

J-FIELD PHYTOREMEDIATION WELL AND  
LYSIMETER INSTALLATION REPORT  
ABERDEEN PROVING GROUND, MARYLAND

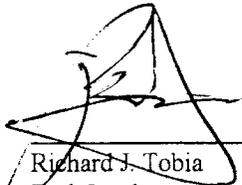
APRIL 1997

J-FIELD PHYTOREMEDIATION WELL AND LYSIMETER INSTALLATION REPORT  
ABERDEEN PROVING GROUND, MARYLAND

Prepared by  
Roy F. Weston, Inc. (WESTON)

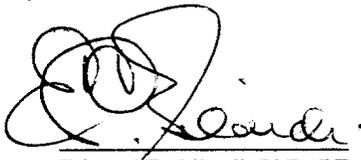
APRIL 1997

U.S. EPA Work Assignment No. 1-173  
WESTON Work Order No. 03347-041-001-1173-01  
U.S. EPA Contract No. 68-C4-0022



Richard J. Tobia  
Task Leader

4/21/97  
(Date)



Edward F. Gilardi, PhD, PE  
Program Manager

4/21/97  
(Date)

## INTRODUCTION

One hundred eighty three hybrid poplar trees were planted from 25 March through 3 April 1996 in a one acre plot as a pilot-scale phytoremediation study at the J-Field Toxic Pits Site (J-Field) of Aberdeen Proving Ground (APG), Maryland. The objective of the project is to contain the flow of volatile organic compounds (VOCs) in the surficial groundwater by removal and destruction of the compounds through natural mechanisms.

Other objectives are to:

- determine the mechanisms responsible for VOC reduction.
- determine the aquifer draw down within the study area and the lateral extent of the trees influence.
- correlate findings from tree tissue and transpirational gas sampling with water quality data from the capillary fringe.

In order to meet these objectives it was determined that additional wells and lysimeters were needed to be installed at the site. Five additional groundwater monitor wells and four lysimeters were proposed and approved to be installed.

### Site History

J-Field is located at the tip of Gunpowder Neck, Edgewood Area of the APG, Harford County, Maryland. The Toxic Pits area of J-Field was once the disposal site for chemical warfare agents, munitions, and industrial chemicals. The Toxic Pits area consists of two parallel disposal pits that are approximately 10-feet-deep by 15-feet-wide by 200-feet-long. Remnants of other pits extend into the marsh area to the east. The pits were used for open-pit burning and detonation from 1940 through 1980. During open burning, wood was first placed in the pit and the waste material, including high explosives, nerve agents, mustard agents, smoke materials, and solvents, were placed on top. The pit was then flooded with fuel oil and ignited. After the first burn, a reburn of the material was performed in the adjacent pit. Any remaining debris was pushed into the marsh. The area to the northeast of the pits appears to be the main pushout area for the debris.

The contaminants of concern are 1,1,2,2-tetrachloroethane (PCA), 1,1,2-trichloroethane (TCA), cis- and trans-1,2-dichloroethene (DCE), trichloroethene (TCE), and tetrachloroethene (PCE). The ecosystem of concern is the adjacent fresh water marsh, the Chesapeake Bay, and surrounding waterways.

## OBSERVATIONS AND ACTIVITIES

### Monitor Wells

Five 2-inch groundwater monitor wells were installed from 7 November through 15 November 1996. The placement of these wells was determined based on the objectives of the pilot-scale monitoring, site conditions, and accessibility (Figure 1). Monitor wells were screened from approximately 3 to 13 feet below ground surface (bgs) (Table 1). This shallow screening interval will allow for the sampling and water level monitoring of the upper part of the surficial aquifer, where the trees will be removing water. J-Field Phytoremediation monitor well #1 (JFP-1) was placed as far up gradient of the phytoremediation study area as possible. The objective of the placement of this well is to obtain a representative sample of groundwater before being impacted by the trees. JFP-2 and JFP-3 were placed within the study area to monitor the trees affect on water quality and water table levels. JFP-4 was placed in-line, down gradient of JFP-1, JFP-2, and JFP-3 so that the affect of a larger planting area on water quality and groundwater elevations can be determined. JFP-5 was placed in the wooded area to the south of the site approximately 100 feet from the study border. This well will provide missing contaminant and elevation information south of the study area.

### Lysimeters

Two sets of two lysimeters were installed near monitor wells JFP-2 and JFP-3 (Figure 1). The lysimeters were placed in pairs and set at depths of approximately 4 and 8-feet bgs (Table 1). The 4-foot lysimeter was placed closest to the well. These depths will allow for coverage of the capillary zone during seasonal highs and lows in the groundwater table. The data obtained from the lysimeters will be correlated with the surrounding tree tissue and transpirational off-gas data to

make a determination as to what degree the pilot study is working.

### Installation

Drilling and installation of the wells and lysimeters were performed by A.C. Schultes of Maryland, Inc. The necessary Harford County permits were obtained by A.C. Schultes. Drilling was performed with 8.25-inch hollow stem augers (4.25 to 6.25 inch ID) and a Central Mine Equipment (CME-55) all-terrain vehicle (ATV) with rubber wheels. Prior to drilling, each location was hand augered with a 3-inch stainless steel auger and cleared for unexploded ordnance to a depth of 10 to 14 feet bgs. Personnel from Human Factors Applications, Inc. performed the clearance. Each open hole was screened for VOCs using a photoionization detector (HNu w/10.2 lamp) (Table 2).

New 2-inch polyvinyl chloride (PVC) schedule 40 well casing (Johnson Wheelabrator Systems) was used for the installation of the wells. Ten feet of 0.010-inch slotted well screen was installed in the bottom of each well. The wells were finished off to a minimum of 1-foot above the top of the screen with #1 grade sand (The Morie Co. Filtration Media) and then pelletized bentonite. A steel protective casing was then installed around the well. This casing was then cemented in with a 4-foot by 4-foot concrete pad finished to ground surface. The well designation was written in the concrete pad and each was banded with the county supplied metal tag (Appendix A and B). Wells listed as JFL #1 through #5 in the A.C. Schultes report should be listed as JFP-1 through JFP-5.

Due to problems in obtaining Teflon<sup>®</sup> lysimeter cups, ceramic lysimeter cups were installed. Timco<sup>™</sup> ceramic cup type lysimeters and accessories were utilized for the installation. All other lysimeter parts were made of PVC. Lysimeters were assembled and checked according to the manufacturers instructions. The lysimeter heads were surrounded with a 200 mesh silica flour slurry before being finished off in the same manner as the wells with sand, bentonite, and a steel casing set in concrete.

Drill cuttings were drummed and later sampled for disposal. HNu readings were taken of the drums (Table 3). Based on these readings, JFP-1 cuttings were disposed of by APG. The remaining four drums were sampled for metals (Appendix C) and were approved by APG personnel to be disposed of on site. These drums were spread out over the tree area on 4 April 1997.

### Well Development

Well development was performed using clean disposable Teflon bailers. At a minimum, 25 gallons was purged from each well (Table 2). Development water was pumped into a tank located on site which held groundwater from an ongoing pump test. This water was later disposed of by APG personnel.

### Well and Lysimeter Survey

On 20 and 21 February 1997 a survey was performed by REAC personnel of the new wells and lysimeters in the tree planting area. Also as part of the survey, other wells in the area were surveyed. These new locations are presented on Figure 1. Elevations of the top of casing (TOC) were also taken for water level measurement purposes (Table 4). It was determined by this survey that the prior location of the wells in this area on previous maps were inaccurate.

### FUTURE WORK

No future work, with the exception of regular monitoring of the wells and lysimeters, is planned at this time.

TABLE 1  
 Well and Lysimeter Installation Specifications  
 J-Field Phytoremediation Well and Lysimeter Installation Report  
 Aberdeen Proving Ground, Maryland  
 April 1997

Location	Installed Depth (ft. bgs)	Screen Interval (ft. bgs)
JFP-1	14.1	3.6 to 13.6
JFP-2	14.0	3.5 to 13.5
JFP-3	13.0	2.5 to 12.5
JFP-4	14.0	3.5 to 13.5
JFP-5	13.75	3.75 to 13.75
JFL-1	4.0	3.5 to 4.0
JFL-2	7.5	7.0 to 7.5
JFL-3	4.0	3.5 to 4.0
JFL-4	7.5	7.0 to 7.5

ft. bgs = feet below ground surface

TABLE 2  
 Well and Lysimeter Installation and Development Data  
 J-Field Phytoremediation Well and Lysimeter Installation Report  
 Aberdeen Proving Ground, Maryland  
 April 1997

Location	HNu (10.2) (units)	Development Water (gallons)	Recovery Rate
JFP-1	65	25	slow
JFP-2	<1	50	good
JFP-3	<1	50	good
JFP-4	<1	50	good
JFP-5	17	25	slow
JFL-1	<1	NA	NA
JFL-2	<1	NA	NA
JFL-3	<1	NA	NA
JFL-4	<1	NA	NA

NA = Not applicable

TABLE 3  
 Drill Cuttings Data  
 J-Field Phytoremediation Well and Lysimeter Installation Report  
 Aberdeen Proving Ground, Maryland  
 April 1997

Location	HNu (10.2) (units)	Quantity <sup>(1)</sup> (gallons)
JFP-1	40	35
JFP-2, JFL-1 & 2	1	50
JFP-3, JFL-3 & 4	ND	50
JFP-4	ND	20
JFP-5	3	25

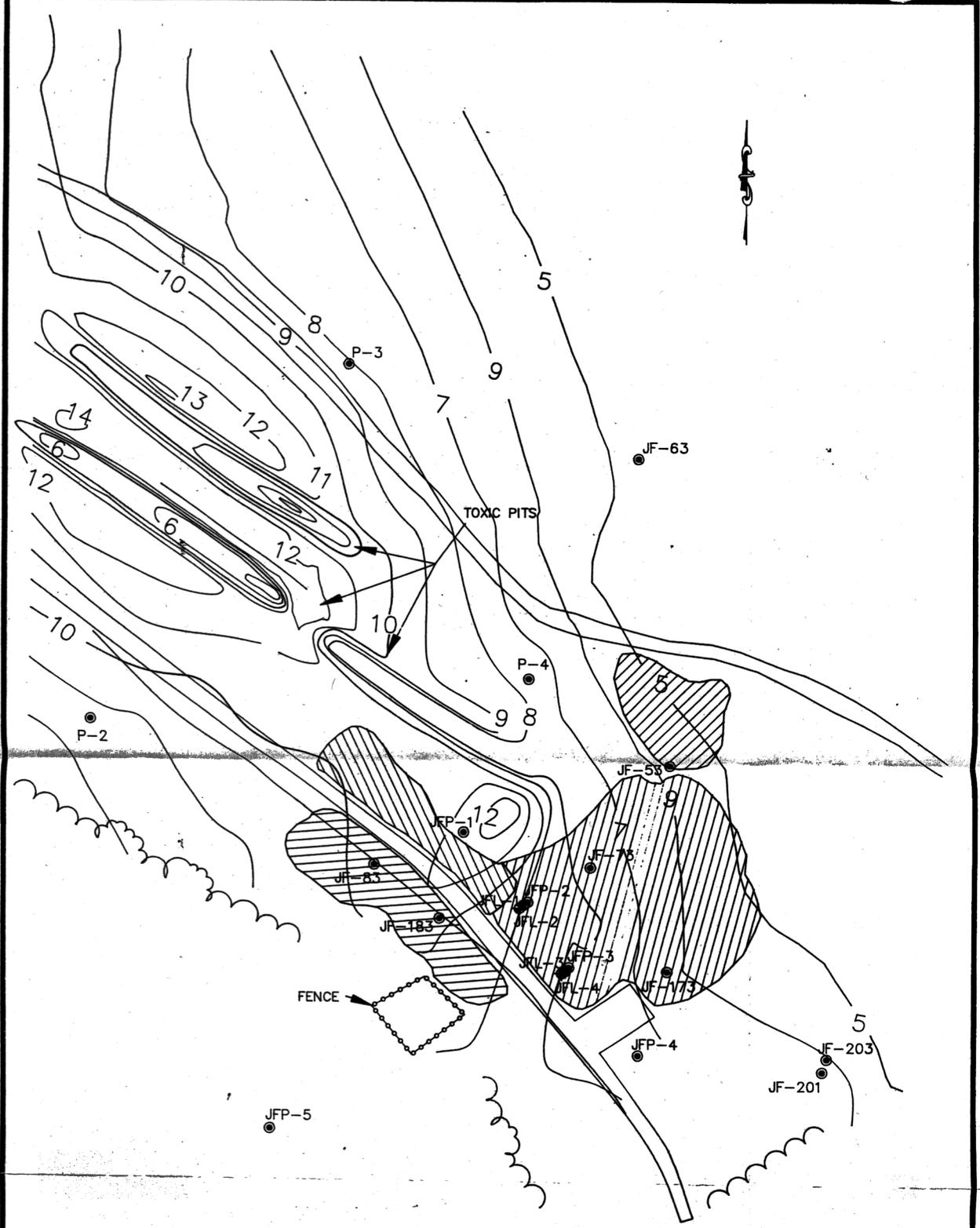
ND = not detected

<sup>(1)</sup> = estimated

TABLE 4  
 Well and Lysimeter Elevations  
 J-Field Phytoremediation Well and Lysimeter Installation Report  
 Aberdeen Proving Ground, Maryland  
 April 1997

Description (Harford County ID #)	Well #	Elevation to TOC (feet above MSL)
Argonne National Labs		
HA-94-0442	JF-201	9.06
HA-94-0443	JF-203	8.77
HA-94-0173	JF-173	9.65
HA-94-0436	JF-183	11.88
Princeton Aqua Science		
HA-81-0526	P-2	11.16
HA-81-0527	P-3	10.27
HA-81-0520	P-4	10.22
United States Geological Survey		
HA-88-1051	JF-53	8.10
HA-88-1054	JF-63	6.80
HA-88-1057	JF-73	10.04
HA-88-1060	JF-83	13.18
Weston/REAC		
HA-94-1334	JFP-1	11.76
HA-94-1335	JFP-2	11.04
HA-94-1336	JFP-3	10.42
HA-94-1337	JFP-4	10.45
HA-94-1338	JFP-5	8.40

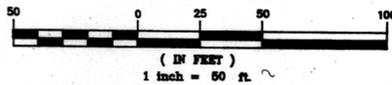
MSL = mean sea level  
 TOC = top of casing



**LEGEND:**

- ◆ LYSIMETER
- MONITOR WELL
- 9 — CONTOUR INTERVAL
- ▨ PHYTOREMEDIATION AREA

**GRAPHIC SCALE**



U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER  
 RESPONSE ENGINEERING AND ANALYTICAL CONTRACT  
 68-C-0022  
 V.D.B. 02347-041-001-1173-01

**FIGURE 1**  
**MONITOR WELL AND**  
**LYSIMETER LOCATION MAP**  
**J-FIELD PHYTOREMEDIATION STUDY**  
**ABERDEEN PROVING GROUND, MD**  
**APRIL 1997**

APPENDIX A  
A.C. Schultes Technical Report  
J-Field Phytoremediation Well and Lysimeter Installation Report  
Aberdeen Proving Ground, Maryland  
April 1997



24 S. River Road, Edgewater, MD 21037, Phone: (410) 841-6710, Facsimile: (410) 841-6711

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**ROY F. WESTON**  
**ABERDEEN PROVING GROUND**  
Edgewood, MD

**ACSM JOB #3052**

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*Established in 1921*

*Serving your needs in the Mid-Atlantic Region*

A.C. SCHULTES, INC.  
664 S. Evergreen Avenue  
Woodbury, NJ 08096  
(609) 845-5656  
(609) 845-1335 FAX

A.C. SCHULTES OF DE, INC.  
Route 13  
Bridgeville, DE 19933  
(302) 337-8254  
(302) 337-8234 FAX

A.C. SCHULTES OF MD, INC.  
24 S. River Road  
Edgewater, MD 21037  
(410) 841-6710  
(410) 841-6711 FAX

A.C. SCHULTES MOTOR & PUMP  
101 Jessup Road  
Thorofare, NJ 08086  
(609) 845-7400  
(609) 848-8309 FAX

**ROY F. WESTON  
ABERDEEN PROVING GROUND  
Edgewood, MD**

**ACSM JOB #3052**

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**I. Well JFL #1**

- A. Driller's Log**
- B. Permit Application**
- C. Completion Report**

**II. Well JFL #2**

- A. Driller's Log**
- B. Permit Application**
- C. Completion Report**

**III. Well JFL #3**

- A. Driller's Log**
- B. Permit Application**
- C. Completion Report**

**IV. Well JFL #4**

- A. Driller's Log**
- B. Permit Application**
- C. Completion Report**

**V. Well JFL #5**

- A. Driller's Log**
- B. Permit Application**
- C. Completion Report**

**A.C. SCHULTES OF MARYLAND, INC.**  
24-26 SOUTH RIVER ROAD EDGEWATER MARYLAND 21037

**Water Well Contractors**

CUSTOMER ROY F. WESTON, INC. JOB 3052  
ADDRESS ABERDEEN PROVING GROUNDS DATE 11/13/96  
LOCATION EDGEWOOD, MARYLAND WELL JFL #1

GROUND	FEET FROM GROUND SURFACE 0 TO -----	WELL LOG			
		2.8'	0	1	TOPSOIL
14'	4' CASING	1	14	MED ORANGE SAND W/SOME CLAY	
10'					

PERMIT NO	<b>HA-94-1334</b>	DIAMETER OF WELL	<b>2"</b>	DEPT. OF WELL	<b>14'</b>
HRS PUMPED		SLOT SIZE	<b>.010</b>	TYPE OF CASING	<b>2" PVC</b>
CAPACITY G P M		DRILLING MACHINE NO	<b>ATV</b>	LENGTH OF CASING	<b>4' 8"</b>
STATIC LEVEL		DRILLER	<b>K. DEROCHE</b>	DISTANCE TO TOP OF Screen	<b>4'</b>
PUMPING LEVEL		GRAVEL	<b># MORIE</b>	TYPE SCREEN	<b>PVC</b>
SPECIFIC CAPACITY		BAGS OF <del>CLAY</del> CEMENT	<b>1</b>	SIZE OF SCREEN	<b>2"</b>
PUMPED WITH		DATE WELL COMPLETED	<b>11/13/96</b>		
DEPTH OF GROUT	<b>: 0' - 3'</b>	DRILLER'S HELPER	<b>J. AMIS</b>		
DEPTH GRAVEL PACKED	<b>3' - 14'</b>				

**KENNETH DEROCHE**  
WELL DRILLER'S SIGNATURE

**PERMIT TO DRILL WELL**  
please print or type

HA - 94 - 1334  
70 fill in this form completely 79

(THIS NUMBER IS TO BE PUNCHED  
IN COLS 3-6 ON ALL CARDS)

**OWNER INFORMATION**

Date Received (APA) 11-12-96  
3 MM DD YY 13

United States Army  
Last Name Owner First Name 34

Aberdeen Proving Ground  
36 Street or RFD 55

Edgewood MD  
57 Town 70 State 72 Zip 76

**LOCATION OF WELL**

Harford County  
8 COUNTY 21

Aberdeen Proving Ground  
23 SUBDIVISION 42

SECTION 44 46 LOT 48 50

Edgewood  
52 NEAREST TOWN 71

MILES FROM TOWN (enter 0 if in town) 7 M I  
73 76 77 78

**DRILLER INFORMATION**

David Hartman  
Driller's Name M D 517  
76 License No. 81

A.C. Schultes of Maryland, Inc.  
Firm Name

24 South River Rd. Edgewater, MD 21037  
Address

David Hartman  
Signature Date 11/18/96

**DIRECTION OF WELL FROM TOWN (CIRCLE BOX)**

**NEAR WHAT ROAD** Ricketts Point Rd. 30

**ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)**

DISTANCE FROM ROAD  
ENTER FT OR MI 30 34 37 38 39

TAX MAP: \_\_\_\_\_ BLK: \_\_\_\_\_ PARCEL \_\_\_\_\_

**WELL INFORMATION**

APPROX. PUMPING RATE N/A  
(GAL. PER MIN.) 8 12

AVERAGE DAILY QUANTITY NEEDED N/A  
(GAL. PER DAY) 14 20

**USE FOR WATER (CIRCLE APPROPRIATE BOX)**

HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)

FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)

INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)

PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE APPROVAL)

TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

**NOT TO BE FILLED IN BY DRILLER  
HEALTH DEPARTMENT APPROVAL**

Harford COUNTY NAME COUNTY NO. 12

STATE SIGNATURE \_\_\_\_\_ INSERT S → 41

DATE ISSUED 11/13/96 CO SIGNATURE \_\_\_\_\_ EXP. DATE 11/13/97

43 MM DD YY 48 NORTH GRID 535 000 EAST GRID 0999 000  
50 55 57 63

APPROXIMATE DEPTH OF WELL 13 FEET  
24 28

APPROXIMATE DIAMETER OF WELL 2" NEAREST INCH

**METHOD OF DRILLING (circle one)**

BORED (or Augered) JETTED Jetted & DRIVEN

AIR-ROTary AIR-PERCussion ROTARY (Hydraulic Rotary)

CABLE REVERSE-ROTary DRIVE-POINT

other \_\_\_\_\_

**REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)**

THIS WELL WILL NOT REPLACE AN EXISTING WELL

THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED

THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS

THIS WELL WILL DEEPEM AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE) 41 52

**Not to be filled in by driller (MDE OR COUNTY USE ONLY)**

APPROP. PERMIT NUMBER \_\_\_\_\_ G A P \_\_\_\_\_ 63

WRITE INITIALS IN BOX PERMIT No. HA - 94 - 1334  
67 68 70 71 72 73 74 75 76 77 78 79

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

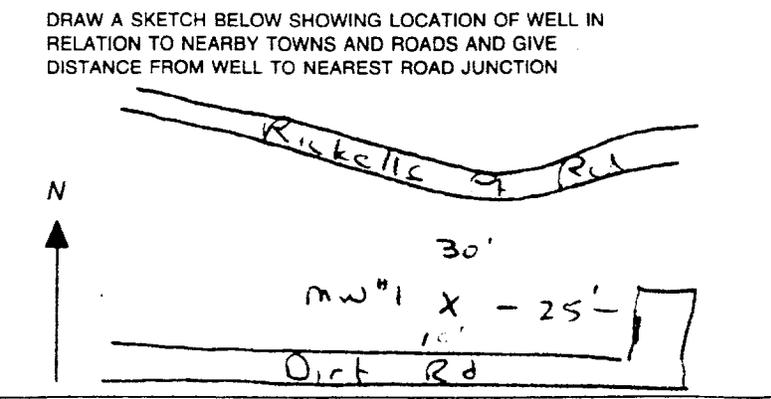
SOURCES OF DRILLING WATER  
1. N/A  
2.  
3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 990

N 530

000  
000



**SPECIAL CONDITIONS**  
NOTE: APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED.

DRILLER

1 1461 SEQUENCE NO. (MDE USE ONLY) STATE OF MARYLAND WELL COMPLETION REPORT THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

THIS NUMBER IS TO BE PUNCHED IN COLUMNS 3-6 ON ALL CARDS. FILL IN THIS FORM COMPLETELY PLEASE PRINT OR TYPE COUNTY NUMBER 12

DATE WELL COMPLETED 111396 Depth of Well 22 14 26 (TO NEAREST FOOT) PERMIT NO. HA-99-1334

OWNER U.S. Army STREET OR RFD Ricketts Point Rd TOWN Edgewood MD SUBDIVISION APG-Edgewood SECTION LOT

**WELL LOG**  
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET		check if water bearing
	FROM	TO	
TOPSOIL	0	1	
RED ORANGE SAND/SOME CLAY	1	14	

**GROUTING RECORD**

WELL HAS BEEN GROUTED (Circle Appropriate Box) **Y** **N**

TYPE OF GROUTING MATERIAL (Circle one) CEMENT **CM** BENTONITE CLAY **BC**

NO. OF BAGS 1 NO. OF POUNDS 94  
GALLONS OF WATER 6

DEPTH OF GROUT SEAL (to nearest foot) from 0 ft. to 2 ft.

**CASING RECORD**

casing types insert appropriate code below

**ST** STEEL **CO** CONCRETE  
**PL** PLASTIC **OT** OTHER

**MAIN CASING TYPE**

Nominal diameter top (main) casing (nearest inch): **2**  
Total depth of main casing (nearest foot): **4**

**OTHER CASING (if used)**

diameter inch depth (feet) from to

**SCREEN RECORD**

screen type or open hole insert appropriate code below

**ST** STEEL **BR** BRASS BRONZE **HO** OPEN HOLE  
**PL** PLASTIC **OT** OTHER

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED **Y** **N**

CIRCLE APPROPRIATE LETTER

**A** A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

**E** ELECTRIC LOG OBTAINED

**P** TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE MENTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

TYPE MWD/MSD/MGD  
DRILLERS LIC. NO. 517

SIGNATURE

LIC. NO.

**C 2**

DEPTH (nearest ft.)	1		2		3	
	8	9	11	15	17	21
1	<b>P</b>	<b>L</b>		<b>4</b>		<b>14</b>
2						
3						
4						

SLOT SIZE 1 .010 2 3  
DIAMETER OF SCREEN **2** (NEAREST INCH)

GRAVEL PACK from 2 to 14  
IF WELL DRILLED WAS FLOWING WELL INSERT **68**

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

TELESCOPE CASING LOG INDICATOR OTHER DATA

**C 3**

**PUMPING TEST**

HOURS PUMPED (nearest hour) 8 9

PUMPING RATE (gal. per min.) 11 15

METHOD USED TO MEASURE PUMPING RATE

WATER LEVEL (distance from land surface)

BEFORE PUMPING 17 20 ft.  
WHEN PUMPING 22 25 ft.

TYPE OF PUMP USED (for test)

**A** air **P** piston **T** turbine  
**C** centrifugal **R** rotary **O** other (describe below)  
**J** jet **S** submersible

**PUMP INSTALLED**

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES **NO**

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. **29**

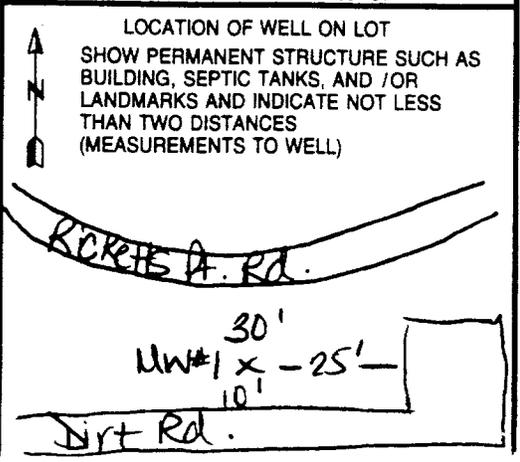
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 31 35

PUMP HORSE POWER 37 41

PUMP COLUMN LENGTH (nearest ft.) 43 47

CASING HEIGHT (circle appropriate box and enter casing height)

**+** above } LAND SURFACE  
**-** below } **3** (nearest foot)  
49 50 51



**A.C. SCHULTES OF MARYLAND, INC.**  
24-26 SOUTH RIVER ROAD EDGEWATER MARYLAND 21037

**Water Well Contractors**

CUSTOMER ROY F. WESTON JOB 3052  
ADDRESS ABERDEEN PROVING GROUNDS DATE 11/14/96  
LOCATION EDGEWOOD, MARYLAND WELL JFL #2

GROUND	FEET FROM GROUND SURFACE 0 TO -----	WELL LOG	
		2' 8"	0
13'6"	1	13	MED ORANGE SAND W/GRAVEL
3'6" CASING			
10'			

PERMIT NO	<b>HA-94-1335</b>	DIAMETER OF WELL	<b>2"</b>	DEPT. OF WELL	<b>13' 6"</b>
HRS PUMPED		SLOT SIZE	<b>.010</b>	TYPE OF CASING	<b>PVC</b>
CAPACITY G P M		DRILLING MACHINE NO	<b>ATV</b>	LENGTH OF CASING	<b>3' 6"</b>
STATIC LEVEL		DRILLER	<b>K. DEROCHE</b>	DISTANCE TO TOP OF Screen	<b>3'6"</b>
PUMPING LEVEL		GRAVEL	<b>MORIE #1</b>	TYPE SCREEN	<b>PVC</b>
SPECIFIC CAPACITY		BAGS OF <del>CEMENT</del> /CEMENT	<b>1</b>	SIZE OF SCREEN	<b>2"</b>
PUMPED WITH		DATE WELL COMPLETED	<b>11/14/96</b>		
DEPTH OF GROUT	<b>: 0-1'6"</b>	DRILLER'S HELPER	<b>J. AMIS</b>		
DEPTH GRAVEL PACKED	<b>1'6"-13'6"</b>				

**K. DEROCHE**  
WELL DRILLER'S SIGNATURE

**PERMIT TO DRILL WELL**  
please print or type

11A-94-1335  
fill in this form completely

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

Date Received (APA)

11-12-96  
8 MM DD YY 13

**OWNER INFORMATION**

United States Army  
Last Name Owner First Name 34  
Aberdeen Proving Ground  
36 Street or RFD 55  
Edgewood MD  
57 Town 70 State 72 Zip 76

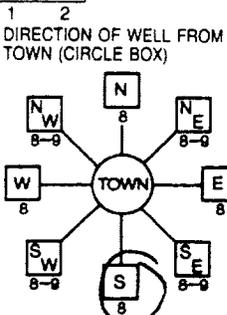
**LOCATION OF WELL**

B 3 Harford County  
8 COUNTY 21  
Aberdeen Proving Ground  
23 SUBDIVISION 42  
SECTION 44 46 LOT 48 50  
Edgewood  
52 NEAREST TOWN 71  
MILES FROM TOWN (enter 0 if in town) 73 7 76 77 78

**DRILLER INFORMATION**

David Hartman  
Driller's Name (M) D 517  
76 License No. 81  
A.C. Schultes of Maryland, Inc.  
Firm Name  
24 South River Rd, Edgewater, MD 21037  
Address  
Signature Date 11/8/96

**DIRECTION OF WELL FROM TOWN (CIRCLE BOX)**



Ricketts Point Rd  
11 NEAR WHAT ROAD 30  
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)  
NORTH  
WEST SOUTH EAST  
34 35 37  
DISTANCE FROM ROAD  
ENTER FT OR MI 38 39  
TAX MAP: BLK: PARCEL

R 2 WELL INFORMATION  
2 APPROX. PUMPING RATE N/A  
(GAL. PER MIN.) 8 12  
AVERAGE DAILY QUANTITY NEEDED N/A  
(GAL. PER DAY) 14 20

**USE FOR WATER (CIRCLE APPROPRIATE BOX)**  
 HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)  
 FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)  
 INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)  
 PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE APPROVAL)  
 ST. OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

**NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL**  
Harford  
COUNTY NAME 12 COUNTY NO.  
STATE SIGNATURE INSERT S → 41  
DATE ISSUED 11/13/96  
43 MM DD YY 48 CO SIGNATURE 11/13/97 EXP. DATE  
NORTH GRID 50 535000 EAST GRID 57 0999000  
55 63

APPROXIMATE DEPTH OF WELL 13 FEET  
24 28

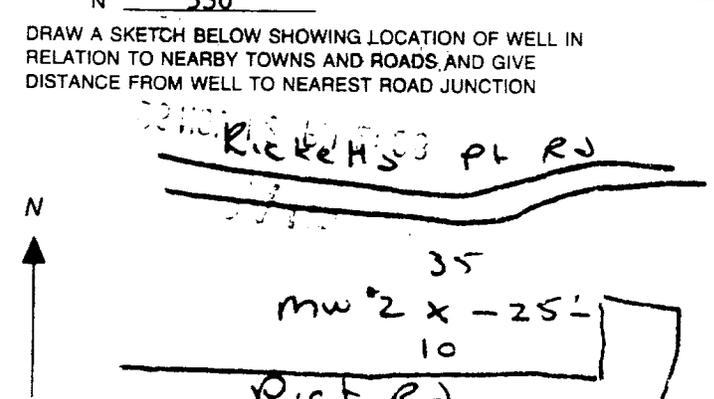
APPROXIMATE DIAMETER OF WELL 2" NEAREST INCH

**METHOD OF DRILLING (circle one)**  
BORED (or Augered) JETTED Jetted & DRIVEN  
3 AIR-ROTARY AIR-PERCussion ROTARY (Hydraulic Rotary)  
3 CABLE REVERSE-ROTARY DRIVE-POINT  
other

**REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)**  
 THIS WELL WILL NOT REPLACE AN EXISTING WELL  
 THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED  
39  THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS  
 THIS WELL WILL DEEPEAN AN EXISTING WELL  
PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE) 41 52

**Not to be filled in by driller (MDE OR COUNTY USE ONLY)**  
APPROP. PERMIT NUMBER 54 G A P 63  
WRITE INITIALS IN BOX PERMIT No. HA-94-1335  
67 68 70 71 72 73 74 75 76 77 78 79

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X  
Carroll Pt.  
SOURCES OF DRILLING WATER  
1. N/A  
2.  
3.  
WRITE THE BOX NUMBER FROM THE MAP HERE  
E 990  
N 530  
000 000



**SPECIAL CONDITIONS**

NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED -

COUNTY





(MDE USE ONLY)

STATE OF MARYLAND  
PERMIT TO DRILL WELL  
please print or type

HA - 94 - 1336  
70 fill in this form completely 79

Date Received (APA)

11-12-96  
MM DD YY 13

OWNER INFORMATION

United States Army

Last Name Owner First Name 34

Aberdeen Proving Ground

36 Street or RFD 55

Edgewood, MD

7 Town 70 State 72 Zip 76

DRILLER INFORMATION

David HARTMAN

Driller's Name 76 License No. 81  
M D 517

24 C. Schultes of Maryland, Inc.

Firm Name

24 South River Rd. Edgewater, MD 21037

Address

Signature Date  
11/8/96

B 3

LOCATION OF WELL

Harford County

8 COUNTY 21

Aberdeen Proving Ground

23 SUBDIVISION 42

SECTION 44 46 LOT 48 50

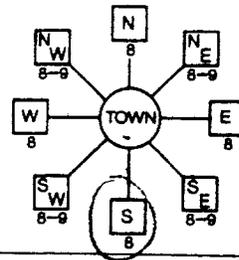
Edgewood

52 NEAREST TOWN 71

MILES FROM TOWN (enter 0 if in town) 7  
73 76 77 78

B 4

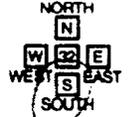
1 2  
DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



Ricketts Point Rd.

11 NEAR WHAT ROAD 30

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)



34 37  
DISTANCE FROM ROAD ENTER FT. OR MI 38 39

TAX MAP: \_\_\_\_\_ BLK: \_\_\_\_\_ PARCEL \_\_\_\_\_

WELL INFORMATION

APPROX. PUMPING RATE N/A  
(GAL. PER MIN.) 8 12

AVERAGE DAILY QUANTITY NEEDED N/A  
(GAL. PER DAY) 14 20

USE FOR WATER (CIRCLE APPROPRIATE BOX)

HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)

FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)

22  INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)

PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE APPROVAL)

TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL

Harford 12  
COUNTY NAME COUNTY NO.

STATE SIGNATURE INSERT S 41

DATE ISSUED 11/13/96 11/13/97  
43 MM DD YY 48 CO SIGNATURE EXP. DATE

NORTH GRID 535 000 EAST GRID 0999 000  
50 55 57 63

APPROXIMATE DEPTH OF WELL 13 FEET  
24 28

APPROXIMATE DIAMETER OF WELL 2" NEAREST INCH

METHOD OF DRILLING (circle one)

CORED (or Augered)  JETTED  Jetted & DRIVEN

30 R-ROTary AIR-PERcussion ROTARY (Hydraulic Rotary)

37 CABLE REVERSE-ROTary DRIVE-POINT

REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)

THIS WELL WILL NOT REPLACE AN EXISTING WELL

THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED

39  THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS

THIS WELL WILL DEEPEEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE) 41 52

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APR PERMIT NUMBER 54 G A P 63

DRILLER INITIALS IN BOX PERMIT No. 10-94-1336  
67 68 70 71 72 73 74 75 76 77 78 79

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER

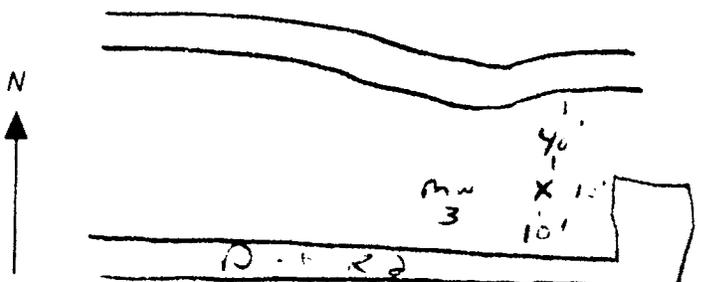
- 1. N/A
- 2.
- 3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 990

N 530

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



SPECIAL CONDITIONS

APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

DRILLER

1 1462

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

COUNTY NUMBER 12

DATE RECEIVED

DATE WELL COMPLETED 111396

DEPTH OF WELL 14 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" HA-94-1336

OWNER US Army, STREET OR RFD Ricketts Point Rd, TOWN Edgewood Md 3, UBDIVISION ADG-Edgewood, SECTION, LOT

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

Table with columns: DESCRIPTION (Use additional sheets if needed), FEET (FROM, TO), check if water bearing. Rows include DP SOIL, SAND/GRAVEL.

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) Y N, TYPE OF GROUTING MATERIAL (Circle one) CM BENTONITE CLAY BC, NO. OF BAGS 1, NO. OF POUNDS 94, GALLONS OF WATER 6, DEPTH OF GROUT SEAL (to nearest foot) from 0 to 2 ft.

CASING RECORD

ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER

MAIN CASING TYPE, Nominal diameter top (main) casing (nearest inch) 2, Total depth of main casing (nearest foot) 4

OTHER CASING (if used) diameter inch, depth (feet) from to

SCREEN RECORD

ST STEEL, BR BRASS, BRONZE, PL PLASTIC, HO OPEN HOLE, OT OTHER

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED Y N

CIRCLE APPROPRIATE LETTER A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE MENTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

TYPE: MWD/MSD/MGD, DRILLERS LIC. NO. 517

SIGNATURE [Signature]

LIC. NO.

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

Table with columns: E A C H C A S I N G, DEPTH (nearest ft.), SLOT SIZE 1.010, DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 2 to 14, IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER) T (E.R.O.S.) W Q

TELESCOPE CASING, LOG INDICATOR, OTHER DATA

C 3

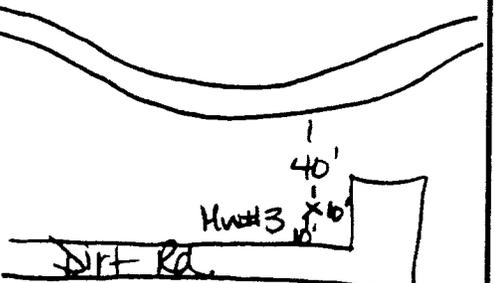
PUMPING TEST

HOURS PUMPED (nearest hour) 8 9, PUMPING RATE (gal. per min.) 11 15, METHOD USED TO MEASURE PUMPING RATE, WATER LEVEL (distance from land surface) BEFORE PUMPING, WHEN PUMPING, TYPE OF PUMP USED (for test) A air, P piston, T turbine, C centrifugal, R rotary, O other, J jet, S submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO, IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS, TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29, CAPACITY: GALLONS PER MINUTE (to nearest gallon), PUMP HORSE POWER, PUMP COLUMN LENGTH (nearest ft.), CASING HEIGHT (circle appropriate box and enter casing height) + above, - below, LAND SURFACE (nearest foot) 3

LOCATION OF WELL ON LOT, SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)





PERMIT TO DRILL WELL

please print or type

HA - 94 - 1337

fill in this form completely

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

Date Received (APA)

7-12-96

OWNER INFORMATION

United States Army

Street Name Owner First Name 34

Aberdeen Proving Ground-

Street or RFD 55

Edgewood MD

Town 70 State 72 Zip 76

LOCATION OF WELL

Harford County

COUNTY 21

Aberdeen Proving Ground

SUBDIVISION 42

SECTION 44 46 LOT 48 50

Edgewood

NEAREST TOWN 71

MILES FROM TOWN (enter 0 if in town) 7 M 73 76-77-78

DRILLER INFORMATION

David Hartman

Driller's Name License No. 81

A.C. Schultes of Maryland, Inc.

Firm Name

24 South River Rd. Edgewater, MD 21037

Address

Signature 11/8/96

Date

APPROX. PUMPING RATE N/A

(GAL. PER MIN.) 8 12

AVERAGE DAILY QUANTITY NEEDED N/A

(GAL. PER DAY) 14 20

USE FOR WATER (CIRCLE APPROPRIATE BOX)

HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)

FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)

INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)

PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE APPROVAL)

TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

DATE ISSUED 11/12/96

CO SIGNATURE EXP. DATE

NORTH GRID 535 000 EAST GRID 0917 000

GRID 50 55 57 63

REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)

THIS WELL WILL NOT REPLACE AN EXISTING WELL

THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED

THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS

THIS WELL WILL DEEPEAN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE) 41 52

Not to be filled in by driller (MDE OR COUNTY USE ONLY).

PERMIT NUMBER G A P 54 63

WRITE INITIALS IN BOX PERMIT No. 11-94-1337

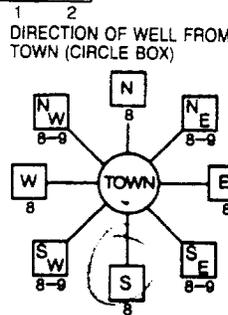
70 71 72 73 74 75 76 77 78 79

SPECIAL CONDITIONS

APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

DRILLER

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



Ricketts Point Rd.

NEAR WHAT ROAD 30

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)



DISTANCE FROM ROAD 34 37

ENTER FT OR MI 38 39

TAX MAP: BLK: PARCEL

NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL

Harford 12

COUNTY NAME COUNTY NO.

STATE SIGNATURE INSERT S

DATE ISSUED 11/12/96

CO SIGNATURE EXP. DATE

NORTH GRID 535 000 EAST GRID 0917 000

GRID 50 55 57 63

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER

1. N/A

2.

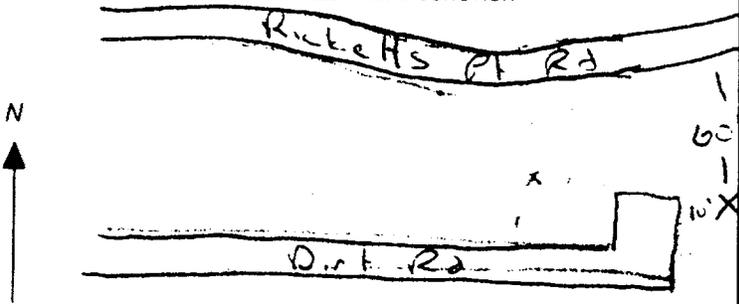
3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 990

N 530

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



1 1463

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

THIS NUMBER IS TO BE PUNCHED COLS. 3-6 ON ALL CARDS)

FILL IN THIS FORM COMPLETELY PLEASE PRINT OR TYPE

COUNTY NUMBER

12

DATE RECEIVED

DATE WELL COMPLETED

Depth of Well

PERMIT NO. FROM "PERMIT TO DRILL WELL"

13

1 1 1 3 9 6

22 1 4 26

28 29 30 31 32 33 34 35 36 37

OWNER: Ricketts Point Rd, Edgewood Md 4, UBDIVISION: ADG-Edgewood, SECTION, LOT 3

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

Table with columns: DESCRIPTION, FEET (FROM, TO), check if water bearing. Rows: TOP SOIL (0-1), MED ORANGE SAND/SOME CLAY (1-14)

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) YES Y NO N. TYPE OF GROUTING MATERIAL: CEMENT CM, BENTONITE CLAY BC. NO. OF BAGS 1, NO. OF POUNDS 94. GALLONS OF WATER 6. DEPTH OF GROUT SEAL (to nearest foot) from 0 to 2 ft.

CASING RECORD

MAIN CASING TYPE: PL, Nominal diameter top (main) casing (nearest inch): 2, Total depth of main casing (nearest foot): 4. OTHER CASING (if used) diameter inch, depth (feet) from to.

OTHER CASING (if used)

SCREEN RECORD: screen type or open hole insert appropriate code below. ST STEEL, BR BRASS, HO OPEN HOLE, PL PLASTIC, OT OTHER.

SCREEN RECORD

DEPTH (nearest ft.) table with rows 1-3 and columns 1-6. Slot size 1: 0.10, 2: , 3: . DIAMETER OF SCREEN: 2 (NEAREST INCH).

GRAVEL PACK from 2 to 14. IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68. MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER) T (E.R.O.S.), W Q.

TELESCOPE CASING, LOG INDICATOR, OTHER DATA.

C 3

PUMPING TEST

HOURS PUMPED (nearest hour) 8 9. PUMPING RATE (gal. per min.) 11 15. METHOD USED TO MEASURE PUMPING RATE. WATER LEVEL (distance from land surface) BEFORE PUMPING, WHEN PUMPING. TYPE OF PUMP USED (for test): A air, P piston, T turbine, C centrifugal, R rotary, O other, J jet, S submersible.

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO. IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS. TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. CAPACITY: GALLONS PER MINUTE (to nearest gallon) 31 35. PUMP HORSE POWER 37 41. PUMP COLUMN LENGTH (nearest ft.) 43 47. CASING HEIGHT (circle appropriate box and enter casing height) + above, - below. LAND SURFACE (nearest foot) 3 51.

LOCATION OF WELL ON LOT SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL). RICKETTS PT. RD., DIFF RD., 60', 10X, UWH.

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED YES Y NO N

CIRCLE APPROPRIATE LETTER A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED, E ELECTRIC LOG OBTAINED, P TEST WELL CONVERTED TO PRODUCTION WELL.

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE OBTAINED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

TYPE: MWD/MSD/MGD. DRILLERS LIC. NO.: 517. SIGNATURE: [Signature]. LIC. NO.:

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

**A.C. SCHULTES OF MARYLAND, INC.**  
24-26 SOUTH RIVER ROAD EDGEWATER MARYLAND 21037

**Water Well Contractors**

CUSTOMER ROY F. WESTON JOB 3052  
ADDRESS ABERDEEN PROVING GROUNDS DATE 11/14/96  
LOCATION EDGEWOOD, MARYLAND WELL JFL #5

GROUND	FEET FROM GROUND SURFACE 0 TO -----	WELL LOG
14'	1 14	MED ORANGE SAND W/GRAVEL
4' CASING		
10'		

PERMIT NO <b>HA-94-1338</b>	DIAMETER OF WELL <b>2"</b>	DEPT. OF WELL <b>14'</b>
HRS PUMPED	SLOT SIZE <b>.010</b>	TYPE OF CASING <b>2" PVC</b>
CAPACITY G P M	DRILLING MACHINE NO <b>ATV</b>	LENGTH OF CASING <b>4' 8"</b>
STATIC LEVEL	DRILLER <b>K. DEROCHE</b>	DISTANCE TO TOP OF Screen <b>4'</b>
PUMPING LEVEL	GRAVEL <b>MORIE #1</b>	TYPE SCREEN <b>PVC</b>
SPECIFIC CAPACITY	BAGS OF <del>PORTLAND</del> /CEMENT <b>1</b>	SIZE OF SCREEN <b>2"</b>
PUMPED WITH	DATE WELL COMPLETED <b>11/14/96</b>	<p align="center"><b>K. DEROCHE</b> WELL DRILLER'S SIGNATURE</p>
DEPTH OF GROUT : <b>0-3'</b>	DRILLER'S HELPER <b>J. AMIS</b>	
DEPTH GRAVEL PACKED <b>3' - 14'</b>		

(MDE USE ONLY)

PERMIT TO DRILL WELL

please print or type

HA - 94 - 1338  
70 fill in this form completely 79

(THIS NUMBER IS TO BE PUNCHED IN COLS 3-6 ON ALL CARDS)

Date Received (APA)

11-12-96  
MM DD YY 13

OWNER INFORMATION

United States Army

Last Name Owner First Name 34

Aberdeen Proving Ground

36 Street or RFD 55

Edgewood

MD

17 Town 70 State 72 Zip 76

DRILLER INFORMATION

David HARTMAN

Driller's Name 76 License No. 81

M D 517

A.C. Schultes of Maryland, Inc.

Firm Name

24 South River Rd. Edgewater, MD 21037

Address

Signature Date 11/18/96

B 3

LOCATION OF WELL

Harford County

8 COUNTY 21

Aberdeen Proving Ground

23 SUBDIVISION 42

SECTION 44 46 LOT 48 50

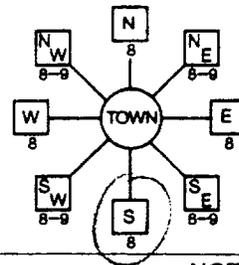
Edgewood

52 NEAREST TOWN 71

MILES FROM TOWN (enter 0 if in town) 7 M 73 76 77 78

B 4

1 2 DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



Ricketts Point Rd.

11 NEAR WHAT ROAD 30

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)



34 37 DISTANCE FROM ROAD ENTER (FT OR MI) 38 39

TAX MAP: BLK: PARCEL

WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.) N/A

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 14 20

USE FOR WATER (CIRCLE APPROPRIATE BOX)

HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)

FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)

22  INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)

PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE APPROVAL)

TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL

Harford 12  
COUNTY NAME COUNTY NO.

STATE SIGNATURE INSERT S → 41

DATE ISSUED 11/13/96 11/13/97

43 MM DD YY 48 CO SIGNATURE EXP. DATE

NORTH GRID 50 000 EAST GRID 57 000

APPROXIMATE DEPTH OF WELL 13 FEET

APPROXIMATE DIAMETER OF WELL 2" NEAREST INCH

METHOD OF DRILLING (circle one)

CORED (or Augered)  JETTED  Jetted & DRIVEN

AIR-ROTARY  AIR-PERCussion  ROTARY (Hydraulic Rotary)

37  CABLE  REVERSE-ROTARY  Drive-POINT

REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)

THIS WELL WILL NOT REPLACE AN EXISTING WELL

THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED

39  THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS

THIS WELL WILL DEEPEM AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE) 41 52

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

PERMIT NUMBER 34 G A P 63

WRITE INITIALS IN BOX PERMIT No. HA - 94 - 1338

SPECIAL CONDITIONS

NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED -

DRILLER

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER

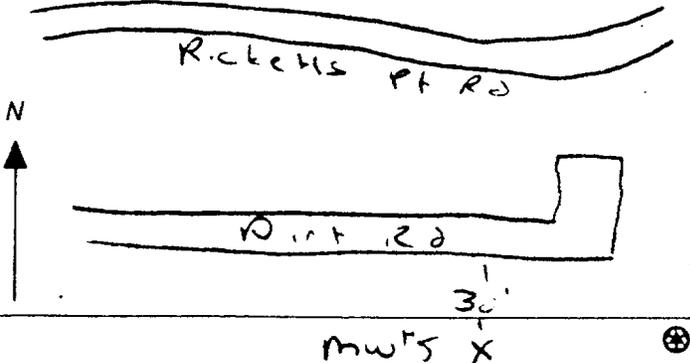
- 1. N/A
- 2.
- 3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 990

N 530

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



1 1464 SEQUENCE NO. (MDE USE ONLY)  
 THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

**STATE OF MARYLAND**  
**WELL COMPLETION REPORT**  
 FILL IN THIS FORM COMPLETELY  
 PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN  
 45 DAYS AFTER WELL IS COMPLETED.  
 COUNTY NUMBER 12

DATE WELL COMPLETED  
 1111396

Depth of Well  
 22 14 26  
 (TO NEAREST FOOT)

PERMIT NO.  
 FROM "PERMIT TO DRILL WELL"  
 4A-94-1338

OWNER US Army  
 STREET OR RFD Ricketts Point Rd TOWN Edgewood Md 5  
 SUBDIVISION ADG Edgewood SECTION \_\_\_\_\_ LOT \_\_\_\_\_

**WELL LOG**  
 Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET		check if water bearing
	FROM	TO	
TOP SOIL	0	1	
MED ORANGE SAND/GRAVEL	1	14	

**GROUTING RECORD**  
 WELL HAS BEEN GROUTED (Circle appropriate box) **Y** **N**  
 TYPE OF GROUTING MATERIAL (Circle one)  
 CEMENT **CM** BENTONITE CLAY **BC**  
 NO. OF BAGS 1 NO. OF POUNDS 94  
 GALLONS OF WATER 6  
 DEPTH OF GROUT SEAL (to nearest foot)  
 from 0 ft. to 2 ft.

**CASING RECORD**  
 casing types insert appropriate code below  
**ST** STEEL **CO** CONCRETE  
**PL** PLASTIC **OT** OTHER

**MAIN CASING TYPE**  
 Nominal diameter top (main) casing (nearest inch)! Total depth of main casing (nearest foot)  
**PL** 2 4

**OTHER CASING (if used)**  
 diameter inch depth (feet) from to

**SCREEN RECORD**  
 screen type or open hole insert appropriate code below  
**ST** STEEL **BR** BRASS BRONZE **HO** OPEN HOLE  
**PL** PLASTIC **OT** OTHER

NUMBER OF UNSUCCESSFUL WELLS: 0  
 WELL HYDROFRACTURED **Y** **N**  
 CIRCLE APPROPRIATE LETTER  
**A** A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED  
**E** ELECTRIC LOG OBTAINED  
**P** TEST WELL CONVERTED TO PRODUCTION WELL

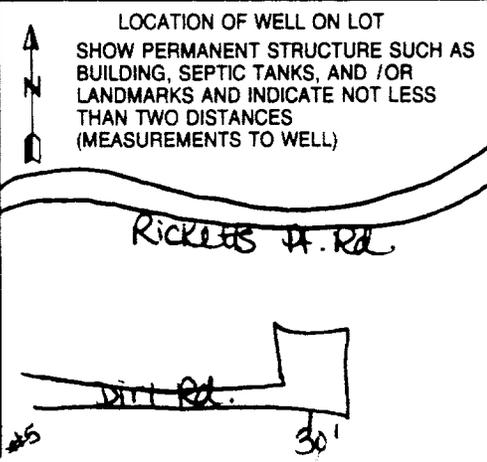
**C 2**  
 DEPTH (nearest ft.)  
 1 2 3  
 E 1 **PL** 4 1 4  
 A 8 9 11 15 17 21  
 C 2  
 S 23 24 26 30 32 36  
 R 3  
 E 38 39 41 45 47 51  
 N  
 SLOT SIZE 1.010 2 3  
 DIAMETER OF SCREEN 2 (NEAREST INCH)  
 56 80

GRAVEL PACK from 2 to 14  
 IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

**MDE USE ONLY**  
 (NOT TO BE FILLED IN BY DRILLER)  
 T (E.R.O.S.) W Q 74 75 76  
 70 72  
 TELESCOPE CASING LOG INDICATOR OTHER DATA

**C 3**  
**PUMPING TEST**  
 HOURS PUMPED (nearest hour) 8 9  
 PUMPING RATE (gal. per min.) 11 15  
 METHOD USED TO MEASURE PUMPING RATE \_\_\_\_\_  
 WATER LEVEL (distance from land surface)  
 BEFORE PUMPING \_\_\_\_\_ ft.  
 WHEN PUMPING \_\_\_\_\_ ft.  
 TYPE OF PUMP USED (for test)  
**A** air **P** piston **T** turbine  
**C** centrifugal **R** rotary **O** other (describe below)  
**J** jet **S** submersible

**PUMP INSTALLED**  
 DRILLER WILL INSTALL PUMP (CIRCLE) YES **NO**  
 IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.  
 TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29  
 CAPACITY: GALLONS PER MINUTE (to nearest gallon) 31 35  
 PUMP HORSE POWER 37 41  
 PUMP COLUMN LENGTH (nearest ft.) 43 47  
**CASING HEIGHT** (circle appropriate box and enter casing height)  
**+** above } LAND SURFACE  
**-** below } (nearest foot) 3



HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  
 TYPE: **MWD/MSD/MGD**  
 DRILLER'S LIC. NO. 517  
 DRILLER'S SIGNATURE  
 (MUST MATCH SIGNATURE ON APPLICATION)  
 LIC. NO. \_\_\_\_\_  
 SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

APPENDIX B  
Well and Lysimeter Logs  
J-Field Phytoremediation Well and Lysimeter Installation Report  
Aberdeen Proving Ground, Maryland  
April 1997

**Well Completion Summary**

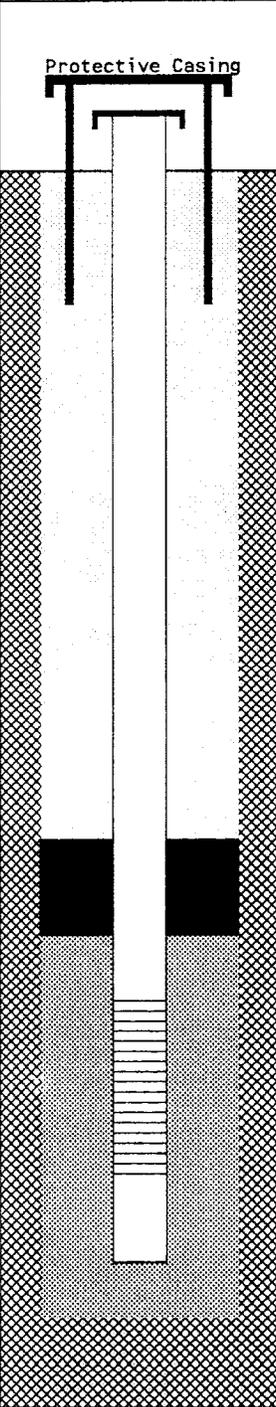
**Roy F. Weston, Inc.**

**CLIENT:** ABERDEEN PROVING GRO  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFP-1  
**START DATE:** 11/12/96  
**COMPLETION DATE:** 11/12/96

**WATER LEVELS**

		DEPTH	ELEV.	DRILLING SUMMARY	
		0.00	TC 2.80	<b>Driller:</b>	
		0.00	GS 0.00	<b>Drilling Fluid:</b>	
				<b>Well Type:</b> SINGLE CASED, SCREENED, PROTECTED	
<b>WELL DESIGN CONSTRUCTION</b>					
		<b>Casing #1 Diameter:</b> 2.00 inch		<b>Interval:</b> 0.00 to 3.60 ft.	
		<b>Type:</b> PVC 40			
		<b>Stick Up Inner Casing:</b> 0.00 ft.		<b>Protective Casing:</b> 2.80 ft.	
		<b>Casing Grout:</b> C/B		<b>Interval:</b> 0.00 to 1.00 ft.	
		<b>Seal Type:</b> BENTONITE PELLETS		<b>Interval:</b> 1.00 to 2.60 ft.	
		<b>Sand Pack Type:</b> #1 MORIE SAND		<b>Interval:</b> 2.60 to 14.10 ft.	
		<b>Grain Size:</b>		<b>Median Diameter:</b>	
		<b>Screen Diameter:</b> 2.00 inch		<b>Interval:</b> 3.60 to 13.60 ft.	
		<b>Type:</b> PVC		<b>Slots:</b> 0.010 inches	
	1.00	BN	-1.00	<b>Silt Trap Interval:</b> 13.60 to 14.10 ft.	
	2.60	SP	-2.60	<b>Backfill Type:</b>	
	3.60	SC	-3.60	<b>Interval:</b> 0.00 to 0.00 ft.	
				<b>Collapsed Type:</b>	
				<b>Interval:</b> 0.00 to 0.00 ft.	
<b>WELL DEVELOPMENT</b>					
<b>Date:</b> / /				<b>Purged Volume:</b> 0.0 gal	
<b>Method:</b>					
<b>Yield:</b>					
<b>COMMENTS</b>					
TC = Top of Casing		SP = Top Sand Pack		= Grout	
GS = Ground Surface		SC = Top Screen		= Seal	
BN = Top Seal		BS = Bottom Screen		= Sand Pack	
BW = Bottom of Well		TD = Total Depth		= Formation	
<b>Additional Comments:</b>					
DTW = 7.0 FT. BGS (TOC)					

**NOTE:** Well Diagram Not to Scale

**Elevations are feet above Mean Sea Level**

**Well Completion Summary**

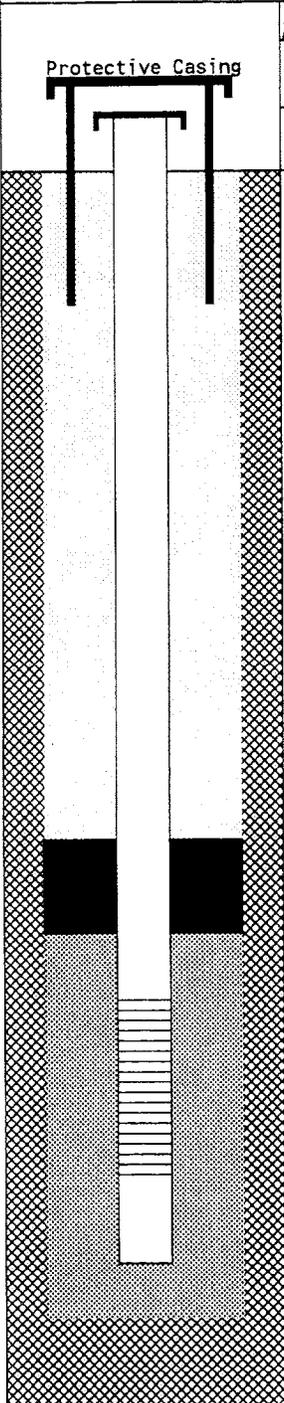
**Roy F. Weston, Inc.**

**CLIENT:** APG  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFP-2  
**START DATE:** 11/13/96  
**COMPLETION DATE:** 11/13/96

**WATER LEVELS**

		DEPTH	ELEV.	DRILLING SUMMARY	
	Protective Casing	0.00	TC 2.80	<b>Driller:</b> <b>Drilling Fluid:</b> <b>Well Type:</b> SINGLE CASSED, SCREENED, PROTECTED	
		0.00	GS 0.00		
				<b>WELL DESIGN CONSTRUCTION</b>	
				<b>Casing #1 Diameter:</b> 2.00 inch <b>Type:</b> PVC 40	<b>Interval:</b> 0.00 to 3.50 ft.
				<b>Stick Up Inner Casing:</b> 0.00 ft.	<b>Protective Casing:</b> 2.80 ft.
				<b>Casing Grout:</b> C/B	<b>Interval:</b> 0.00 to 1.50 ft.
				<b>Seal Type:</b> BENTONITE PELLETS	<b>Interval:</b> 1.50 to 2.50 ft.
				<b>Sand Pack Type:</b> #1 MORIE SAND <b>Grain Size:</b>	<b>Interval:</b> 2.50 to 14.00 ft.
				<b>Screen Diameter:</b> 2.00 inch <b>Type:</b> PVC	<b>Median Diameter:</b> <b>Interval:</b> 3.50 to 13.50 ft. <b>Slots:</b> 0.010 inches
				<b>Silt Trap Interval:</b> 0.00 to 0.00 ft.	
				<b>Backfill Type:</b>	<b>Interval:</b> 0.00 to 0.00 ft.
				<b>Collapsed Type:</b>	<b>Interval:</b> 0.00 to 0.00 ft.
				<b>WELL DEVELOPMENT</b>	
				<b>Date:</b> / /	
				<b>Method:</b>	
				<b>Yield:</b>	<b>Purged Volume:</b> 0.0 gal
				<b>COMMENTS</b>	
				TC = Top of Casing GS = Ground Surface BN = Top Seal BW = Bottom of Well	SP = Top Sand Pack SC = Top Screen BS = Bottom Screen TD = Total Depth
					[Dotted] = Grout [Solid Black] = Seal [Cross-hatched] = Sand Pack [Diagonal Lines] = Formation
				<b>Additional Comments:</b>	

**NOTE:** Well Diagram Not to Scale

**Elevations are feet above Mean Sea Level**

**Well Completion Summary**

**Roy F. Weston, Inc.**

**CLIENT:** ABERDEEN PROVING GRO  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFP-3  
**START DATE:** 11/12/96  
**COMPLETION DATE:** 11/12/96

**WATER LEVELS**

			<b>DEPTH</b>		<b>ELEV.</b>	<b>DRILLING SUMMARY</b>		
		0.00	<b>TC</b>		2.80	<b>Driller:</b>		
		0.00	<b>GS</b>		0.00	<b>Drilling Fluid:</b>		
						<b>Well Type:</b> SINGLE CASSED, SCREENED, PROTECTED		
	<b>WELL DESIGN CONSTRUCTION</b>							
						<b>Casing #1 Diameter:</b> 2.00 inch	<b>Interval:</b> 0.00 to 2.50 ft.	
						<b>Type:</b> PVC 40		
						<b>Stick Up Inner Casing:</b> 0.00 ft.	<b>Protective Casing:</b> 0.00 ft.	
					<b>Casing Grout:</b> C/B	<b>Interval:</b> 0.00 to 0.50 ft.		
					<b>Seal Type:</b> BENTONITE PELLETS	<b>Interval:</b> 0.50 to 1.50 ft.		
					<b>Sand Pack Type:</b> #1 MORIE SAND	<b>Interval:</b> 1.50 to 13.00 ft.		
					<b>Grain Size:</b>	<b>Median Diameter:</b>		
					<b>Screen Diameter:</b> 2.00 inch	<b>Interval:</b> 2.55 to 12.50 ft.		
					<b>Type:</b> PVC	<b>Slots:</b> 0.010 inches		
	0.50	<b>BN</b>			-0.50	<b>Silt Trap Interval:</b> 12.50 to 13.00 ft.		
						<b>Backfill Type:</b>		
	1.50	<b>SP</b>			-1.50	<b>Interval:</b> 0.00 to 0.00 ft.		
						<b>Collapsed Type:</b>		
	2.55	<b>SC</b>			-2.55	<b>WELL DEVELOPMENT</b>		
						<b>Date:</b> / /		
						<b>Method:</b>		
						<b>Yield:</b>		
						<b>Purged Volume:</b> 0.0 gal		
	12.50	<b>BS</b>			-12.50	<b>COMMENTS</b>		
						TC = Top of Casing		
						GS = Ground Surface		
						BN = Top Seal		
						BW = Bottom of Well		
						SP = Top Sand Pack		
						SC = Top Screen		
						BS = Bottom Screen		
						TD = Total Depth		
	13.00	<b>TD</b>			-13.00	= Grout		
						= Seal		
						= Sand Pack		
						= Formation		
						<b>Additional Comments:</b>		
						DTW = 5' BGS		

**NOTE:** Well Diagram Not to Scale

**Elevations are feet above Mean Sea Level**

**Well Completion Summary**

**Roy F. Weston, Inc.**

**CLIENT:** APG  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFP-4  
**START DATE:** 11/12/96  
**COMPLETION DATE:** 11/12/96

**WATER LEVELS**

		DEPTH	ELEV.	DRILLING SUMMARY	
	Protective Casing	0.00 TC	2.80	<b>Driller:</b> <b>Drilling Fluid:</b> <b>Well Type:</b> SINGLE CASED, SCREENED, PROTECTED	
		0.00 GS	0.00	<b>WELL DESIGN CONSTRUCTION</b>	
				<b>Casing #1 Diameter:</b> 2.00 inch <b>Type :</b> PVC 40	<b>Interval:</b> 0.00 to 3.50 ft.
				<b>Stick Up Inner Casing:</b> 0.00 ft.	<b>Protective Casing:</b> 2.80 ft.
				<b>Casing Grout:</b> C/B	<b>Interval:</b> 0.00 to 1.50 ft.
				<b>Seal Type:</b> BENTONITE PELLETS	<b>Interval:</b> 1.50 to 2.50 ft.
				<b>Sand Pack Type :</b> #1 MORIE SAND <b>Grain Size :</b> <b>Screen Diameter:</b> 2.00 inch <b>Type :</b> PVC	<b>Interval:</b> 2.50 to 14.00 ft. <b>Median Diameter:</b> <b>Interval:</b> 3.50 to 13.50 ft. <b>Slots:</b> 0.010 inches
		1.50 BN	-1.50	<b>Silt Trap Interval:</b> 13.50 to 14.00 ft.	
		2.50 SP	-2.50	<b>Backfill Type:</b> <b>Collapsed Type:</b>	<b>Interval:</b> 0.00 to 0.00 ft. <b>Interval:</b> 0.00 to 0.00 ft.
		3.50 SC	-3.50	<b>WELL DEVELOPMENT</b>	
				<b>Date:</b> / / <b>Method:</b> <b>Yield:</b>	<b>Purged Volume:</b> 0.0 gal
		13.50 BS	-13.50	<b>COMMENTS</b>	
				TC = Top of Casing    SP = Top Sand Pack GS = Ground Surface    SC = Top Screen BN = Top Seal    BS = Bottom Screen BW = Bottom of Well    TD = Total Depth	[Pattern] = Grout [Solid Black] = Seal [Dotted] = Sand Pack [Cross-hatched] = Formation
		14.00 TD	-14.00	<b>Additional Comments:</b>	

**NOTE:** Well Diagram Not to Scale

Elevations are feet above Mean Sea Level

# Lysimeter Completion Summary

Roy F. Weston, Inc.

**CLIENT:** ABERDEEN PROVING GRO  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFL-4 DEEP  
**START DATE:** 11/13/96  
**COMPLETION DATE:** 11/13/96

## WATER LEVELS

DEPTH	ELEV.	DRILLING SUMMARY	
		TC	GS
0.00	0.00		
0.00	0.00		
1.00	-1.00		
2.00	-2.00		
4.42	-4.42		
5.42	-5.42		
5.75	-5.75		
7.12	-7.12		
7.50	-7.50		
7.50	-7.50		

Protective Casing

**DRILLING SUMMARY**

**Driller:**  
**Drilling Fluid:**  
**Well Type:** SINGLE CASED, LYSIMETER, PROTECTED

**WELL DESIGN CONSTRUCTION**

**Casing #1 Diameter:** 2.00 inch      **Interval:** 0.00 to 7.12 ft.  
**Type:** PVC      40

**Stick Up Inner Casing:** 0.00 ft.      **Protective Casing:** 0.00 ft.  
**Casing Grout:** C/B      **Interval:** 0.00 to 1.00 ft.

**Seal Type 1:** BENTONITE PELLETS      **Interval:** 1.00 to 2.00 ft.  
**Seal Type 2:** BENTONITE PELLETS      **Interval:** 4.42 to 5.42 ft.  
**Sand Pack Type 1:** SILICA FLOUR      **Interval:** 2.00 to 4.42 ft.  
**Sand Pack Type 2:** #1 MORIE SAND      **Interval:** 5.42 to 5.75 ft.  
**Sand Pack Type 3:** #1 MORIE SAND      **Interval:** 5.75 to 7.12 ft.  
**Screen Diameter:** 2.00 inch      **Interval:** 7.12 to 7.50 ft.  
**Type:**      **Slots:** inches

**Silt Trap Interval:** 0.00 to 0.00 ft.  
**Backfill Type:**      **Interval:** 0.00 to 0.00 ft.  
**Collapsed Type:**      **Interval:** 0.00 to 0.00 ft.

**WELL DEVELOPMENT**

**Date:** / /  
**Method:**  
**Yield:**      **Purged Volume:** 0.0 gal

**COMMENTS**

TC = Top of Casing      SP = Top Sand Pack      [Pattern] = Grout  
GS = Ground Surface      TL = Top Lysimeter Cup      [Solid Black] = Seal  
BN = Top Seal      BL = Botm Lysimeter Cup      [Cross-hatch] = Sand Pack  
BW = Bottom of Well      TD = Total Depth      [Diagonal Lines] = Formation

**Additional Comments:**  
SILICA FLOUR 200 MESH USED FOR SAND PACT 2 (SP2)

**NOTE:** Well Diagram Not to Scale

Elevations are feet above Mean Sea Level

**Well Completion Summary**

**Roy F. Weston, Inc.**

**CLIENT:** ABERDEEN PROVING GRO  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFP-5  
**START DATE:** 11/13/95  
**COMPLETION DATE:** 11/13/95

**WATER LEVELS**

		DEPTH	ELEV.	DRILLING SUMMARY	
	0.00	TC	2.80	<b>Driller:</b> <b>Drilling Fluid:</b> <b>Well Type:</b> SINGLE CASSED, SCREENED, PROTECTED	
	0.00	GS	0.00		
				<b>WELL DESIGN CONSTRUCTION</b>	
		<b>Casing #1 Diameter:</b> 2.00 inch		<b>Interval:</b> 0.00 to 3.75 ft.	
		<b>Type :</b> PVC 40			
		<b>Stick Up Inner Casing:</b> 0.00 ft.		<b>Protective Casing:</b> 2.80 ft.	
		<b>Casing Grout:</b> C/B		<b>Interval:</b> 0.00 to 1.50 ft.	
		<b>Seal Type:</b> BENTONITE PELLETS		<b>Interval:</b> 1.50 to 2.50 ft.	
		<b>Sand Pack Type :</b> #1 MORIE SAND		<b>Interval:</b> 2.50 to 14.25 ft.	
		<b>Grain Size :</b>		<b>Median Diameter:</b>	
		<b>Screen Diameter:</b> 2.00 inch		<b>Interval:</b> 3.75 to 13.75 ft.	
		<b>Type :</b> PVC		<b>Slots:</b> 0.010 inches	
1.50	BN	-1.50	<b>Silt Trap Interval:</b> 13.75 to 14.25 ft.		
		<b>Backfill Type:</b>		<b>Interval:</b> 0.00 to 0.00 ft.	
2.50	SP	-2.50	<b>Collapsed Type:</b>		
		<b>Interval:</b> 0.00 to 0.00 ft.			
				<b>WELL DEVELOPMENT</b>	
		<b>Date:</b> / /			
		<b>Method:</b>			
		<b>Yield:</b>		<b>Purged Volume:</b> 0.0 gal	
				<b>COMMENTS</b>	
TC = Top of Casing		SP = Top Sand Pack		[Symbol] = Grout	
GS = Ground Surface		SC = Top Screen		[Symbol] = Seal	
BN = Top Seal		BS = Bottom Screen		[Symbol] = Sand Pack	
BW = Bottom of Well		TD = Total Depth		[Symbol] = Formation	
13.75		BS		-13.75	
14.25		TD		-14.25	
				<b>Additional Comments:</b>	

**NOTE:** Well Diagram Not to Scale

**Elevations are feet above Mean Sea Level**

# Lysimeter Completion Summary

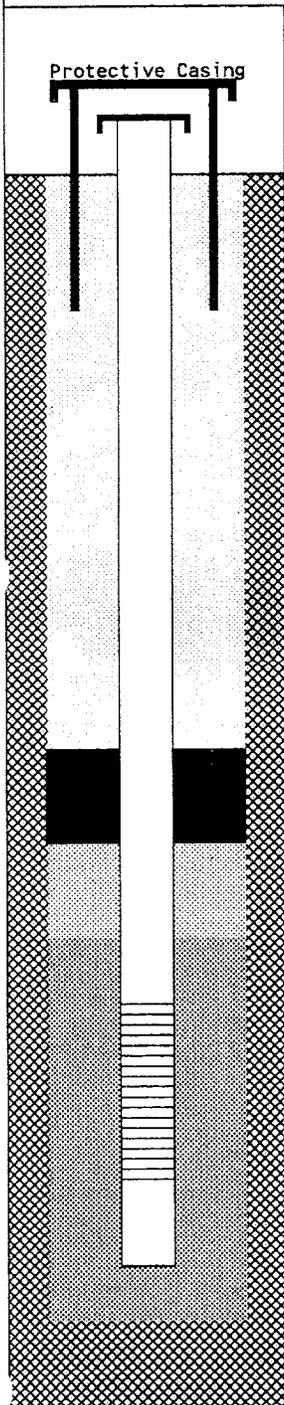
Roy F. Weston, Inc.

CLIENT: ABERDEEN PROVING GRO  
SITE NAME: J-FIELD

DRILLING FIRM: A.C. SHULTES  
INSPECTOR: G. NEWHART

WELL ID: JFL-1 SHALLOW  
START DATE: 11/13/96  
COMPLETION DATE: 11/13/96

### WATER LEVELS

		DEPTH		ELEV.	DRILLING SUMMARY	
	Protective Casing	0.00	TC	0.00	Driller:	
		0.00	GS	0.00	Drilling Fluid:	
					Well Type: SINGLE CASED, LYSIMETER, PROTECTED	
<b>WELL DESIGN CONSTRUCTION</b>						
		Casing #1 Diameter: 2.00 inch		Interval: 0.00 to 3.50 ft.		
		Type : PVC 40				
		Stick Up Inner Casing: 0.00 ft.		Protective Casing: 0.00 ft.		
		Casing Grout: C/B		Interval: 0.00 to 2.25 ft.		
		Seal Type 1: BENTONITE PELLETS		Interval: 0.92 to 3.25 ft.		
		Seal Type 2:		Interval: 3.25 to 3.55 ft.		
		Sand Pack Type 1: SILICA FLOUR		Interval: 1.92 to 2.25 ft.		
		Sand Pack Type 2: #1 MORIE SAND		Interval: 2.25 to 3.67 ft.		
		0.92	BN	-0.92	Screen Diameter: 2.00 inch	Interval: 3.00 to 4.00 ft.
					Type :	Slots: inches
		1.92	SPI	-1.92	Silt Trap Interval: 0.00 to 0.00 ft.	
					Backfill Type:	Interval: 0.00 to 0.00 ft.
		2.25	SP2	-2.25	Collapsed Type:	Interval: 0.00 to 0.00 ft.
<b>WELL DEVELOPMENT</b>						
		3.00	TL	-3.00	Date: / /	
					Method:	
					Yield:	Purged Volume: 0.0 gal
<b>COMMENTS</b>						
		4.00	BL	-4.00	TC = Top of Casing	SP = Top Sand Pack
					GS = Ground Surface	TL = Top Lysimeter Cup
					BN = Top Seal	BL = Botm Lysimeter Cup
					BW = Bottom of Well	TD = Total Depth
						= Grout
						= Seal
						= Sand Pack
						= Formation
					Additional Comments:	
					SILICA FLOUR 200 MESH USED FOR SAND PACK2 (SP2)	

NOTE: Well Diagram Not to Scale

Elevations are feet above Mean Sea Level

# Lysimeter Completion Summary

Roy F. Weston, Inc.

CLIENT: APG  
SITE NAME: J-FIELD

DRILLING FIRM: A.C. SHULTES  
INSPECTOR: G. NEWHART

WELL ID: JFL-2 DEEP  
START DATE: 11/13/96  
COMPLETION DATE: 11/13/96

## WATER LEVELS

DEPTH	ELEV.	DRILLING SUMMARY	
		Driller:	Drilling Fluid:
0.00	TC	0.00	Well Type: SINGLE CASED, LYSIMETER, PROTECTED
0.00	GS	0.00	
<b>WELL DESIGN CONSTRUCTION</b>			
1.00	BN	-1.00	Casing #1 Diameter: 2.00 inch Interval: 0.00 to 7.12 ft. Type: PVC 40
2.00	SPI	-2.00	
Stick Up Inner Casing: 0.00 ft. Protective Casing: 0.00 ft.			
Casing Grout: C/B Interval: 0.00 to 1.00 ft.			
Seal Type 1: BENTONITE PELLETS Interval: 1.00 to 2.00 ft.			
Seal Type 2: BENTONITE PELLETS Interval: 4.42 to 5.42 ft.			
Sand Pack Type 1: SILICA FLOUR Interval: 2.00 to 4.42 ft.			
Sand Pack Type 2: #1 MORIE SAND Interval: 5.42 to 5.75 ft.			
Sand Pack Type 3: #1 MORIE SAND Interval: 5.75 to 7.12 ft.			
4.42	BN	-4.42	Screen Diameter: 2.00 inch Interval: 7.12 to 7.50 ft.
Type: inches			
Silt Trap Interval: 0.00 to 0.00 ft.			
Backfill Type: Interval: 0.00 to 0.00 ft.			
Collapsed Type: Interval: 0.00 to 0.00 ft.			
<b>WELL DEVELOPMENT</b>			
Date: / /			
Method:			
Yield: Purged Volume: 0.0 gal			
<b>COMMENTS</b>			
TC = Top of Casing SP = Top Sand Pack = Grout			
GS = Ground Surface TL = Top Lysimeter Cup = Seal			
BN = Top Seal BL = Botm Lysimeter Cup = Sand Pack			
BW = Bottom of Well TD = Total Depth = Formation			
Additional Comments: SILICA FLOUR 200 MESH USED FOR SAND PACK 2 (SP2)			

NOTE: Well Diagram Not to Scale

Elevations are feet above Mean Sea Level

**Lysimeter Completion Summary**

**Roy F. Weston, Inc.**

**CLIENT:** APG  
**SITE NAME:** J-FIELD

**DRILLING FIRM:** A.C. SHULTES  
**INSPECTOR:** G. NEWHART

**WELL ID:** JFL-3 SHALLOW  
**START DATE:** 11/13/96  
**COMPLETION DATE:** 11/13/96

**WATER LEVELS**

DEPTH	ELEV.	DRILLING SUMMARY	
		TC	GS
0.00	0.00	TC	GS
0.00	0.00	GS	
<b>WELL DESIGN CONSTRUCTION</b>			
<b>Casing #1 Diameter:</b> 2.00 inch		<b>Interval:</b> 0.00 to 3.50 ft.	
<b>Type :</b> PVC 40			
<b>Stick Up Inner Casing:</b> 0.00 ft.		<b>Protective Casing:</b> 0.00 ft.	
<b>Casing Grout:</b> C/B		<b>Interval:</b> 0.00 to 2.25 ft.	
<b>Seal Type 1:</b> BENTONITE PELLETS		<b>Interval:</b> 0.92 to 1.92 ft.	
<b>Seal Type 2:</b>		<b>Interval:</b> 2.25 to 3.67 ft.	
<b>Sand Pack Type 1:</b> SILICA FLOUR		<b>Interval:</b> 1.92 to 2.25 ft.	
<b>Sand Pack Type 2:</b> #1 MORIE SAND		<b>Interval:</b> 2.25 to 3.00 ft.	
0.92	-0.92	BN	
<b>Screen Diameter:</b> 2.00 inch		<b>Interval:</b> 3.67 to 4.00 ft.	
<b>Type :</b>		<b>Slots:</b> inches	
1.92	-1.92	SPI	
<b>Silt Trap Interval:</b> 0.00 to 0.00 ft.			
<b>Backfill Type:</b>		<b>Interval:</b> 0.00 to 0.00 ft.	
<b>Collapsed Type:</b>		<b>Interval:</b> 0.00 to 0.00 ft.	
2.25	-2.25	SP2	
<b>WELL DEVELOPMENT</b>			
3.67	-3.67	TL	
<b>Date:</b> / /		<b>Purged Volume:</b> 0.0 gal	
<b>Method:</b>			
<b>Yield:</b>			
<b>COMMENTS</b>			
TC = Top of Casing		SP = Top Sand Pack	
GS = Ground Surface		TL = Top Lysimeter Cup	
BN = Top Seal		BL = Botm Lysimeter Cup	
BW = Bottom of Well		TD = Total Depth	
		= Grout	
		= Seal	
		= Sand Pack	
		= Formation	
<b>Additional Comments:</b>			
SILICA FLOUR 200 MESH USED FOR SANDPACK 2 (SP2)			

**NOTE:** Well Diagram Not to Scale

**Elevations are feet above Mean Sea Level**

APPENDIX C  
Analytical Memorandum Report  
J-Field Phytoremediation Well and Lysimeter Installation Report  
Aberdeen Proving Ground, Maryland  
April 1997

ANALYTICAL MEMORANDUM REPORT

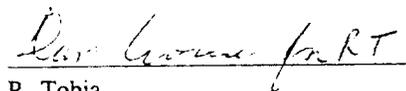
Prepared by  
Roy F. Weston, Inc.

J-Field Phytoremediation  
Aberdeen, MD

December, 1996

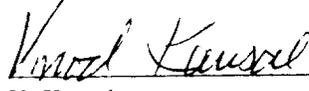
EPA Work Assignment No. 1-173  
WESTON Work Order No. 03347-041-001-1173-01  
EPA Contract No. 68-C4-0022

Submitted to  
H. Compton  
EPA-ERTC

  
R. Tobia  
Task Leader

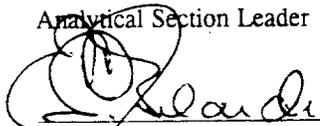
12/17/96  
Date

Analysis by:  
Envirotech Research

  
V. Kansal  
Analytical Section Leader

12/17/96  
Date

Prepared by:  
J. Tomaszewicz

  
E. Gilardi  
Program Manager

12/17/96  
Date

Reviewed by:  
M. Barkley

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Appendix will be furnished on request.

**Table 1.1 Results of the Analysis for TAL Metals in Soil  
WA# 1-173 J-Field Phytoremediation**

Dry Weight Basis											
Sample No.	Method Blank		9009		9010		9011		9012		
Location	Lab		JFP-2		JFP-3		JFP-4		JFP-5		
Percent Solids	100		82		82		83		79		
Analyte	Analysis Method	Conc mg/kg	MDL mg/kg								
Aluminum	ICAP	U	11	6200	27	6900	27	4700	26	5700	28
Antimony	ICAP	U	0.46	U	1.1	U	1.1	U	1.1	U	1.2
Arsenic	ICAP	U	0.30	4.1	0.73	2.4	0.73	2.7	0.73	3.4	0.76
Barium	ICAP	U	0.16	30	0.39	27	0.39	19	0.39	28	0.41
Beryllium	ICAP	U	0.02	0.39	0.05	0.24	0.05	0.20	0.05	0.48	0.05
Cadmium	ICAP	U	0.04	U	0.10	U	0.10	U	0.10	0.18	0.10
Calcium	ICAP	17	9.6	1400	23	1200	24	950	23	430	25
Chromium	ICAP	U	0.10	8.9	0.24	9.5	0.24	6.8	0.24	8.5	0.25
Cobalt	ICAP	U	0.11	4.0	0.27	3.0	0.27	3.1	0.27	17	0.28
Copper	ICAP	U	0.41	6.2	1.0	7.2	1.0	4.8	1.0	6.7	1.0
Iron	ICAP	U	4.8	13000	12	11000	12	7900	12	11000	12
Lead	ICAP	U	0.17	7.5	0.41	7.8	0.41	6.7	0.41	6.1	0.43
Magnesium	ICAP	U	8.8	950	21	1200	21	960	21	1200	22
Manganese	ICAP	U	0.09	65	0.22	54	0.22	54	0.22	62	0.23
Nickel	ICAP	U	0.16	6.4	0.39	8.0	0.39	6.5	0.39	41	0.41
Potassium	ICAP	U	23	350	55	600	55	320	55	530	58
Selenium	ICAP	U	0.47	U	1.1	U	1.1	U	1.1	U	1.2
Silver	ICAP	U	0.09	U	0.22	U	0.22	U	0.22	U	0.23
Sodium	ICAP	U	39	U	96	U	96	U	95	U	100
Thallium	ICAP	U	0.44	U	1.1	U	1.1	U	1.1	U	1.1
Vanadium	ICAP	U	0.12	16	0.29	13	0.29	9.2	0.29	9.8	0.30
Zinc	ICAP	U	0.36	21	0.87	24	0.88	19	0.87	230	0.91

## SUMMARY of ABBREVIATIONS

AA	Atomic Absorption				
B	The analyte was found in the blank				
BFB	Bromofluorobenzene				
BPQL	Below the Practical Quantitation Limit				
C	Centigrade				
D	(Surrogate Table) this value is from a diluted sample and was not calculated (Result Table) this result was obtained from a diluted sample				
CLP	Contract Laboratory Protocol				
COC	Chain of Custody				
CONC	Concentration				
CRDL	Contract Required Detection Limit				
CRQL	Contract Required Quantitation Limit				
DFTPP	Decafluorotriphenylphosphine				
DL	Detection Limit				
E	The value is greater than the highest linear standard and is estimated				
EMPC	Estimated maximum possible concentration				
ICAP	Inductively Coupled Argon Plasma				
IDL	Instrument Detection Limit				
ISTD	Internal Standard				
J	The value is below the method detection limit and is estimated				
LCS	Laboratory Control Sample				
LCSD	Laboratory Control Sample Duplicate				
MDL	Method Detection Limit				
MQL	Method Quantitation Limit				
MI	Matrix Interference				
MS	Matrix Spike				
MSD	Matrix Spike Duplicate				
MW	Molecular Weight				
NA	either Not Applicable or Not Available				
NC	Not Calculated				
NR	Not Requested				
NS	Not Spiked				
% D	Percent Difference				
% REC	Percent Recovery				
PQL	Practical Quantitation Limit				
PPBV	Parts per billion by volume				
QL	Quantitation Limit				
RPD	Relative Percent Difference				
RSD	Relative Standard Deviation				
SIM	Selected Ion Mode				
U	Denotes not detected				
m <sup>3</sup>	cubic meter	kg	kilogram	ng	nanogram
l(L)	liter	g	gram	pg	picogram
mL	milliliter	mg	milligram		
μL	microliter	μg	microgram		
*	denotes a value that exceeds the acceptable QC limit				

Abbreviations that are specific to a particular table are explained in footnotes on that table

Revision 11/22/96

Table 2.1 Results of the MS/MSD Analysis for TAL Metals in Soil  
WA# 1-173 J-Field Phytoremediation

Analyte	Sample No.	Sample Conc. mg/kg	Original Conc.		Recovered Conc.		Percent Recovery		RPD	Recommended Limit	
			Spike mg/kg	Dup. mg/kg	Spike mg/kg	Dup. mg/kg	Spike	Dup.		% Rec.	RPD
Aluminum	9011	4680	241.8	241.8	6165	5265	NC	NC	NC	NA	NA
Antimony	9011	U	60.46	60.46	30.15	37.81	50 *	63 *	23	80-120	NA
Arsenic	9011	2.737	241.8	241.8	230.1	230.0	94	94	0	80-120	NA
Barium	9011	18.87	241.8	241.8	250.6	251.4	96	96	0	80-120	NA
Beryllium	9011	0.2029	6.05	6.05	6.055	6.076	97	97	0	80-120	NA
Cadmium	9011	U	6.05	6.05	5.740	5.684	95	94	1	80-120	NA
Calcium	9011	951.0	2418	2418	3218	3235	94	95	1	80-120	NA
Chromium	9011	6.764	24.18	24.18	30.40	29.93	98	96	2	80-120	NA
Cobalt	9011	3.098	60.46	60.46	62.39	62.80	98	99	1	80-120	NA
Copper	9011	4.816	30.23	30.23	35.15	34.71	100	99	1	80-120	NA
Iron	9011	7884	120.9	120.9	8060	7650	NC	NC	NC	NA	NA
Lead	9011	6.650	60.46	60.46	63.25	62.78	94	93	1	80-120	NA
Magnesium	9011	958.2	2418	2418	3315	3223	98	94	4	80-120	NA
Manganese	9011	53.61	60.46	60.46	119.9	120.7	110	111	1	80-120	NA
Nickel	9011	6.482	60.46	60.46	66.20	66.10	99	99	0	80-120	NA
Potassium	9011	316.9	2418	2418	2461	2383	89	85	5	80-120	NA
Selenium	9011	U	241.8	241.8	223.1	223.4	92	92	0	80-120	NA
Silver	9011	U	6.05	6.05	5.448	5.530	90	91	1	80-120	NA
Sodium	9011	U	2418	2418	2303	2295	95	95	0	80-120	NA
Thallium	9011	U	241.8	241.8	228.1	228.6	94	95	1	80-120	NA
Vanadium	9011	9.162	60.46	60.46	67.24	66.94	96	96	0	80-120	NA
Zinc	9011	19.44	60.46	60.46	81.84	79.75	103	100	3	80-120	NA

**Table 2.2 Results of the Blank Spike Analysis for TAL Metals in Soil  
WA# 1-173 J-Field Phytoremediation**

Analyte	Sample Conc. mg/kg	Spiked Conc. mg/kg	Recovered Conc. mg/kg	Percent Recovery	Recommended Limit
Aluminum	U	200.0	192.7	96	80-120
Antimony	U	50.00	45.37	91	80-120
Arsenic	U	200.0	184.7	92	80-120
Barium	U	200.0	190.1	95	80-120
Beryllium	U	5.000	4.857	97	80-120
Cadmium	U	5.000	4.804	96	80-120
Calcium	16.81	2000	1889	94	80-120
Chromium	U	20.00	18.93	95	80-120
Cobalt	U	50.00	48.01	96	80-120
Copper	U	25.00	24.51	98	80-120
Iron	U	100.0	90.93	91	80-120
Lead	U	50.00	46.79	94	80-120
Magnesium	U	2000	1786	89	80-120
Manganese	U	50.00	47.61	95	80-120
Nickel	U	50.00	48.06	96	80-120
Potassium	U	2000	1716	86	80-120
Selenium	U	200.0	180.3	90	80-120
Silver	U	5.000	4.505	90	80-120
Sodium	U	2000	1811	91	80-120
Thallium	U	200.0	185.8	93	80-120
Vanadium	U	50.00	47.32	95	80-120
Zinc	U	50.00	48.97	98	80-120

**Table 2.3 Results of the Duplicate Sample Analysis for TAL Metals in Soil  
WA# 1-173 J-Field Phytoremediation**

Dry Weight Basis

Sample No. 9011				
Analyte	Sample Conc. mg/kg	Duplicate Conc. mg/kg	RPD	RPD Limit
Aluminum	4680	5634	19	20
Antimony	U	U	NC	20
Arsenic	2.737	1.532	56 *	20
Barium	18.87	20.98	11	20
Beryllium	0.2029	0.2351	15	20
Cadmium	U	U	NC	20
Calcium	951.0	951.4	0	20
Chromium	6.764	7.507	10	20
Cobalt	3.098	3.396	9	20
Copper	4.816	5.146	7	20
Iron	7884	8378	6	20
Lead	6.650	5.849	13	20
Magnesium	958.2	1103	14	20
Manganese	53.61	59.91	11	20
Nickel	6.482	7.299	12	20
Potassium	316.9	438.5	32 *	20
Selenium	U	U	NC	20
Silver	U	U	NC	20
Sodium	U	U	NC	20
Thallium	U	U	NC	20
Vanadium	9.162	9.666	5	20
Zinc	19.44	21.56	10	20

Table 2.4 Results of the LCS/LCSD Analysis for TAL Metals in Soil  
WA# 1-173 J-Field Phytoremediation

Analyte	True Value		Found Value		Percent Recovery		RPD	Found Value Limits mg/kg	RPD Limit
	LCS mg/kg	LCSD mg/kg	LCS mg/kg	LCSD mg/kg	LCS	LCSD			
Aluminum	6990.0	6990.0	6409.5	6203.5	92	89	3	4150.0-9830.0	NA
Antimony	35.0	35.0	36.6	36.0	105	103	2	3.2-66.8	NA
Arsenic	164.0	164.0	148.8	148.0	91	90	1	115.0-212.0	NA
Barium	439.0	439.0	386.2	393.1	88	90	2	321.0-557.0	NA
Beryllium	97.8	97.8	88.7	87.5	91	89	2	75.1-121.0	NA
Cadmium	112.0	112.0	99.3	98.2	89	88	1	82.1-143.0	NA
Calcium	2620.0	2620.0	2263.1	2230.2	86	85	1	1880.0-3360.0	NA
Chromium	96.2	96.2	88.0	87.1	92	91	1	73.5-119.0	NA
Cobalt	83.6	83.6	78.1	77.1	93	92	1	63.6-104.0	NA
Copper	140.0	140.0	126.8	124.7	91	89	2	110.0-169.0	NA
Iron	17000.0	17000.0	16134.7	16731.8	95	98	3	6940.0-27100.0	NA
Lead	96.1	96.1	84.5	83.7	88	87	1	70.6-122.0	NA
Magnesium	1750.0	1750.0	1525.6	1503.3	87	86	1	1240.0-2260.0	NA
Manganese	314.0	314.0	287.9	285.0	92	91	1	250.0-379.0	NA
Nickel	72.0	72.0	65.5	65.1	91	90	1	53.6-90.3	NA
Potassium	2170.0	2170.0	1940.7	1888.2	89	87	2	1220.0-3120.0	NA
Selenium	68.9	68.9	61.7	60.4	90	88	2	49.2-88.6	NA
Silver	82.5	82.5	72.7	71.7	88	87	1	60.9-104.0	NA
Sodium	288.0	288.0	220.7	230.7	77	80	4	185.0-391.0	NA
Thallium	86.0	86.0	75.7	73.1	88	85	3	40.9-131.0	NA
Vanadium	96.7	96.7	92.9	92.7	96	96	0	60.7-133.0	NA
Zinc	276.0	276.0	254.4	251.5	92	91	1	204.0-349.0	NA



Roy F. Weston, Inc.  
GSA Raritan Depot  
Building 209 Annex (Bay F)  
2890 Woodbridge Avenue  
Edison, New Jersey 08837-3679  
908-321-4200 • Fax 908-494-4021

Envirotech Research  
777 New Durham Road  
Edison, NJ 08817

Attn: Kevin Hoogerhyde

14 November 1996

Project # 3347-141-001-1173 J Field Phytoremediation

As per Weston REAC Purchase Order number 72132, please analyze samples according to the following parameters:

Analysis/Method	Matrix	# of samples
TAL Metals except mercury SW-846-6010	Soil	5
Data package: See attached Deliverables Requirements		

Samples are expected to arrive at your laboratory between November 18-19, 1996. All applicable QA/QC (MS/MSD) analysis as per method, will be performed on our sample matrix. Preliminary sample and MS/MSD result tables plus a signed copy of our Chain of Custody must be faxed to REAC 5 business days after receipt of the sample. The complete data package is due 10 business days after receipt of the samples. The complete data package must include all items on the deliverables checklist.

Please submit all reports and technical questions concerning this project to John Johnson at (908) 321-4248 or fax to (908) 494-4020. Any contractual question, please call Cynthia Davison at (908) 321-4296.

Thank you

Sincerely,

Misty Barkley  
Data Validation and Report Writing Group Leader  
Roy F. Weston, Inc. / REAC Project

MB:jj Attachments

cc. R. Singhvi  
H. Compton  
1173\non\mem\9611\sub\1173Con

V. Kansal  
Subcontracting File  
B. Lewan

C. Davison  
R. Tobia  
M. Barkley



REAC, Eason, Nc  
 (908) 321-4200  
 EPA Contract 68-C4-0022

**CHAIN OF CUSTODY RECORD**

Project Name: S-Field, APC No: 07319  
 Project Number: 1173  
 RFW Contact: John Johnson Phone: x4299 (908) 321-4200

Job R164

SHEET NO. 1 OF 1

**Sample Identification**

**Analyses Requested**

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analyses Requested
69386	9049	JFP-2	S	11/15/46	1	400 (400)	metals
69387	9010	JFP-3	↓	↓	1	↓	↓
69388	9011	JFP-4	↓	↓	1	↓	↓
69389	9012	JFP-5	↓	↓	1	↓	↓
f3830011							

Matrix:

- SD - Sediment
- DS - Drum Solids
- DL - Drum Liquids
- X - Other
- PW - Potable Water
- GW - Groundwater
- SW - Surface Water
- SL - Sludge
- S - Soil
- W - Water
- O - Oil
- A - Air

Special Instructions:

*no mercury needed*

**FOR SUBCONTRACTING USE ONLY**  
**FROM CHAIN OF CUSTODY #**

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time
4/Analysis	<i>J. [Signature]</i>	11/15/46	<i>B. [Signature]</i>	11/17/46	<i>ALL Analysis Release</i>	11/17/46	<i>[Signature]</i>	11/18/46	1613