed and found to be below 1.5 Times above background.

Rcvd 9-3-98
1200 hrs

Radiation Survey Form WP 437, RU017 CU273



15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2221

Meter Serial#: 89636

Calibration Due: 11-20-98

Survey Date/Time: 9-3-98

Surveyor(s): C. Hamer & J. Rankins

Detector Model#: 2x2 NaI "K"

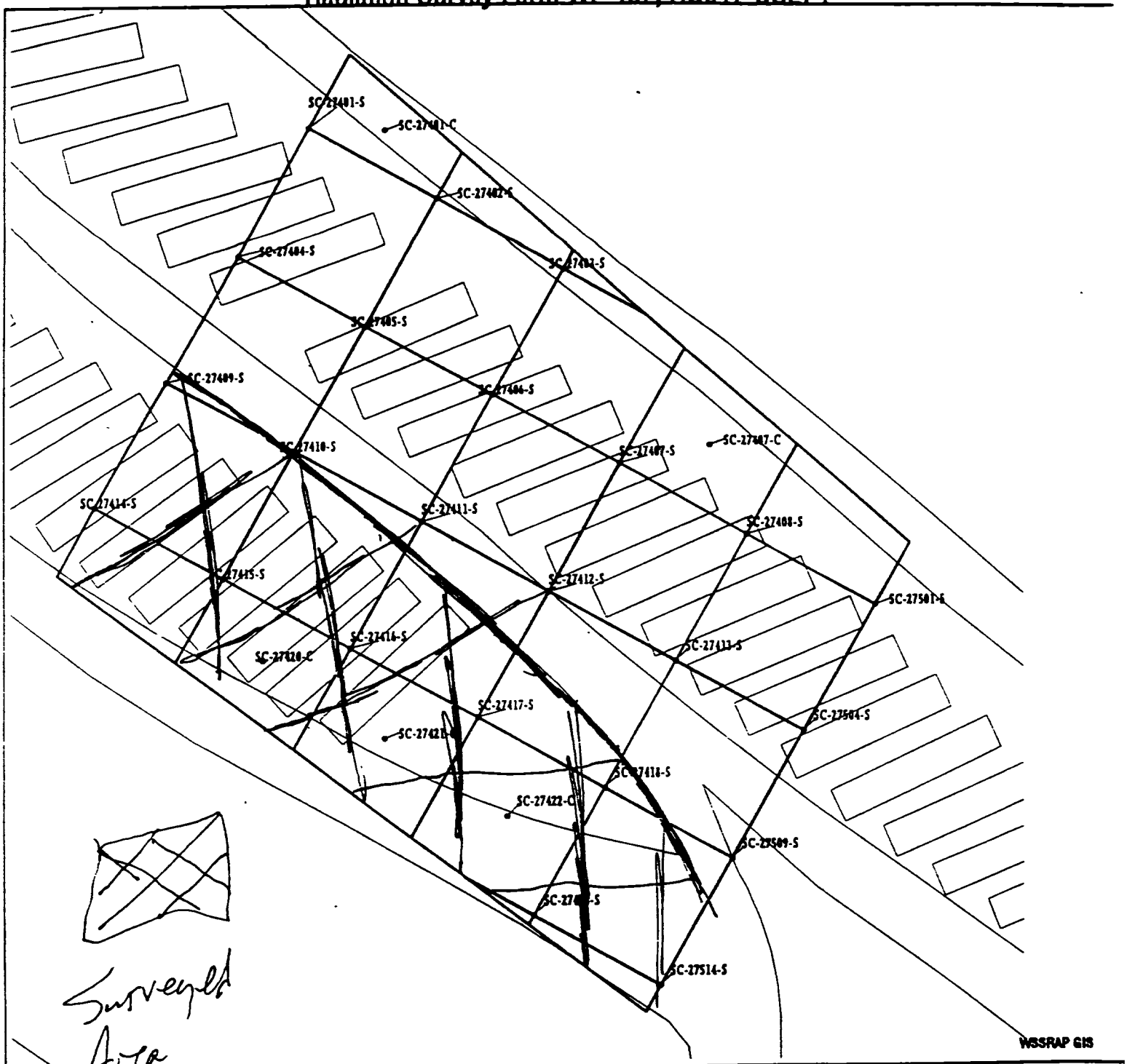
Detector Serial#: 126403

Calibration Due: 1-21-99

Field Bkg.: 12,000

Comments: Area was surveyed and found to be below 1.5 times background

Radiation Survey Form WP 437, BU017 CU274



Surveyed Area

15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2220/2221 Detector Model#: 2x2 NaI G/K

Meter Serial#: 48407/89636 Detector Serial#: 122912/12640

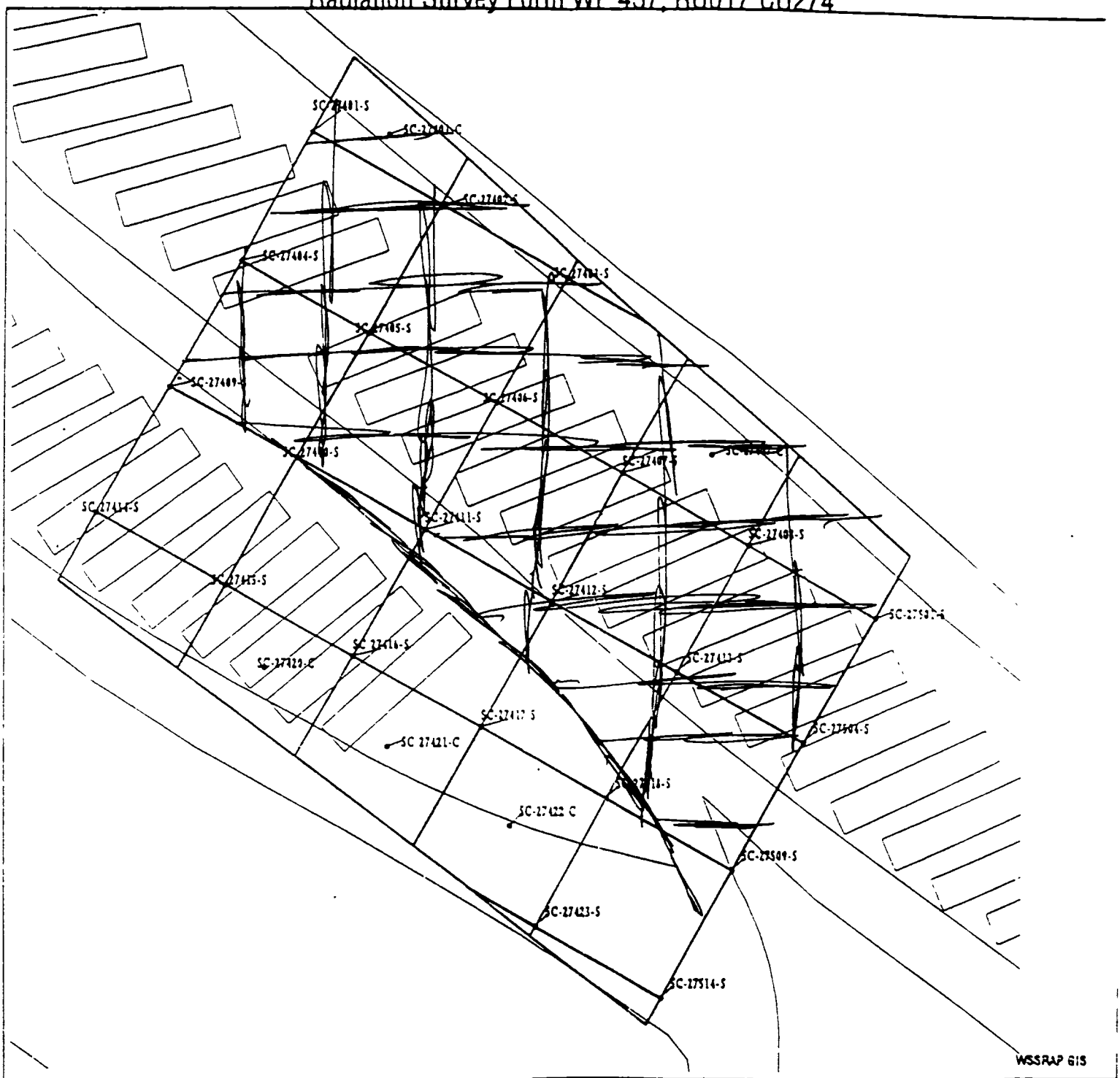
Calibration Due: 11-20-98/11-20-98 Calibration Due: 11-17-98/1-21-99

Survey Date/Time: 7-17-98 Field Bkg.: 10000 cpm

Surveyor(s): L. Hagoss / C. Hanner

Comments: The above area surveyed and found to be less than 1/2 of back-ground

Radiation Survey Form WP 437, BU017 CU274



15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2220 / 2221

Meter Serial#: 48407 / 89636

Calibration Due: 11-20-98 / 11-20-99

Survey Date/Time: 7-20-98

Surveyor(s): Chris Hanner / Jan Rankins

Detector Model#: 2x2 NaI G & K

Detector Serial#: 122192 / 120403

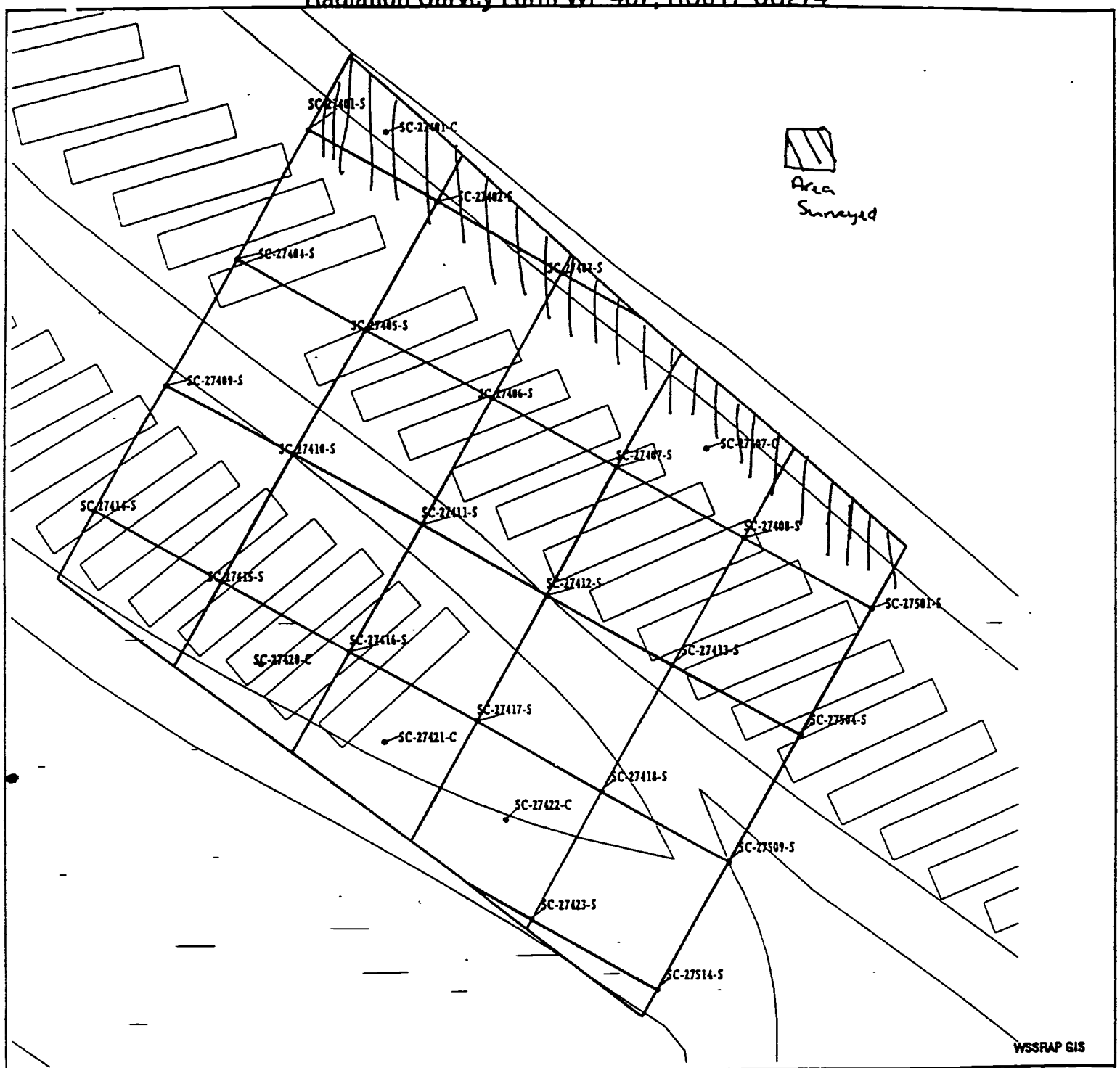
Calibration Due: 11-17-98 / 1-21-99

Field Bkg.: 9500 cpm

Comments: Area was surveyed and found to be below 1.5 Times above background

Rc'vd 9-3-98
1200HRS

Radiation Survey Form WP 437, RU017 CU274



15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2221

Meter Serial#: 89636

Calibration Due: 11-20-98

Survey Date/Time: 9-3-98

Surveyor(s): C. Hanner & J. Rankins

Detector Model#: 2x2 NaI "K"

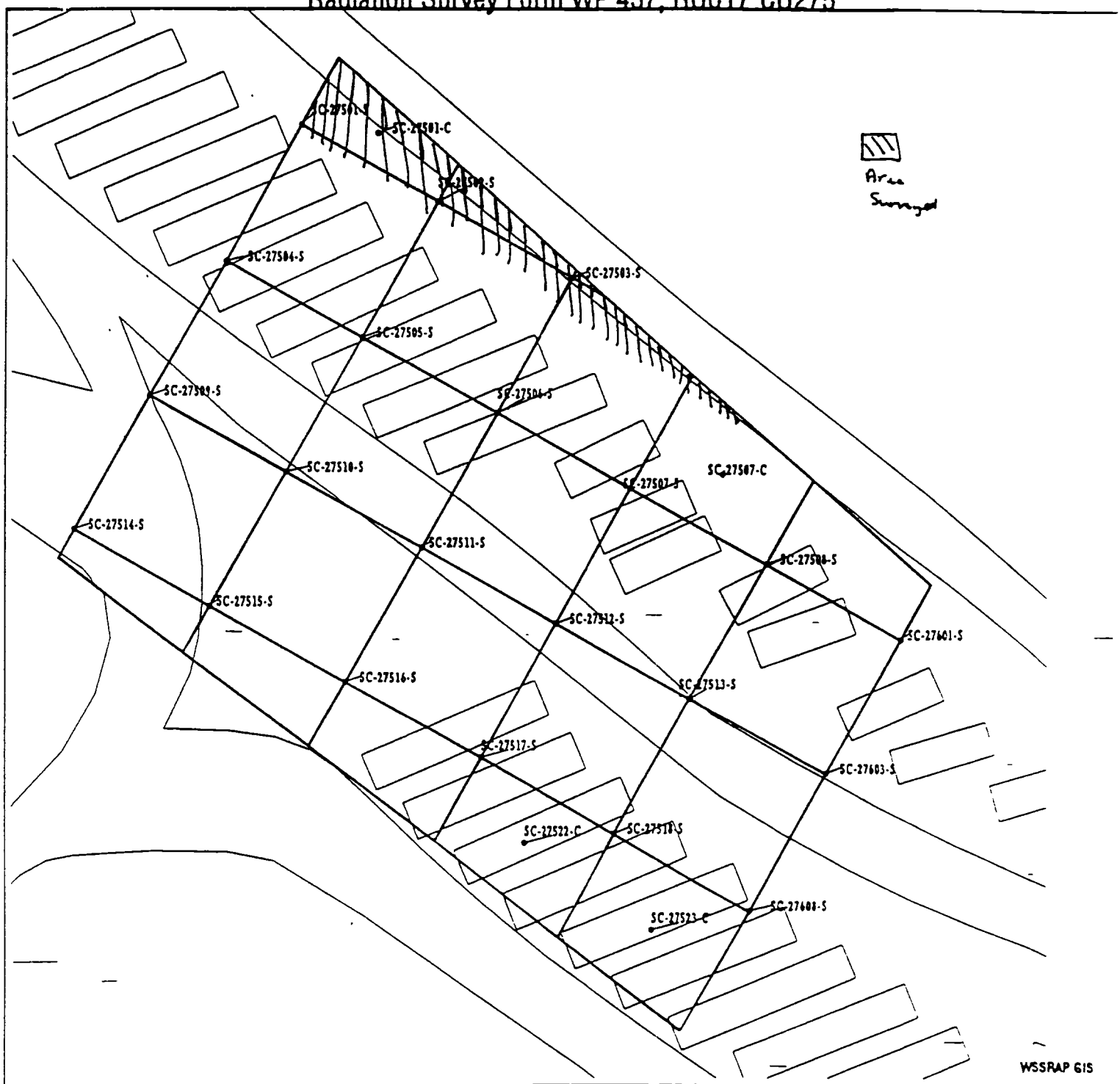
Detector Serial#: 126403

Calibration Due: 1-21-99

Field Bkg.: 12,000

Comments: Area was surveyed and found to be below 1.5 times background

Radiation Survey Form WP 437, RU017 CU275



15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2221

Meter Serial#: 89636

Calibration Due: 11-20-98

Survey Date/Time: 9-3-98

Surveyor(s): C. Hanner & J. Rankins

Detector Model#: 2x2 NaI "K"

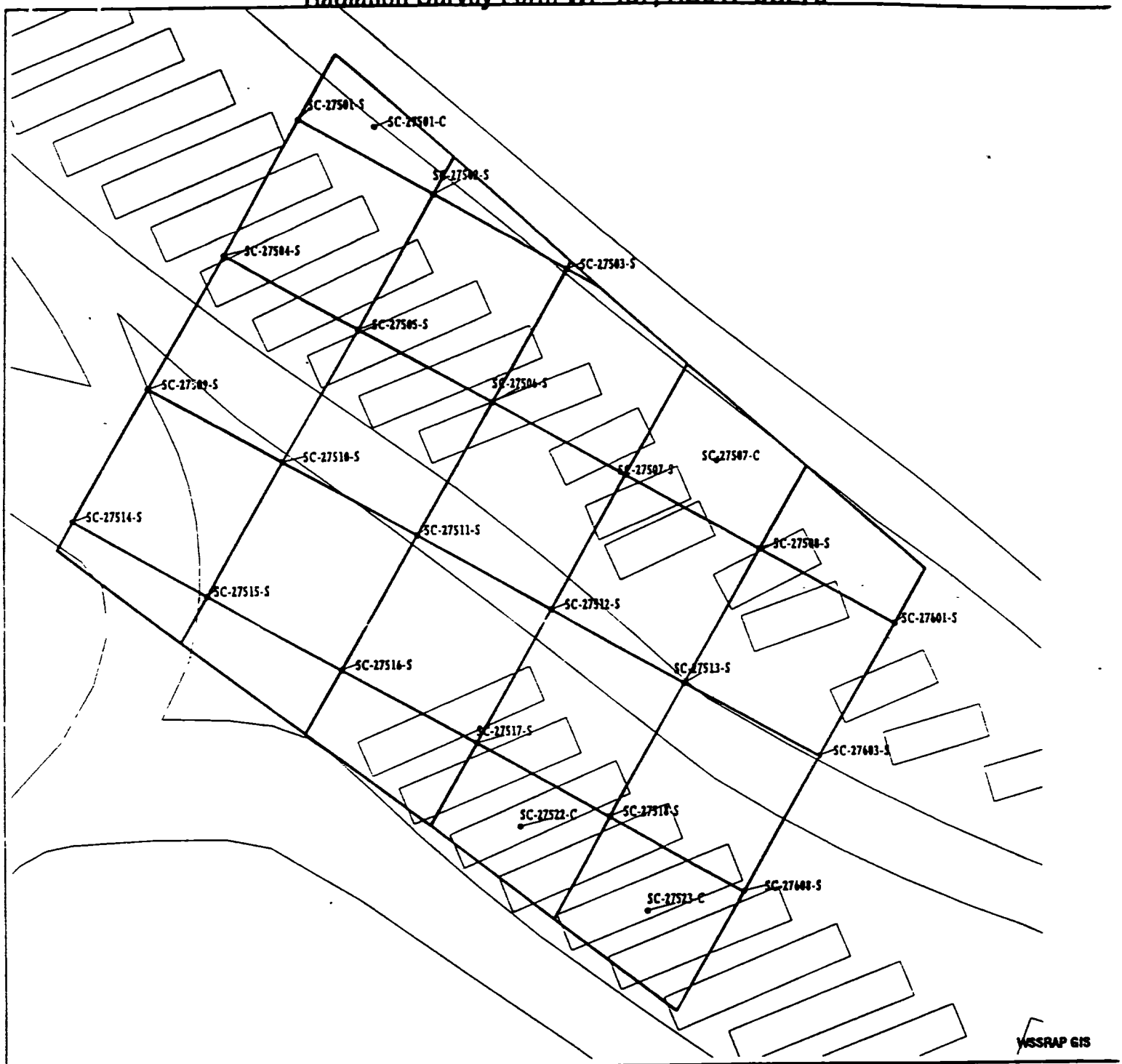
Detector Serial#: 126403

Calibration Due: 1-21-99

Field Bkg.: 12,000

Comments: Area was surveyed and found to be below 1.5 times background

Radiation Survey Form WP 437, BU017 CU275



15 7.5 0 METERS

45 22.5 0 FEET

N S

Meter Model#: 2221

Meter Serial#: 89636

Calibration Due: 11-20-98

Survey Date/Time: 7-24-98 / 1000

Surveyor(s): Jonathan Rankins

Comments: The above area was surveyed and found to be < 1.5 X BKGD.

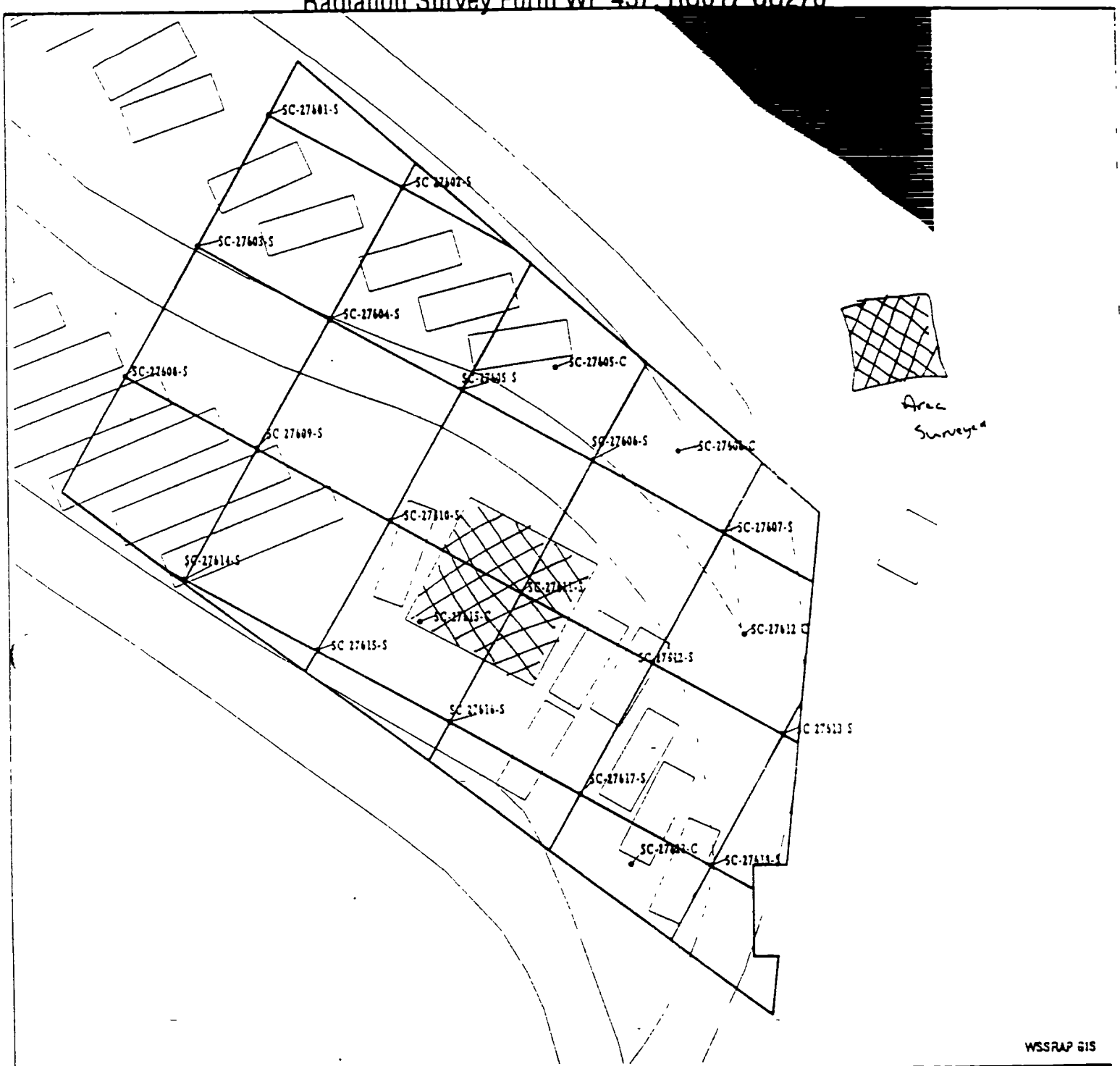
Detector Model#: "K" - 4330 (DOE)

Detector Serial#: 126403

Calibration Due: 1-21-99

Field Bkg.: 14000 cpm

Radiation Survey Form WP 437, RU017 CU276



WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2221 / 2221

Meter Serial#: 89636 / 117611

Calibration Due: 4-20-98 / 1-8-99

Detector Model#: 44-10 / 44-10

Detector Serial#: 126403 / 126402

Calibration Due: 1-21-99 / 1-22-99

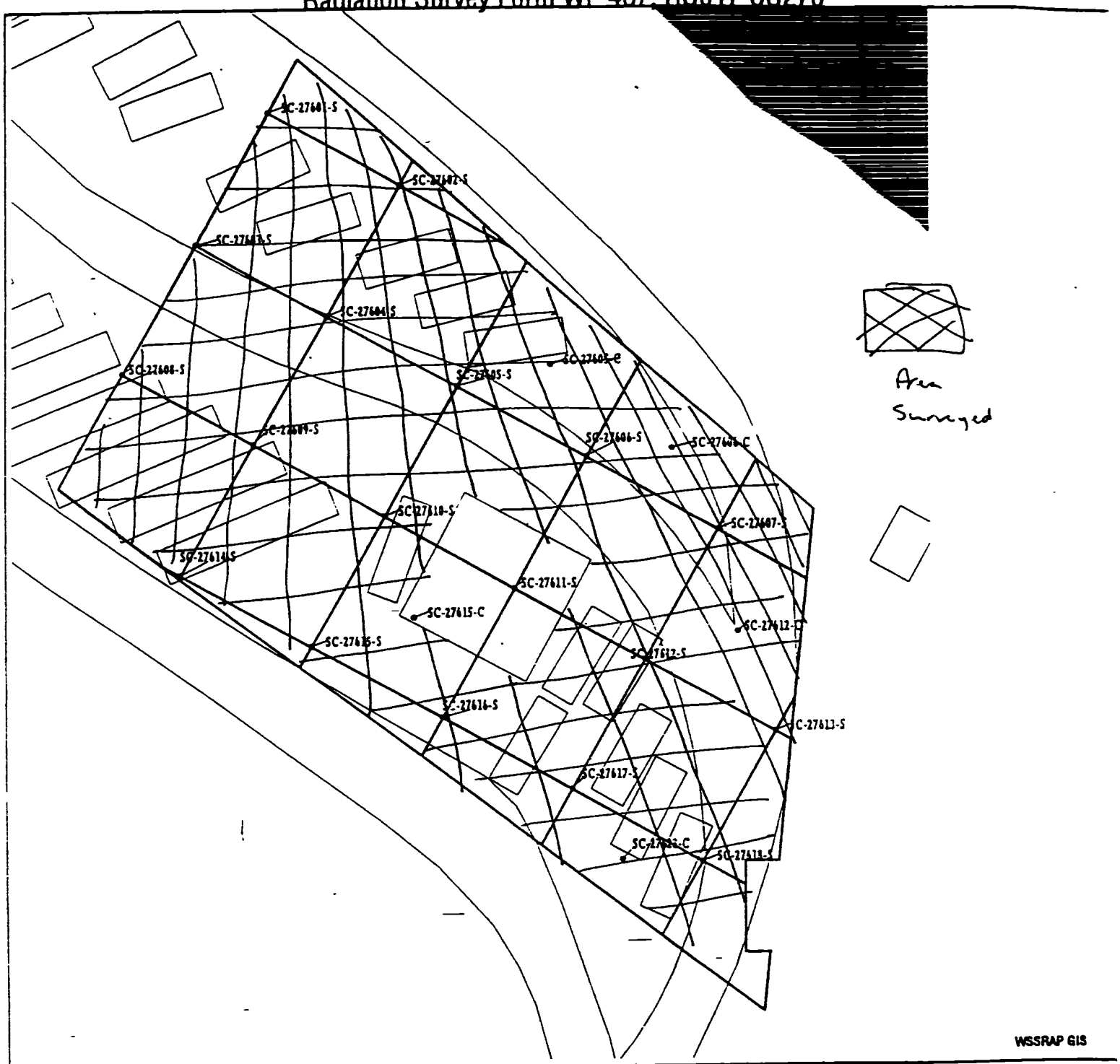
Survey Date/Time: 8/26/98

Field Bkg.: 11,000

Surveyor(s): C. Hanner & J. Rankins

Comments: Area was surveyed & found to be below 1.5 times background

Radiation Survey Form WP 437, BU017 CU276



WSSRAP GIS

15 7.5 0 METERS

45 22.5 0 FEET

Meter Model#: 2221

Meter Serial#: 117611

Calibration Due: 1-8-99

Survey Date/Time: 8/27/98

Surveyor(s): C. Hanner

Detector Model#: 2x2 NaI "J"

Detector Serial#: 126402

Calibration Due: 1-22-99

Field Bkg.: 10,500 cpm

Comments: Area Surveyed and found to be below 65 times background

APPENDIX B
Final Data

APPENDIX B WP-437 RU017 Final Data

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27506-S	07/25/1998	PCB	172	43	UG/KG
SC-27507-S	07/25/1998	PCB	0	45	UG/KG
SC-27510-S	07/25/1998	PCB	0	39	UG/KG
SC-27511-S	07/25/1998	PCB	510	39	UG/KG
SC-27515-S	07/25/1998	PCB	0	40	UG/KG
SC-27606-S	08/27/1998	PCB	0	40	UG/KG
SC-27606-C	08/27/1998	PCB	0	41	UG/KG
SC-27610-S	08/27/1998	PCB	0	38	UG/KG
SC-27611-S	08/27/1998	PCB	0	39	UG/KG
SC-27615-C	08/27/1998	PCB	0	37	UG/KG
SC-27506-S	07/25/1998	ARSENIC	8	0.56	UG/G
SC-27507-S	07/25/1998	ARSENIC	5	0.6	UG/G
SC-27510-S	07/25/1998	ARSENIC	3.9	0.6	UG/G
SC-27511-S	07/25/1998	ARSENIC	4.5	0.6	UG/G
SC-27515-S	07/25/1998	ARSENIC	8.1	0.58	UG/G
SC-27606-S	08/27/1998	ARSENIC	7	0.5	UG/G
SC-27606-C	08/27/1998	ARSENIC	11.6	0.49	UG/G
SC-27610-S	08/27/1998	ARSENIC	11.8	0.45	UG/G
SC-27611-S	08/27/1998	ARSENIC	15.5	0.45	UG/G
SC-27615-C	08/27/1998	ARSENIC	8.9	0.45	UG/G
SC-27618-S	08/27/1998	ARSENIC	8.2	0.48	UG/G
SC-27207-S	07/16/1998	PAH	0	9.5	UG/KG
SC-27209-S	09/04/1998	PAH	0	11	UG/KG
SC-27214-S	07/16/1998	PAH	0	11	UG/KG
SC-27215-S	07/16/1998	PAH	0	10	UG/KG
SC-27216-S	07/21/1998	PAH	0	10	UG/KG
SC-27216-C	09/04/1998	PAH	0	10	UG/KG
SC-27221-S	07/16/1998	PAH	0	11	UG/KG
SC-27222-S	07/16/1998	PAH	0	11	UG/KG
SC-27226-C	07/16/1998	PAH	0	11	UG/KG
SC-27227-S	07/16/1998	PAH	0	12	UG/KG
SC-27228-C	07/16/1998	PAH	0	10	UG/KG
SC-27229-S	07/16/1998	PAH	0	10	UG/KG
SC-27301-S	09/03/1998	PAH	0	10	UG/KG
SC-27301-C	09/03/1998	PAH	0	10	UG/KG
SC-27302-S	09/03/1998	PAH	0	10	UG/KG
SC-27303-S	09/03/1998	PAH	0	11	UG/KG
SC-27304-S	09/03/1998	PAH	0	11	UG/KG
SC-27305-S	07/21/1998	PAH	0	9.9	UG/KG
SC-27306-S	07/21/1998	PAH	0	11	UG/KG
SC-27307-S	07/21/1998	PAH	0	11	UG/KG
SC-27308-S	07/21/1998	PAH	0	12	UG/KG
SC-27308-C	09/03/1998	PAH	0	12	UG/KG
SC-27309-S	07/21/1998	PAH	0	12	UG/KG
SC-27310-S	07/16/1998	PAH	0	10	UG/KG
SC-27311-S	07/21/1998	PAH	0	9.6	UG/KG

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS	
SC-27312-S	07/21/1998	PAH	0	10	UG/KG	
SC-27313-S	07/21/1998	PAH	0	12	UG/KG	
SC-27314-S	07/21/1998	PAH	186	9.6	UG/KG	
SC-27315-S	07/16/1998	PAH	0	11	UG/KG	
SC-27316-S	07/17/1998	PAH	0	9.7	UG/KG	
SC-27317-S	07/17/1998	PAH	0	11	UG/KG	
SC-27318-S	07/17/1998	PAH	0	12	UG/KG	
SC-27319-S	07/21/1998	PAH	0	11	UG/KG	
SC-27320-C	07/17/1998	PAH	0	10	UG/KG	
SC-27321-C	07/17/1998	PAH	0	10	UG/KG	
SC-27322-S	07/17/1998	PAH	0	12	UG/KG	
SC-27323-S	07/17/1998	PAH	0	11	UG/KG	
SC-27324-S	07/17/1998	PAH	0	10	UG/KG	
SC-27328-C	07/17/1998	PAH	0	11	UG/KG	
SC-27401-S	09/03/1998	PAH	0	12	UG/KG	
SC-27401-C	09/03/1998	PAH	0	12	UG/KG	
SC-27402-S	09/03/1998	PAH	0	12	UG/KG	
SC-27403-S	09/03/1998	PAH	0	12	UG/KG	
SC-27404-S	07/21/1998	PAH	0	11	UG/KG	
SC-27405-S	07/21/1998	PAH	0	10	UG/KG	
SC-27406-S	07/21/1998	PAH	0	11	UG/KG	SUM
SC-27407-C	07/21/1998	PAH	2872	99.2	UG/KG	
SC-27407-S	07/21/1998	PAH	6649	11	UG/KG	
SC-27407-C-HS01	07/31/1998	PAH	794	12	UG/KG	
SC-27407-C-HS04	07/31/1998	PAH	1010	60	UG/KG	
SC-27407-C-HS03	07/31/1998	PAH	2620	11	UG/KG	
SC-27407-C-HS02	07/31/1998	PAH	1320	11	UG/KG	
SC-27408-S	07/21/1998	PAH	42	10	UG/KG	
SC-27409-S	07/21/1998	PAH	0	11	UG/KG	
SC-27410-S	07/21/1998	PAH	0	11	UG/KG	
SC-27411-S	07/21/1998	PAH	0	10	UG/KG	
SC-27412-S	07/21/1998	PAH	0	9 6	UG/KG	
SC-27413-S	07/21/1998	PAH	0	9.7	UG/KG	
SC-27414-S	07/17/1998	PAH	295	9 8	UG/KG	SUM
SC-27415-S	07/17/1998	PAH	0	10	UG/KG	
SC-27416-S	07/17/1998	PAH	113	9 8	UG/KG	
SC-27417-S	07/21/1998	PAH	0	9 4	UG/KG	
SC-27418-S	07/21/1998	PAH	0	9.6	UG/KG	
SC-27420-C	07/17/1998	PAH	63	11	UG/KG	
SC-27421-C	07/17/1998	PAH	0	10	UG/KG	
SC-27422-C	07/17/1998	PAH	0	9.8	UG/KG	
SC-27423-S	07/25/1998	PAH	190	190	UG/KG	
SC-27501-C	07/25/1998	PAH	740	180	UG/KG	
SC-27501-S	07/25/1998	PAH	1280	190	UG/KG	
SC-27502-S	07/25/1998	PAH	1700	180	UG/KG	
SC-27502-S-RS	09/03/1998	PAH	0	11	UG/KG	
SC-27503-S	07/25/1998	PAH	810	180	UG/KG	
SC-27504-S	07/25/1998	PAH	520	200	UG/KG	

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27505-S	07/25/1998	PAH	0	210	UG/KG
SC-27506-S	07/25/1998	PAH	1058	220	UG/KG
SC-27507-S	07/25/1998	PAH	0	220	UG/KG
SC-27509-S	07/25/1998	PAH	0	190	UG/KG
SC-27510-S	07/25/1998	PAH	0	200	UG/KG
SC-27511-S	07/25/1998	PAH	1520	190	UG/KG
SC-27514-S	07/25/1998	PAH	0	180	UG/KG
SC-27515-S	07/25/1998	PAH	0	200	UG/KG
SC-27506-S	07/25/1998	CHROMIUM	18.7	0.12	UG/G
SC-27507-S	07/25/1998	CHROMIUM	13.3	0.14	UG/G
SC-27510-S	07/25/1998	CHROMIUM	12.4	0.14	UG/G
SC-27511-S	07/25/1998	CHROMIUM	15.4	0.14	UG/G
SC-27515-S	07/25/1998	CHROMIUM	13.5	0.14	UG/G
SC-27606-C	08/27/1998	CHROMIUM	13.9	0.2	UG/G
SC-27606-S	08/27/1998	CHROMIUM	12.9	0.2	UG/G
SC-27610-S	08/27/1998	CHROMIUM	15.3	0.18	UG/G
SC-27611-S	08/27/1998	CHROMIUM	11.8	0.18	UG/G
SC-27615-C	08/27/1998	CHROMIUM	13.8	0.18	UG/G
SC-27506-S	07/25/1998	LEAD	12	0.28	UG/G
SC-27507-S	07/25/1998	LEAD	8	0.3	UG/G
SC-27510-S	07/25/1998	LEAD	8.1	0.3	UG/G
SC-27511-S	07/25/1998	LEAD	10.7	0.3	UG/G
SC-27515-S	07/25/1998	LEAD	7.2	0.28	UG/G
SC-27606-C	08/27/1998	LEAD	11.7	0.4	UG/G
SC-27606-S	08/27/1998	LEAD	11.9	0.4	UG/G
SC-27610-S	08/27/1998	LEAD	17.9	0.36	UG/G
SC-27611-S	08/27/1998	LEAD	18.7	0.36	UG/G
SC-27615-C	08/27/1998	LEAD	12.4	0.36	UG/G
SC-27207-S	07/16/1998	RADIUM-226	0.76	0.28	PCI/G
SC-27209-S	09/04/1998	RADIUM-226	1.05	0.41	PCI/G
SC-27214-S	07/16/1998	RADIUM-226	1 35	0.23	PCI/G
SC-27215-S	07/16/1998	RADIUM-226	0.86	0.29	PCI/G
SC-27216-S	07/21/1998	RADIUM-226	1.15	0.42	PCI/G
SC-27216-C	09/04/1998	RADIUM-226	1.31	0.31	PCI/G
SC-27221-S	07/16/1998	RADIUM-226	1.12	0.25	PCI/G
SC-27222-S	07/16/1998	RADIUM-226	1.62	0.33	PCI/G
SC-27226-C	07/16/1998	RADIUM-226	1.43	0.26	PCI/G
SC-27227-S	07/16/1998	RADIUM-226	1.13	0.47	PCI/G
SC-27228-C	07/16/1998	RADIUM-226	1.24	0.27	PCI/G
SC-27229-S	07/16/1998	RADIUM-226	1.02	0.36	PCI/G
SC-27301-S	09/03/1998	RADIUM-226	1.41	0.19	PCI/G
SC-27301-C	09/03/1998	RADIUM-226	1.7	0.32	PCI/G
SC-27302-S	09/03/1998	RADIUM-226	1.27	0.33	PCI/G
SC-27303-S	09/03/1998	RADIUM-226	1.15	0.24	PCI/G
SC-27304-S	09/03/1998	RADIUM-226	1.08	0.25	PCI/G
SC-27305-S	07/21/1998	RADIUM-226	1.24	0.27	PCI/G
SC-27306-S	07/21/1998	RADIUM-226	1.52	0.29	PCI/G
SC-27307-S	07/21/1998	RADIUM-226	1.32	0.32	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27308-S	07/21/1998	RADIUM-226	1 11	0.33	PCI/G
SC-27308-C	09/03/1998	RADIUM-226	0 38	0.76	PCI/G
SC-27309-S	07/21/1998	RADIUM-226	1.24	0.27	PCI/G
SC-27310-S	07/16/1998	RADIUM-226	1.44	0.34	PCI/G
SC-27311-S	07/21/1998	RADIUM-226	1.35	0.35	PCI/G
SC-27312-S	07/21/1998	RADIUM-226	1.68	0.26	PCI/G
SC-27313-S	07/21/1998	RADIUM-226	1 29	0.26	PCI/G
SC-27314-S	07/21/1998	RADIUM-226	1 19	0.3	PCI/G
SC-27315-S	07/16/1998	RADIUM-226	1.04	0.33	PCI/G
SC-27316-S	07/17/1998	RADIUM-226	1.42	0.26	PCI/G
SC-27317-S	07/17/1998	RADIUM-226	1.34	0.21	PCI/G
SC-27318-S	07/17/1998	RADIUM-226	1.17	0.33	PCI/G
SC-27319-S	07/21/1998	RADIUM-226	1 41	0.3	PCI/G
SC-27320-C	07/17/1998	RADIUM-226	1 27	0.31	PCI/G
SC-27321-C	07/17/1998	RADIUM-226	1 11	0 32	PCI/G
SC-27322-S	07/17/1998	RADIUM-226	1 16	0 24	PCI/G
SC-27323-S	07/17/1998	RADIUM-226	1 2	0.32	PCI/G
SC-27324-S	07/17/1998	RADIUM-226	1 32	0.29	PCI/G
SC-27328-C	07/17/1998	RADIUM-226	1.23	0 37	PCI/G
SC-27401-C	09/03/1998	RADIUM-226	0.95	0.26	PCI/G
SC-27401-S	09/03/1998	RADIUM-226	0 99	0.41	PCI/G
SC-27402-S	09/03/1998	RADIUM-226	1 12	0.28	PCI/G
SC-27403-S	09/03/1998	RADIUM-226	1 01	0.37	PCI/G
SC-27404-S	07/21/1998	RADIUM-226	1 19	0 23	PCI/G
SC-27405-S	07/21/1998	RADIUM-226	1 18	0 35	PCI/G
SC-27406-S	07/21/1998	RADIUM-226	1 47	0 24	PCI/G
SC-27407-S	07/21/1998	RADIUM-226	2 11	0 28	PCI/G
SC-27407-C	07/21/1998	RADIUM-226	1 23	0 44	PCI/G
SC-27408-S	07/21/1998	RADIUM-226	1.44	0 43	PCI/G
SC-27409-S	07/21/1998	RADIUM-226	1 34	0 24	PCI/G
SC-27410-S	07/21/1998	RADIUM-226	1.28	0 21	PCI/G
SC-27411-S	07/21/1998	RADIUM-226	1.26	0 24	PCI/G
SC-27412-S	07/21/1998	RADIUM-226	0 87	0 31	PCI/G
SC-27413-S	07/21/1998	RADIUM-226	1 28	0.18	PCI/G
SC-27414-S	07/17/1998	RADIUM-226	7.6	0.48	PCI/G
SC-27414-S-RS	07/22/1998	RADIUM-226	0 86	0.34	PCI/G
SC-27415-S	07/17/1998	RADIUM-226	1.19	0.35	PCI/G
SC-27416-S	07/17/1998	RADIUM-226	4 28	0.36	PCI/G
SC-27416-S-RS	07/22/1998	RADIUM-226	1.27	0 25	PCI/G
SC-27417-S	07/21/1998	RADIUM-226	1 48	0.29	PCI/G
SC-27418-S	07/21/1998	RADIUM-226	2 11	0.24	PCI/G
SC-27420-C	07/17/1998	RADIUM-226	1 18	0 28	PCI/G
SC-27421-C	07/17/1998	RADIUM-226	2 11	0.31	PCI/G
SC-27422-C	07/17/1998	RADIUM-226	1 11	0.27	PCI/G
SC-27423-S	07/25/1998	RADIUM-226	1.46	0.31	PCI/G
SC-27501-C	07/25/1998	RADIUM-226	1.58	0 47	PCI/G
SC-27501-S	07/25/1998	RADIUM-226	1 94	0 29	PCI/G
SC-27502-S	07/25/1998	RADIUM-226	2 74	0 43	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27502-S-RS	09/03/1998	RADIUM-226	1.16	0.26	PCI/G
SC-27503-S	07/25/1998	RADIUM-226	1.51	0.29	PCI/G
SC-27504-S	07/25/1998	RADIUM-226	1.32	0.33	PCI/G
SC-27505-S	07/25/1998	RADIUM-226	1.76	0.27	PCI/G
SC-27506-S	07/25/1998	RADIUM-226	2.48	0.42	PCI/G
SC-27507-S	07/25/1998	RADIUM-226	1.57	0.4	PCI/G
SC-27509-S	07/25/1998	RADIUM-226	1.42	0.41	PCI/G
SC-27510-S	07/25/1998	RADIUM-226	1.24	0.22	PCI/G
SC-27511-S	07/25/1998	RADIUM-226	5.92	0.63	PCI/G
SC-27511-S-RS	08/03/1998	RADIUM-226	1.59	0.33	PCI/G
SC-27514-S	07/25/1998	RADIUM-226	1.51	0.27	PCI/G
SC-27515-S	07/25/1998	RADIUM-226	1.47	0.4	PCI/G
SC-27606-C	08/27/1998	RADIUM-226	0.947	0.298	PCI/G
SC-27606-S	08/27/1998	RADIUM-226	0.93	0.328	PCI/G
SC-27610-S	08/27/1998	RADIUM-226	0.668	0.252	PCI/G
SC-27611-S	08/27/1998	RADIUM-226	0.743	0.335	PCI/G
SC-27615-C	08/27/1998	RADIUM-226	0.746	0.373	PCI/G
SC-27618-S	08/27/1998	RADIUM-226	1.24	0.522	PCI/G
SC-27207-S	07/16/1998	RADIUM-228	0.505	1.01	PCI/G
SC-27209-S	09/04/1998	RADIUM-228	1.22	0.59	PCI/G
SC-27214-S	07/16/1998	RADIUM-228	1.4	0.37	PCI/G
SC-27215-S	07/16/1998	RADIUM-228	0.98	0.44	PCI/G
SC-27216-S	07/21/1998	RADIUM-228	0.57	0.68	PCI/G
SC-27216-C	09/04/1998	RADIUM-228	1.12	0.32	PCI/G
SC-27221-S	07/16/1998	RADIUM-228	1.25	0.36	PCI/G
SC-27222-S	07/16/1998	RADIUM-228	1.41	0.14	PCI/G
SC-27226-C	07/16/1998	RADIUM-228	1.21	0.39	PCI/G
SC-27227-S	07/16/1998	RADIUM-228	0.68	1.36	PCI/G
SC-27228-C	07/16/1998	RADIUM-228	1.26	0.36	PCI/G
SC-27229-S	07/16/1998	RADIUM-228	1.35	0.48	PCI/G
SC-27301-C	09/03/1998	RADIUM-228	1.06	0.65	PCI/G
SC-27301-S	09/03/1998	RADIUM-228	1.03	0.48	PCI/G
SC-27302-S	09/03/1998	RADIUM-228	1.28	0.5	PCI/G
SC-27303-S	09/03/1998	RADIUM-228	1.33	0.38	PCI/G
SC-27304-S	09/03/1998	RADIUM-228	0.99	0.41	PCI/G
SC-27305-S	07/21/1998	RADIUM-228	1.11	0.38	PCI/G
SC-27306-S	07/21/1998	RADIUM-228	1.41	0.58	PCI/G
SC-27307-S	07/21/1998	RADIUM-228	1.54	0.54	PCI/G
SC-27308-S	07/21/1998	RADIUM-228	1.36	0.51	PCI/G
SC-27308-C	09/03/1998	RADIUM-228	1.62	0.63	PCI/G
SC-27309-S	07/21/1998	RADIUM-228	1.55	0.32	PCI/G
SC-27310-S	07/16/1998	RADIUM-228	1.26	0.36	PCI/G
SC-27311-S	07/21/1998	RADIUM-228	0.615	1.23	PCI/G
SC-27312-S	07/21/1998	RADIUM-228	1.21	0.4	PCI/G
SC-27313-S	07/21/1998	RADIUM-228	1.18	0.36	PCI/G
SC-27314-S	07/21/1998	RADIUM-228	1.03	0.44	PCI/G
SC-27315-S	07/16/1998	RADIUM-228	1.28	0.49	PCI/G
SC-27316-S	07/17/1998	RADIUM-228	1.13	0.52	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27317-S	07/17/1998	RADIUM-228	1.44	0.43	PCI/G
SC-27318-S	07/17/1998	RADIUM-228	1.54	0.6	PCI/G
SC-27319-S	07/21/1998	RADIUM-228	0.62	1.24	PCI/G
SC-27320-C	07/17/1998	RADIUM-228	1 02	0.28	PCI/G
SC-27321-C	07/17/1998	RADIUM-228	1.32	0.49	PCI/G
SC-27322-S	07/17/1998	RADIUM-228	1 15	0 32	PCI/G
SC-27323-S	07/17/1998	RADIUM-228	0.63	1.26	PCI/G
SC-27324-S	07/17/1998	RADIUM-228	1.3	0.44	PCI/G
SC-27328-C	07/17/1998	RADIUM-228	1.19	0.73	PCI/G
SC-27401-C	09/03/1998	RADIUM-228	1 19	0.36	PCI/G
SC-27401-S	09/03/1998	RADIUM-228	1 12	0.45	PCI/G
SC-27402-S	09/03/1998	RADIUM-228	1 37	0.11	PCI/G
SC-27403-S	09/03/1998	RADIUM-228	1.46	0 27	PCI/G
SC-27404-S	07/21/1998	RADIUM-228	1.16	0.31	PCI/G
SC-27405-S	07/21/1998	RADIUM-228	1.22	0 61	PCI/G
SC-27406-S	07/21/1998	RADIUM-228	1.17	0.4	PCI/G
SC-27407-C	07/21/1998	RADIUM-228	0 9	0.53	PCI/G
SC-27407-S	07/21/1998	RADIUM-228	1.39	0.44	PCI/G
SC-27408-S	07/21/1998	RADIUM-228	1.48	0 57	PCI/G
SC-27409-S	07/21/1998	RADIUM-228	1 44	0.42	PCI/G
SC-27410-S	07/21/1998	RADIUM-228	1 18	0.41	PCI/G
SC-27411-S	07/21/1998	RADIUM-228	0.95	0.36	PCI/G
SC-27412-S	07/21/1998	RADIUM-228	0 365	0.73	PCI/G
SC-27413-S	07/21/1998	RADIUM-228	0.34	0.68	PCI/G
SC-27414-S	07/17/1998	RADIUM-228	1 69	0.48	PCI/G
SC-27414-S-RS	07/22/1998	RADIUM-228	1 37	0 7	PCI/G
SC-27415-S	07/17/1998	RADIUM-228	1 22	0 24	PCI/G
SC-27416-S	07/17/1998	RADIUM-228	1 03	0 43	PCI/G
SC-27416-S-RS	07/22/1998	RADIUM-228	1 18	0.34	PCI/G
SC-27417-S	07/21/1998	RADIUM-228	1 32	0.61	PCI/G
SC-27418-S	07/21/1998	RADIUM-228	0 48	0 34	PCI/G
SC-27420-C	07/17/1998	RADIUM-228	0 39	0 78	PCI/G
SC-27421-C	07/17/1998	RADIUM-228	0 93	0.31	PCI/G
SC-27422-C	07/17/1998	RADIUM-228	0 9	0.39	PCI/G
SC-27423-S	07/25/1998	RADIUM-228	1.07	0.43	PCI/G
SC-27501-S	07/25/1998	RADIUM-228	1.09	0.5	PCI/G
SC-27501-C	07/25/1998	RADIUM-228	0 545	1 09	PCI/G
SC-27502-S	07/25/1998	RADIUM-228	1 08	0.5	PCI/G
SC-27502-S-RS	09/03/1998	RADIUM-228	1 17	0.34	PCI/G
SC-27503-S	07/25/1998	RADIUM-228	1 26	0.27	PCI/G
SC-27504-S	07/25/1998	RADIUM-228	1 37	0.56	PCI/G
SC-27505-S	07/25/1998	RADIUM-228	1 35	0.42	PCI/G
SC-27506-S	07/25/1998	RADIUM-228	1 19	0.69	PCI/G
SC-27507-S	07/25/1998	RADIUM-228	0 455	0.91	PCI/G
SC-27509-S	07/25/1998	RADIUM-228	1 5	0.53	PCI/G
SC-27510-S	07/25/1998	RADIUM-228	1 12	0.32	PCI/G
SC-27511-S	07/25/1998	RADIUM-228	1 03	0.83	PCI/G
SC-27511-S-RS	08/03/1998	RADIUM-228	1 32	0 5	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27514-S	07/25/1998	RADIUM-228	0.9	0.34	PCI/G
SC-27515-S	07/25/1998	RADIUM-228	1.11	0.5	PCI/G
SC-27606-C	08/27/1998	RADIUM-228	1.11	0.591	PCI/G
SC-27606-S	08/27/1998	RADIUM-228	0.703	1.12	PCI/G
SC-27610-S	08/27/1998	RADIUM-228	0.958	0.582	PCI/G
SC-27611-S	08/27/1998	RADIUM-228	0.959	0.739	PCI/G
SC-27615-C	08/27/1998	RADIUM-228	0.677	1.06	PCI/G
SC-27618-S	08/27/1998	RADIUM-228	1.27	1.08	PCI/G
SC-27506-S	07/25/1998	THALLIUM	0.37	0.74	UG/G
SC-27507-S	07/25/1998	THALLIUM	0.39	0.78	UG/G
SC-27510-S	07/25/1998	THALLIUM	0.39	0.78	UG/G
SC-27511-S	07/25/1998	THALLIUM	0.39	0.78	UG/G
SC-27515-S	07/25/1998	THALLIUM	0.38	0.76	UG/G
SC-27506-S	07/25/1998	THORIUM-230	38.8	0.62	PCI/G
SC-27506-S-RS	08/03/1998	THORIUM-230	1.4	0.62	PCI/G
SC-27507-S	07/25/1998	THORIUM-230	4.24	0.62	PCI/G
SC-27510-S	07/25/1998	THORIUM-230	0.97	0.62	PCI/G
SC-27511-S	07/25/1998	THORIUM-230	14	0.62	PCI/G
SC-27511-S-RS	08/03/1998	THORIUM-230	1.38	0.62	PCI/G
SC-27515-S	07/25/1998	THORIUM-230	1.5	0.62	PCI/G
SC-27606-S	08/27/1998	THORIUM-230	0.315	0.242	PCI/G
SC-27606-C	08/27/1998	THORIUM-230	0.404	0.181	PCI/G
SC-27610-S	08/27/1998	THORIUM-230	1.1	0.404	PCI/G
SC-27611-S	08/27/1998	THORIUM-230	1.62	0.359	PCI/G
SC-27615-C	08/27/1998	THORIUM-230	1.25	0.532	PCI/G
SC-27618-S	08/27/1998	THORIUM-230	1.28	0.468	PCI/G
SC-27506-S	07/25/1998	THORIUM-232	1.22	0.69	PCI/G
SC-27507-S	07/25/1998	THORIUM-232	0.47	0.91	PCI/G
SC-27510-S	07/25/1998	THORIUM-232	1.15	0.32	PCI/G
SC-27511-S	07/25/1998	THORIUM-232	1.06	0.83	PCI/G
SC-27511-S-RS	08/03/1998	THORIUM-232	1.35	0.5	PCI/G
SC-27515-S	07/25/1998	THORIUM-232	1.14	0.5	PCI/G
SC-27606-C	08/27/1998	THORIUM-232	0.374	0.195	PCI/G
SC-27606-S	08/27/1998	THORIUM-232	0.302	0.261	PCI/G
SC-27610-S	08/27/1998	THORIUM-232	0.776	0.435	PCI/G
SC-27611-S	08/27/1998	THORIUM-232	0.87	0.387	PCI/G
SC-27615-C	08/27/1998	THORIUM-232	0.789	0.574	PCI/G
SC-27618-S	08/27/1998	THORIUM-232	0.619	0.504	PCI/G
SC-27206-C	11/05/1998	URANIUM-238	1.77	3.54	PCI/G
SC-27207-S	07/16/1998	URANIUM-238	1.7	3.4	PCI/G
SC-27208-S	11/05/1998	URANIUM-238	1.2	2.4	PCI/G
SC-27209-S	09/04/1998	URANIUM-238	1.99	3.98	PCI/G
SC-27214-S	07/16/1998	URANIUM-238	1.43	2.86	PCI/G
SC-27215-S	07/16/1998	URANIUM-238	1.645	3.29	PCI/G
SC-27216-S	07/21/1998	URANIUM-238	2.52	2.14	PCI/G
SC-27216-C	09/04/1998	URANIUM-238	1.325	2.65	PCI/G
SC-27221-S	07/16/1998	URANIUM-238	1.325	2.65	PCI/G
SC-27222-S	07/16/1998	URANIUM-238	2 02	4.04	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27226-C	07/16/1998	URANIUM-238	2 45	2.58	PCI/G
SC-27227-S	07/16/1998	URANIUM-238	15.9	4.86	PCI/G
SC-27228-C	07/16/1998	URANIUM-238	1.36	2 72	PCI/G
SC-27229-S	07/16/1998	URANIUM-238	1 925	3.85	PCI/G
SC-27301-S	09/03/1998	URANIUM-238	3.78	1.85	PCI/G
SC-27301-C	09/03/1998	URANIUM-238	2.03	4.06	PCI/G
SC-27302-S	09/03/1998	URANIUM-238	2.09	4.18	PCI/G
SC-27303-S	09/03/1998	URANIUM-238	1.365	2.73	PCI/G
SC-27304-S	09/03/1998	URANIUM-238	1.245	2.49	PCI/G
SC-27305-S	07/21/1998	URANIUM-238	3 23	2.33	PCI/G
SC-27306-S	07/21/1998	URANIUM-238	6.66	2.92	PCI/G
SC-27307-S	07/21/1998	URANIUM-238	3.98	2 17	PCI/G
SC-27308-S	07/21/1998	URANIUM-238	5.82	2.94	PCI/G
SC-27308-C	09/03/1998	URANIUM-238	2.13	4.26	PCI/G
SC-27309-S	07/21/1998	URANIUM-238	7 19	2.56	PCI/G
SC-27310-S	07/16/1998	URANIUM-238	1 72	2.48	PCI/G
SC-27311-S	07/21/1998	URANIUM-238	4 14	4.01	PCI/G
SC-27312-S	07/21/1998	URANIUM-238	1 43	2.86	PCI/G
SC-27313-S	07/21/1998	URANIUM-238	1 51	2.41	PCI/G
SC-27314-S	07/21/1998	URANIUM-238	5 59	2.46	PCI/G
SC-27315-S	07/16/1998	URANIUM-238	1 7	3 4	PCI/G
SC-27316-S	07/17/1998	URANIUM-238	5.56	3 96	PCI/G
SC-27317-S	07/17/1998	URANIUM-238	2 16	2 54	PCI/G
SC-27318-S	07/17/1998	URANIUM-238	1 95	3 9	PCI/G
SC-27319-S	07/21/1998	URANIUM-238	2 05	4 1	PCI/G
SC-27320-C	07/17/1998	URANIUM-238	8.46	3 03	PCI/G
SC-27321-C	07/17/1998	URANIUM-238	1 74	2 39	PCI/G
SC-27322-S	07/17/1998	URANIUM-238	1 325	2.65	PCI/G
SC-27323-S	07/17/1998	URANIUM-238	1 985	3 97	PCI/G
SC-27324-S	07/17/1998	URANIUM-238	1 75	2 41	PCI/G
SC-27328-C	07/17/1998	URANIUM-238	1 97	3 94	PCI/G
SC-27401-S	09/03/1998	URANIUM-238	1.835	3 67	PCI/G
SC-27401-C	09/03/1998	URANIUM-238	1 425	2 85	PCI/G
SC-27402-S	09/03/1998	URANIUM-238	1 53	3 06	PCI/G
SC-27403-S	09/03/1998	URANIUM-238	2 13	4 26	PCI/G
SC-27404-S	07/21/1998	URANIUM-238	3.02	2 36	PCI/G
SC-27405-S	07/21/1998	URANIUM-238	2.015	4 03	PCI/G
SC-27406-S	07/21/1998	URANIUM-238	3.02	2 01	PCI/G
SC-27407-C	07/21/1998	URANIUM-238	3.62	3.27	PCI/G
SC-27407-S	07/21/1998	URANIUM-238	3 38	3 27	PCI/G
SC-27408-S	07/21/1998	URANIUM-238	2 41	4 82	PCI/G
SC-27409-S	07/21/1998	URANIUM-238	1 42	2 84	PCI/G
SC-27410-S	07/21/1998	URANIUM-238	1.925	3 85	PCI/G
SC-27411-S	07/21/1998	URANIUM-238	1 35	2.7	PCI/G
SC-27412-S	07/21/1998	URANIUM-238	1.63	2 03	PCI/G
SC-27413-S	07/21/1998	URANIUM-238	3	1 8	PCI/G
SC-27414-S	07/17/1998	URANIUM-238	5 97	3 72	PCI/G
SC-27415-S	07/17/1998	URANIUM-238	2 2	4 4	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27416-S	07/17/1998	URANIUM-238	5.29	3.36	PCI/G
SC-27417-S	07/21/1998	URANIUM-238	3.77	4.09	PCI/G
SC-27418-S	07/21/1998	URANIUM-238	5.85	2.41	PCI/G
SC-27420-C	07/17/1998	URANIUM-238	3.77	2.13	PCI/G
SC-27421-C	07/17/1998	URANIUM-238	4.33	2.34	PCI/G
SC-27422-C	07/17/1998	URANIUM-238	3.56	2.27	PCI/G
SC-27423-S	07/25/1998	URANIUM-238	3.53	2.83	PCI/G
SC-27501-S	07/25/1998	URANIUM-238	6.18	2.4	PCI/G
SC-27501-C	07/25/1998	URANIUM-238	4.13	3.35	PCI/G
SC-27502-S	07/25/1998	URANIUM-238	2.64	5.27	PCI/G
SC-27502-S-RS	09/03/1998	URANIUM-238	3.62	2.13	PCI/G
SC-27503-S	07/25/1998	URANIUM-238	7.07	3.01	PCI/G
SC-27504-S	07/25/1998	URANIUM-238	9.13	4.64	PCI/G
SC-27505-S	07/25/1998	URANIUM-238	5.21	2.6	PCI/G
SC-27506-S	07/25/1998	URANIUM-238	65.3	7.4	PCI/G
SC-27507-S	07/25/1998	URANIUM-238	75.2	3.64	PCI/G
SC-27507-C	07/25/1998	URANIUM-238	234	11.3	PCI/G
SC-27507-C-RS	08/03/1998	URANIUM-238	6.18	4.21	PCI/G
SC-27508-S	07/25/1998	URANIUM-238	8.13	3.67	PCI/G
SC-27509-S	07/25/1998	URANIUM-238	2.06	4.12	PCI/G
SC-27510-S	07/25/1998	URANIUM-238	1.32	2.64	PCI/G
SC-27511-S	07/25/1998	URANIUM-238	400	15.2	PCI/G
SC-27511-S-RS	08/03/1998	URANIUM-238	4.06	2.05	PCI/G
SC-27512-S	07/25/1998	URANIUM-238	9.15	2.82	PCI/G
SC-27513-S	07/25/1998	URANIUM-238	2.005	4.01	PCI/G
SC-27514-S	07/25/1998	URANIUM-238	5.84	2.93	PCI/G
SC-27515-S	07/25/1998	URANIUM-238	25.6	5.31	PCI/G
SC-27516-S	07/25/1998	URANIUM-238	5.73	2.07	PCI/G
SC-27517-S	07/25/1998	URANIUM-238	9.06	3.99	PCI/G
SC-27518-S	07/25/1998	URANIUM-238	3.4	1.73	PCI/G
SC-27522-C	07/25/1998	URANIUM-238	2.225	4.45	PCI/G
SC-27523-C	07/25/1998	URANIUM-238	7.22	2.46	PCI/G
SC-27601-S	07/25/1998	URANIUM-238	1.905	3.81	PCI/G
SC-27602-S	08/27/1998	URANIUM-238	3.3	3.71	PCI/G
SC-27603-S	07/25/1998	URANIUM-238	2.89	2.09	PCI/G
SC-27604-S	08/27/1998	URANIUM-238	7.31	4.06	PCI/G
SC-27605-C	08/27/1998	URANIUM-238	1.91	3.7	PCI/G
SC-27605-S	08/27/1998	URANIUM-238	3.54	3.74	PCI/G
SC-27606-C	08/27/1998	URANIUM-238	4.17	2.54	PCI/G
SC-27606-S	08/27/1998	URANIUM-238	5.91	2.32	PCI/G
SC-27607-S	08/27/1998	URANIUM-238	2.73	3.3	PCI/G
SC-27608-S	07/25/1998	URANIUM-238	5.03	3.23	PCI/G
SC-27609-S	08/27/1998	URANIUM-238	6.53	4.22	PCI/G
SC-27610-S	08/27/1998	URANIUM-238	2.3	2.48	PCI/G
SC-27611-S	08/27/1998	URANIUM-238	1.99	2.85	PCI/G
SC-27612-C	08/27/1998	URANIUM-238	3 53	4.85	PCI/G
SC-27612-S	08/27/1998	URANIUM-238	3.3	3.4	PCI/G
SC-27613-S	08/27/1998	URANIUM-238	4.46	4.12	PCI/G

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS
SC-27614-S	08/27/1998	URANIUM-238	5.09	4.57	PCI/G
SC-27615-S	08/27/1998	URANIUM-238	8.49	4.4	PCI/G
SC-27615-C	08/27/1998	URANIUM-238	1.52	2.09	PCI/G
SC-27616-S	08/27/1998	URANIUM-238	2 1	2.55	PCI/G
SC-27617-S	08/27/1998	URANIUM-238	5 2	4 18	PCI/G
SC-27618-S	08/27/1998	URANIUM-238	2.35	2.52	PCI/G
SC-27623-C	08/27/1998	URANIUM-238	2 46	1.86	PCI/G

APPENDIX C
Coordinates

WP437 - RU17 Coordinate List

Sample ID	Sample Date	Northing	Easting	Elevation
SC-27206-C	11/05/1998	1043923.66	755511.31	643.54
SC-27207-S	07/16/1998	1043906.31	755521.10	643.49
SC-27208-S	11/05/1998	1043890.23	755511.31	643.54
SC-27209-S	09/04/1998	1043874.32	755578.42	637.58
SC-27214-S	07/16/1998	1043861.85	755534.04	641.57
SC-27215-S	07/16/1998	1043845.80	755562.16	642.04
SC-27216-S	07/21/1998	1043829.61	755591.07	642.44
SC-27216-C	09/04/1998	1043832.51	755611.03	642.02
SC-27221-S	07/16/1998	1043817.00	755546.35	643.02
SC-27222-S	07/16/1998	1043800.90	755575.00	643.63
SC-27226-C	07/16/1998	1043793.94	755554.89	643.63
SC-27227-S	07/16/1998	1043772.34	755559.28	644.29
SC-27228-C	07/16/1998	1043764.72	755539.29	646.47
SC-27229-S	07/16/1998	1043743.68	755542.98	647.41
SC-27301-S	09/03/1998	1043813.73	755619.63	642.30
SC-27301-C	09/03/1998	1043813.96	755637.57	642.01
SC-27302-S	09/03/1998	1043797.61	755648.29	642.12
SC-27303-S	09/03/1998	1043781.49	755676.94	640.45
SC-27304-S	09/03/1998	1043765.55	755705.55	639.73
SC-27305-S	07/21/1998	1043785.06	755603.65	644.29
SC-27306-S	07/21/1998	1043768.98	755632.25	643.02
SC-27307-S	07/21/1998	1043753.18	755660.73	643.09
SC-27308-S	07/21/1998	1043736.72	755689.60	642.81
SC-27308-C	09/03/1998	1043742.09	755710.54	640.30
SC-27309-S	07/21/1998	1043720.72	755718.22	642.07
SC-27310-S	07/16/1998	1043756.30	755587.83	644.64
SC-27311-S	07/21/1998	1043740.46	755616.39	644.81
SC-27312-S	07/21/1998	1043724.33	755644.85	644.01
SC-27313-S	07/21/1998	1043708.39	755673.42	643.42
SC-27314-S	07/21/1998	1043692.07	755702.19	643.34
SC-27315-S	07/16/1998	1043727.58	755571.59	645.57
SC-27316-S	07/17/1998	1043711.82	755600.23	645.38
SC-27317-S	07/17/1998	1043695.92	755628.80	645.04
SC-27318-S	07/17/1998	1043679.67	755657.45	644.41
SC-27319-S	07/21/1998	1043663.83	755685.99	644.71
SC-27320-C	07/17/1998	1043707.58	755581.04	646.14
SC-27321-C	07/17/1998	1043682.64	755594.56	644.83
SC-27322-S	07/17/1998	1043667.50	755612.80	645.61
SC-27323-S	07/17/1998	1043650.89	755641.47	645.87
SC-27324-S	07/17/1998	1043634.98	755670.06	645.72
SC-27328-C	07/17/1998	1043620.26	755681.19	644.49
SC-27401-S	09/03/1998	1043704.54	755746.77	640.39
SC-27401-C	09/03/1998	1043704.17	755763.81	639.27
SC-27402-S	09/03/1998	1043688.72	755775.42	640.57
SC-27403-S	09/03/1998	1043672.71	755804.04	639.45
SC-27404-S	07/21/1998	1043675.94	755730.90	642.85

Sample ID	Sample Date	Northing	Easting	Elevation
SC-27405-S	07/21/1998	1043660.32	755759.23	642.56
SC-27406-S	07/21/1998	1043644.06	755788.04	642.43
SC-27407-C	07/21/1998	1043632.11	755836.95	641.20
SC-27407-S	07/21/1998	1043627.95	755816.74	641.98
SC-27407-C-HS01*	07/31/1998	1043639.15	755813.61	641.79
SC-27407-C-HS04*	07/31/1998	1043624.91	755805.48	642.50
SC-27407-C-HS03*	07/31/1998	1043616.90	755819.79	642.29
SC-27407-C-HS02*	07/31/1998	1043631.14	755827.92	641.52
SC-27408-S	07/21/1998	1043611.96	755845.34	641.53
SC-27409-S	07/21/1998	1043647.55	755714.72	643.78
SC-27410-S	07/21/1998	1043631.35	755743.45	643.60
SC-27411-S	07/21/1998	1043615.49	755771.96	643.17
SC-27412-S	07/21/1998	1043599.41	755800.63	643.59
SC-27413-S	07/21/1998	1043583.27	755829.35	643.23
SC-27414-S*	07/17/1998	1043618.90	755698.70	646.50
SC-27414-S-RS	07/22/1998	1043618.89	755698.69	645.45
SC-27415-S	07/17/1998	1043603.25	755727.15	644.54
SC-27416-S*	07/17/1998	1043586.80	755755.90	645.60
SC-27416-S-RS	07/22/1998	1043586.51	755756.15	644.56
SC-27417-S	07/21/1998	1043570.75	755784.62	644.71
SC-27418-S	07/21/1998	1043554.64	755813 32	644.60
SC-27420-C	07/17/1998	1043584.11	755736.15	645.31
SC-27421-C	07/17/1998	1043565.88	755763.78	645.01
SC-27422-C	07/17/1998	1043548.48	755791.20	645 18
SC-27423-S	07/25/1998	1043526.65	755796.90	645.52
SC-27501-S	07/25/1998	1043596.31	755873.59	640 62
SC-27501-C	07/25/1998	1043594.09	755890.29	640.73
SC-27502-S	07/25/1998	1043580.16	755902.34	640.45
SC-27502-S-RS	09/03/1998	1043579.90	755902 45	638.05
SC-27503-S	07/25/1998	1043557.31	755928.20	638.38
SC-27504-S	07/25/1998	1043567.16	755858.05	642.62
SC-27505-S	07/25/1998	1043551.26	755886.58	641 63
SC-27506-S	07/25/1998	1043522.47	755917.77	636.95
SC-27506-S-RS	08/03/1998	1043522.33	755917.90	635.11
SC-27507-S	07/25/1998	1043530.24	755945.85	635.07
SC-27507-C	07/25/1998	1043522.10	755963.36	636.49
SC-27507-C-RS	08/03/1998	1043521.92	755963.56	635.56
SC-27508-S	07/25/1998	1043503.29	755972.35	637.76
SC-27509-S	07/25/1998	1043538.76	755841.83	644.09
SC-27510-S	07/25/1998	1043522.52	755870.62	644.04
SC-27511-S	07/25/1998	1043515.41	755896.62	639.11
SC-27511-S-RS	08/03/1998	1043515.57	755896.48	638.29
SC-27512-S	07/25/1998	1043490.96	755927.49	641.30
SC-27513-S	07/25/1998	1043474.42	755956.56	639.66
SC-27514-S	07/25/1998	1043510.18	755825.78	645.55
SC-27515-S	07/25/1998	1043504.61	755851.31	641.60
SC-27516-S	07/25/1998	1043478.01	755883.12	643.93
SC-27517-S	07/25/1998	1043462 19	755911.58	642.59

Sample ID	Sample Date	Northing	Easting	Elevation
SC-27518-S	07/25/1998	1043445.72	755940.54	641.11
SC-27522-C	07/25/1998	1043443.60	755921.25	642.20
SC-27523-C	07/25/1998	1043426.39	755948.17	640.64
SC-27601-S	07/25/1998	1043486.98	756001.30	635.67
SC-27602-S	08/27/1998	1043471.18	756029.49	634.15
SC-27603-S	07/25/1998	1043458.75	755984.86	637.46
SC-27604-S	08/27/1998	1043442.59	756013.62	635.73
SC-27605-C	08/27/1998	1043431.30	756062.96	633.15
SC-27605-S	08/27/1998	1043426.54	756042.13	634.00
SC-27606-C	08/27/1998	1043403.12	756099.12	627.32
SC-27606-S	08/27/1998	1043397.21	756075.50	628.13
SC-27607-S	08/27/1998	1043394.51	756099.42	632.68
SC-27608-S	07/25/1998	1043429.72	755969.18	638.75
SC-27609-S	08/27/1998	1043413.94	755997.16	636.87
SC-27610-S	08/27/1998	1043397.93	756026.43	632.24
SC-27611-S	08/27/1998	1043381.92	756054.82	627.88
SC-27612-C	08/27/1998	1043372.06	756103.64	633.97
SC-27612-S	08/27/1998	1043365.89	756083.40	633.92
SC-27613-S	08/27/1998	1043349.87	756112.07	634.92
SC-27614-S	08/27/1998	1043385.34	755981.32	638.09
SC-27615-S	08/27/1998	1043369.29	756010.40	636.73
SC-27615-C	08/27/1998	1043375.62	756032.45	627.60
SC-27616-S	08/27/1998	1043353.34	756038.35	634.61
SC-27617-S	08/27/1998	1043337.21	756067.72	636.20
SC-27618-S	08/27/1998	1043321.26	756095.90	634.46
SC-27623-C	08/27/1998	1043321.65	756078.85	637.14

* elevations taken from the final asbuilts