SUNRAY SERVICES, INC.

123-SR-2 - 41867
162-SR-2 - 41868

CSN: 72-0144 Permit No.

Media: Air, Water, Solid, Hazardous

Sort: Permit, Compliance, Legal, Misc.

SCANNED AND ENTERED

August 19, 1993

Ms. Laura Mack
Chief, Solid Waste Division
Arkansas Department of Pollution Control & Ecology
P.O. Box 8913
Little Rock, AR 72219-8913

Dear Ms. Mack:

Please find enclosed three copies of the Hydrogeologic Investigations Report prepared by SCS Engineers. This report outlines the scope of work and methodology used for the monitor well abandonment and reinstallation project that took place at Sunray Services, Inc. Tontitown landfill earlier this year.

If you have any questions or comments, please feel free to contact me at (501) 751-7024.

Sincerely,

Kevin E. Hodges, EIT
Project Engineer

pc G.R. Holcomb, Sunray

HYDROGEOLOGIC INVESTIGATIONS REPORT
SUNRAY SERVICES, INC.
TONTITOWN LANDFILL SITE
TONTITOWN, ARKANSAS

Prepared for:

Sunray Services, Inc.
105 Old Missouri Road
Springdale, Arkansas 72764

Prepared by:

SCS Engineers
10401 Holmes Road, Suite 400
Kansas City, Missouri 64131
(816) 941-7510

August 13, 1993
File No. 08-89015.12

CONTENTS

FIGURES

INTRODUCTION

A hydrogeologic investigation was performed in accordance with conditions outlined in the Permit Modifications 123-SR-2 and 162-SR-2, dated September 20, 1991, at the Sunray Services Landfill, Tontitown, Arkansas. The emphasis of this investigation was the evaluation of bedrock fractures and joints in this region.

The proposed scope of work to investigate these fractures and joints initially consisted of packer tests within the original monitoring wells. An attempt was made to packer test the nine existing on-site monitoring wells, however, because of the large diameter of the borehole and the inter-connected fractures in the bedrock, an adequate seal between the packers could not be achieved. Therefore, a downhole camera survey was used to investigate the bedrock aquifer.

The nine existing monitoring wells were viewed using a 5 1/4-inch diameter stainless steel "down-hole" camera. During this procedure, the integrity of the well construction for each of these wells was noted.

The downhole camera survey indicated that four existing monitoring wells (MW-3, MW-4, MW-7, and MW-9) were improperly constructed. The survey indicted that the well casing in well MW-3 was broken near the soil rock interface, and that the grout seal at the soil-rock interface was damaged. A leaking seam was observed at approximately 14-feet below land surface in well MW-4. A hole was observed in the well casing at approximately 80-feet below land surface in well MW-7. The well casing was cracked in well MW-9 from approximately 61 to 65-feet below land surface.

SCS reported these challenges to the Arkansas Department of Pollution Control and Ecology (ADPC&E) and proposed abandoning these four wells and replacing three of them to accurately monitor the groundwater beneath the landfill.

The ADPC&E responded to SCS and affirmed the request to abandon MW-3, MW-4, MW-7, and MW-9. The ADPC&E also agreed to replacing only MW-3, MW-4, and MW-7.

SCOPE OF WORK

As requested by the ADPC&E, the following changes to the groundwater monitoring system were to be accomplished at the Sunray Services, Incorporated, landfill in Tontitown, Arkansas.

1. Monitoring Wells MW-3, MW-4, MW-7, and MW-9 were to be abandoned using the appropriate well abandonment procedures as outlined by the ADPC&E.

2. New wells were to be installed within 30 feet of the former locations of MW-3, MW-4, and MW-7. The new wells were to be constructed with a 20 foot screen across the water table surface and installed in conformance with ASTM D 5092-90.

3. All ten monitoring wells in the groundwater monitoring system were to be sampled quarterly using the sampling methodology outlined in the approved sampling plan.

4. The samples obtained from each well were to be analyzed for the parameters listed in Condition 20 of the revised permit.

These changes were to be completed within 60 days of receipt of the request by ADPC&E.

METHODOLOGY

Well Abandonment

Four monitoring wells were abandoned; three of the four were replaced with permanent monitoring wells. The monitoring wells were abandoned between February 15 and March 8, 1993. The wells were abandoned according to the abandonment guidelines provided by the ADPC&E. Exact abandonment procedures follow:

The casing and annular material were removed by drilling the wells out with an over-sized bit. Cuttings from the drilling operations were monitored for PVC and annular materials. This ensured that the drill bit was properly aligned in the monitoring well to remove all of the casing and annular materials. At the location of MW-4, MW-7, and MW-9, a pilot bit was attached on the end of the oversized bit. This was required at these locations in order to stay properly aligned in the borehole.

Below the casing depth, the original monitoring wells were completed as "open" boreholes, hence there was no annular or well materials to remove below this depth. To eliminate the need to ream the boreholes to their total depth, the uncased section of monitoring wells MW-3 and MW-4 were initially grouted from their total depth to the approximate bottom of casing depth. The grout was then allowed to cure before any further drilling at these locations. After the grout had cured, a measurement was obtained to determine the level of the grout after shrinkage. These two boreholes were then reamed to a depth of at least 2 feet below the bottom of the casing depth, or to the grout depth, whichever was deeper. Monitoring wells MW-7 and MW-9 were reamed out to the total depth of the original monitoring wells in order to remove all cuttings from the borehole.

After the original monitoring wells were drilled out, all of the boreholes were pressure-cemented back to the surface. A tremie pipe was inserted to within at least 2 feet of the total depth of the borehole. The boreholes were grouted until the cement-bentonite grout circulated back to the surface. The cement-bentonite grout consisted of a 2 to 5 percent bentonite content by weight, with pumped weight of no less than 12.5 pounds per gallon.

All of the abandoned boreholes were grouted in two steps, half-full on the first day, and then circulated back to the surface on the second day. This reduced the head pressure created by completely grouting to the surface at one time. Any shrinkage of the grout after the first day was remedied by the second addition of grout to the borehole. Any shrinkage after the second addition of grout was remedied by filling the remaining void with additional cement-bentonite grout.

Monitoring Well Drilling

The drilling program consisted of three borings, with the installation of groundwater monitoring wells in each of these borings. The replacement wells were located within 30-feet of the original wells, as requested by ADPC&E.

The three borings were drilled with a Speedstar 30K drill rig, using air as the drilling media and a 7 7/8-inch bit. The borings were drilled to a depth of 15 feet below the water table. The cuttings were logged by SCS personnel. No samples were collected.

By using air as the drilling media, the water table was easily recognized. The borings were drilled to a depth of 15-feet below the water table in order to install the monitoring wells with 20 feet of well screen; 15-feet below the water table, 5-feet above, as requested by the ADPC&E.

The boreholes were monitored for contamination during the drilling procedures by a Photo-Ionization Detector (PID) and a Methane meter. The borehole was monitored at least every 20-feet during the drilling operations, and at the beginning of each day.

Boring logs are presented in Appendix A.

Monitoring Well Installation

The monitoring wells were constructed of 4-inch diameter, 0.010-inch (10-slot) PVC well screen, and flush joint, screw-type, Schedule 40 riser pipe. The riser pipe was installed to approximately 2.5 feet above the ground surface. Clean sand filter pack was tremied into the annular space around the screen to a point at least 2-feet above the top of the screen, and a 2 to 4-feet thick bentonite pellet seal was placed above the filter sand. The remaining annular space was filled with a cement-bentonite mix tremied into position.

An oversized steel surface casing with locking cap was placed over the riser pipe and a protective pad, approximately 4-feet square, was constructed around the steel casing.

Well Development

The replacement groundwater monitoring wells were developed using an electrically operated staged impeller submersible pump. In addition, an air lift pump was required to complete development of well MW-4.

These wells were developed before quarterly groundwater sampling was performed. The development process was continued until the temperature and pH of the water had stabilized within a 10 percent range or until 10 well volumes had been removed from each of these wells.

Decontamination

The drill rig and augers were decontaminated before commencement of drilling and between each boring. Decontamination consisted of removal of all larger particulate in the area of the boring, then moving to the specified decontamination area. The drill rig, augers, and all tools coming into contact with the augers were steam pressure-washed.

SUMMARY

The following changes to the groundwater monitoring system occurred at the Sunray Services Landfill in Tontitown, Arkansas.

1. Monitoring Wells MW-3, MW-4, MW-7, and MW-9 were abandoned using the appropriate well abandonment procedures as outlined by the ADPC&E.

2. New wells were installed within 30-feet of the former locations of MW-3, MW-4, and MW-7. The new wells were equipped with 20-foot screen across the water table surface and installed in conformance with ASTM D 5092-90.

3. All ten monitoring wells in the groundwater monitoring system were sampled using the methodology outlined in the approved sampling plan.

4. The samples obtained from each well were analyzed for the parameters listed in Condition No. 20 of the revised permit.

These changes were completed within 60 days of receipt of the request by ADPC&E.

APPENDIX A

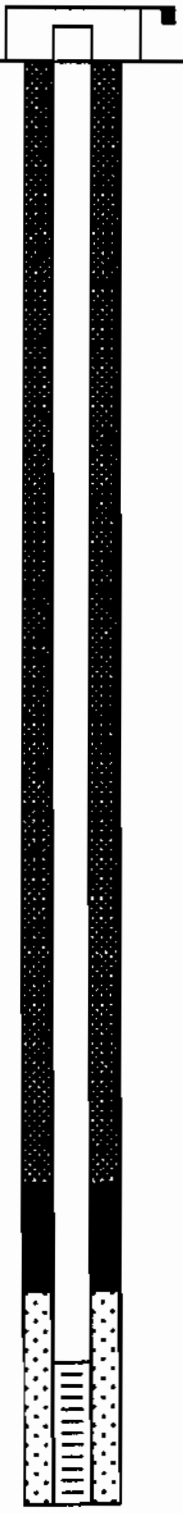
BORING LOGS

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER *MW-3R*
DATE DRILLED *Layne Western*
SURFACE ELEVATION *1215.88 Feet MSL*
CLIENT *SUNRAY SERVICES*
PROJECT *SUNRAY Services, Incorporated*
LOGGED BY *Ken Light*

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
0							Brown Silty CLAY intermixed with broken CHERT: Topsoil
5							Intermixed: Orange, highly plastic moist CLAY and white CHERT
10							
13							LIMESTONE: White, weathered, Cherty
14							Intermixed: Orange, highly plastic, moist CLAY and white LIMESTONE
15							
20							
21							LIMESTONE: White, weathered, Cherty
22							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
25							
30							
35							
38							Water at 38'
40							

WELL DIAGRAM



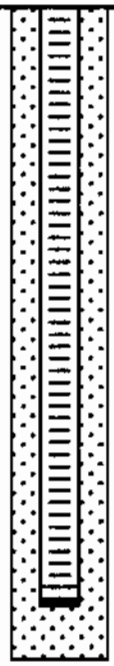
JOB NUMBER: 0889015.12

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-3R
DATE DRILLED Layne Western
SURFACE ELEVATION 1215.98 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Ken Light

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
45								
50								
55							LIMESTONE: White, competent CHERT	
							Bottom of boring at 58'	
60								
65								
70								
75								
80								



JOB NUMBER: 08R9015.12

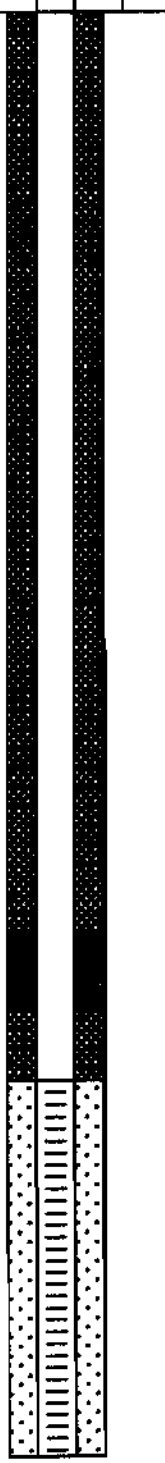
SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-4R
DATE DRILLED Layne Western
SURFACE ELEVATION 1208.00 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
0							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
15							LIMESTONE: White, weathered, Cherty
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
							LIMESTONE: White, weathered, Cherty
20			0	0			Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
25							LIMESTONE: White, weathered, Cherty
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
30							LIMESTONE: White, weathered, Cherty
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
							LIMESTONE: White, weathered, Cherty
35							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
							LIMESTONE: White, weathered, Cherty
40			0	0			

WELL DIAGRAM



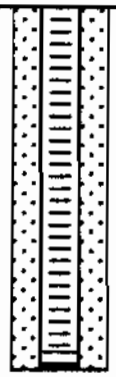
JOB NUMBER: 0BB8015.12

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-4R
DATE DRILLED Layne Western
SURFACE ELEVATION 1206.00 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
45								
50							Bottom of boring at 50'	
55								
60								
65								
70								
75								
80								



JOB NUMBER: 08R9015.12

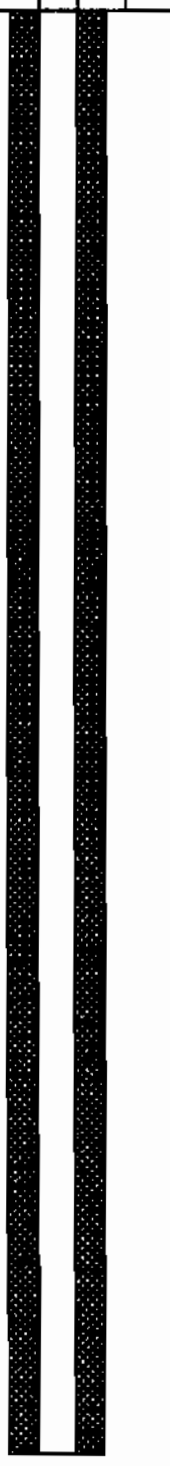
SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
0							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
10							LIMESTONE: White, weathered, Cherty
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
15			0	0			LIMESTONE: White, weathered, Cherty
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
25							LIMESTONE: White, weathered, Cherty
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE
30							Cuttings are slightly moist below 30', dry above this point. No water identified in the borehole upon pauses in the drilling operations
35			0	0			
40							

WELL DIAGRAM

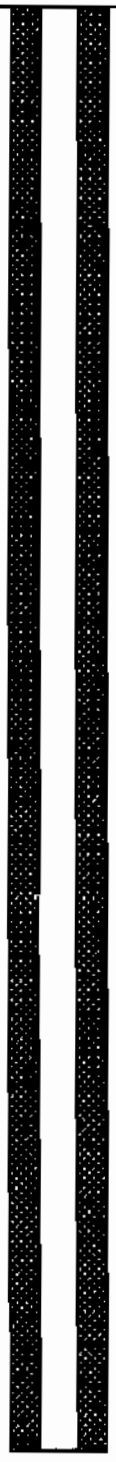


JOB NUMBER: 0886015.12

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL
CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
							LIMESTONE: White, weathered, Cherty	
45							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE	
							LIMESTONE: White, weathered, Cherty	
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE	
50							LIMESTONE: White, weathered, Cherty	
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE	
55			0	0				
							LIMESTONE: White, weathered, Cherty	
60							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE	
65							LIMESTONE: White, weathered, Cherty	
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE	
70							LIMESTONE: White, weathered, Cherty	
							Intermixed: Orange, highly plastic CLAY and white, weathered, Cherty LIMESTONE	
75			0	0			LIMESTONE: White, weathered, Cherty. Bedrock, cuttings are dry and dusty	
80								



SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

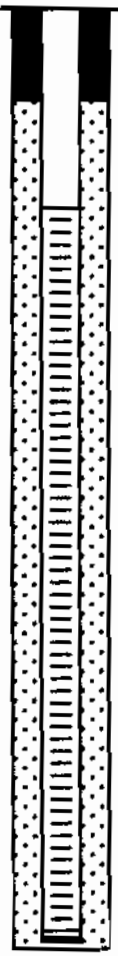
DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
85							As Above: Limestone: White, weathered, Cherty	
90								
95			0	0				
100								
105								
110								
115			0	0				
120								

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
125							As Above. Limestone: White, weathered, Cherty	
130								
135			0	0				
140								
145								
							Bottom of boring at 146'	
150								
155								
160								



JOB NUMBER: 08R9015.12

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
							Brown Clayey SILT	
							Intermixed Orange/red, highly plastic CLAY and white, Cherty LIMESTONE	

5
10
15
20
25
30
35
40

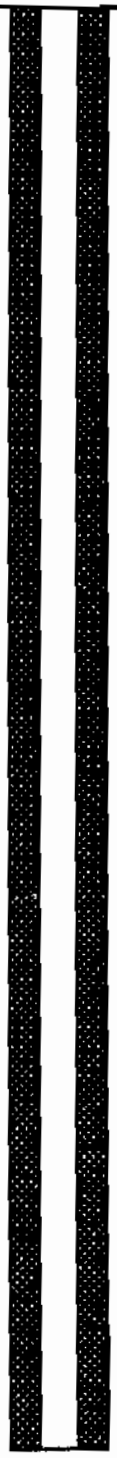
JOB NUMBER: 08P0015.12

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
45								
50		104	40	ND				
		99	48	ND				
55								
60		95	88	ND				
65		100	95	ND				
		103	98	ND				
70								
75								
80								



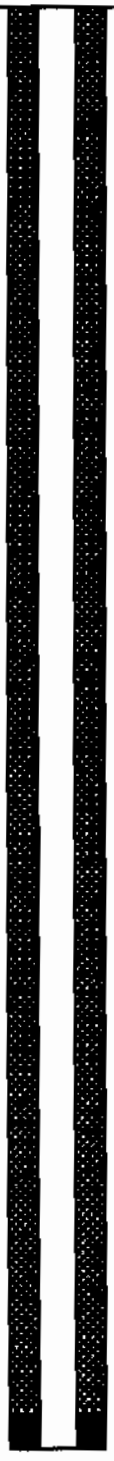
JOB NUMBER: 08P0016.12

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
85								
90								
95								
100								
105								
110								
115								
120								

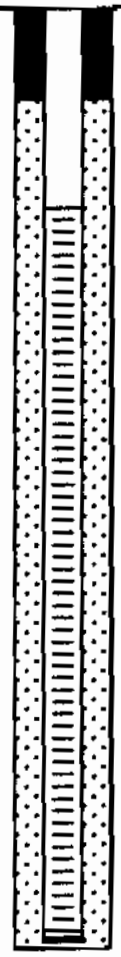


SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS

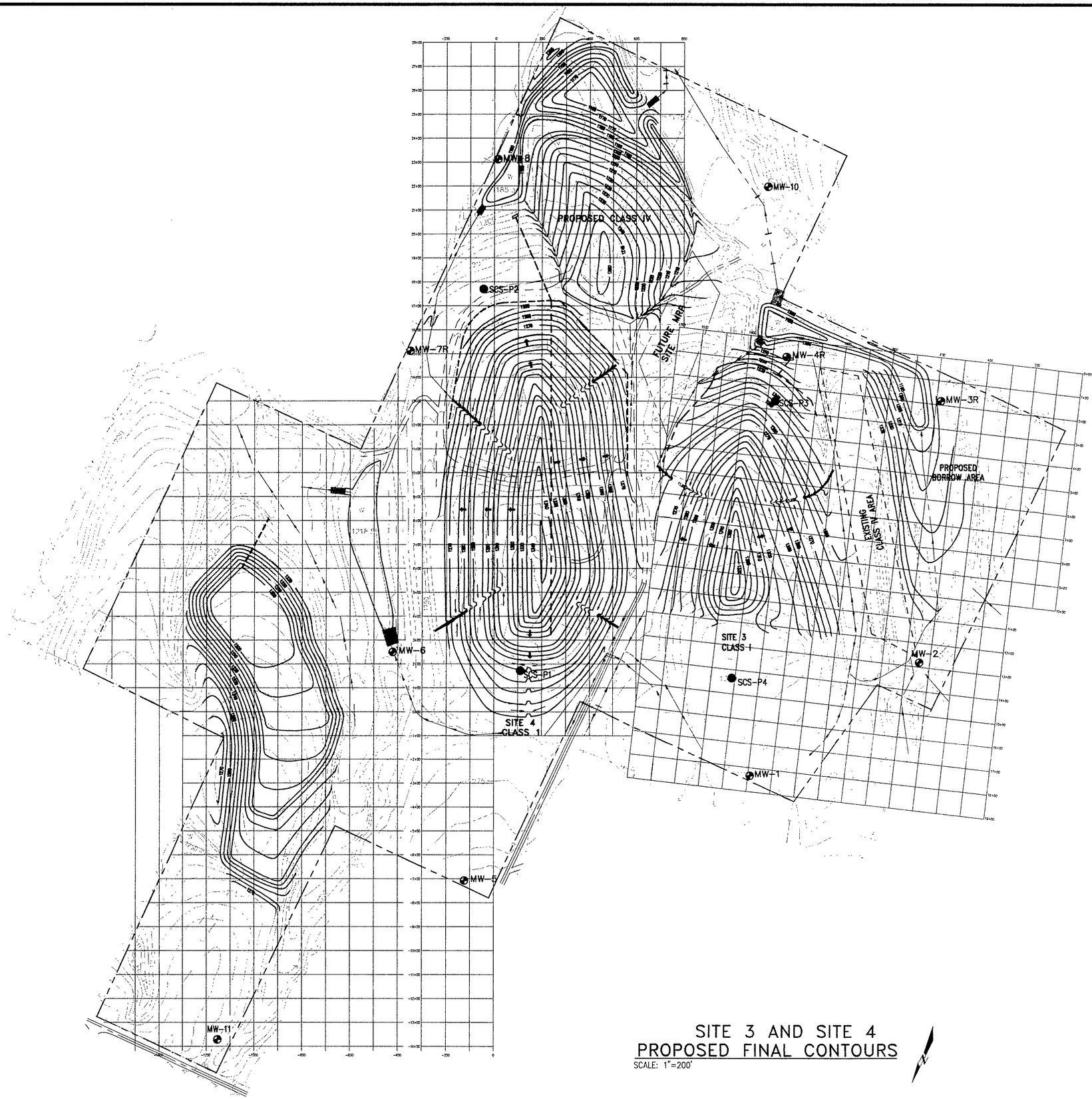
BORING NUMBER MW-7R
DATE DRILLED Layne Western
SURFACE ELEVATION 1243.70 Feet MSL

CLIENT SUNRAY SERVICES
PROJECT SUNRAY Services, Incorporated
LOGGED BY Joe Hoffmeister

DEPTH feet	SAMPLE	SAMP. NO.	HNu (ppm)	% LEL	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS	WELL DIAGRAM
125								
130								
135								
140								
145							Bottom of boring at 146'	
150								
155								
160								



JOB NUMBER: 08R9015.12



SITE 3 AND SITE 4
PROPOSED FINAL CONTOURS
SCALE: 1"=200'

4SUN01 1"=200' 6-8-93

REV.	DATE	DESCRIPTION	CK. BY
1	1-27-92	CHANGED GRID, ADDED BORROW AREA	LDL
		CONTOURS AND PUT ON DISCHARGED PIPE	
2	6-8-93	MOVED AND RENAMED WELLS MW-3,	LDL
3		MW-4, MW-7 AND DELETED MW-9	
4			
5			

SHEET TITLE
SITE 3 AND SITE 4
PROPOSED FINAL CONTOURS

PROJECT TITLE
FINAL CLOSURE MODIFICATIONS
SITES 3 AND 4
PERMIT NUMBERS 123SR2, 162SR2
TONTITOWN ARKANSAS

CLIENT
SUNRAY SERVICES, INC.
105 OLD MISSOURI ROAD
SPRINGDALE, ARKANSAS 72765
(501) 361-2926

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
8401 HOLMES ROAD, SUITE 400, KANSAS CITY, MISSOURI 64131
PH. (816) 941-7910 FAX NO. (816) 941-8025

PROJ. NO. 01-SJ015.06
DSN. BY: TWK
DWN. BY: CAN
CHK. BY: SKE\LDL
D/A RVW BY:
APP. BY:

CADD FILE: 4SUN01

DATE: FEBRUARY 1992

SCALE: 1"=200'-0"

DRAWING NO. 1 of 15

41867 & 41868