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INITIAL Kim DATE 3/14/94

COPY

INEL RCRA/CERCLA INVESTIGATIONS

SAMPLE AND CORE DESCRIPTION
LOGBOOK - I

WELL NO: 8902D

DATE START ______________, 19 ______

DATE END ______________, 19 ______

LOGBOOK NO: BWP-003

LOGBOOK ASSIGNED TO: TED CLAWSON

SITE: 8902D - RWMC

WHEN COMPLETED RETURN TO: DONNA KIRCHNER
MS: ~~4153~~ /1403

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FORM EG&G-3025
Rev. 05-89

DRILLING CORE LOG

Date: 1/25/90

Geologist: T Clawson

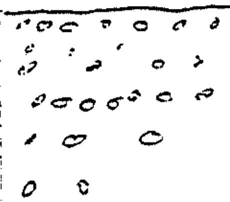
Core Length: 3.3 (ft.)

Borehole: 8922 D

Sample No.: D02 Z89 01

Cored Interval: 25' Top

28.3 Bottom

Depth Below Land Surface (ft.)	Core Diagram	Description
25		lt gray vesicular basalt matrix
26 ~~25.5~~		vesicles 1 to 2 MM thin sheets
		of vesicles at 25.5, 26, 26.5
27		27, ~~[illegible]~~ sheet vesicles 5MM
28		to 15MM

Remarks: run interrupted because adjustment unit backed off and locked up the tube

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FORM EG&G-3025 (Rev. 05-88)

DRILLING CORE LOG

Date: 1-29-90

Geologist: T S Clawson

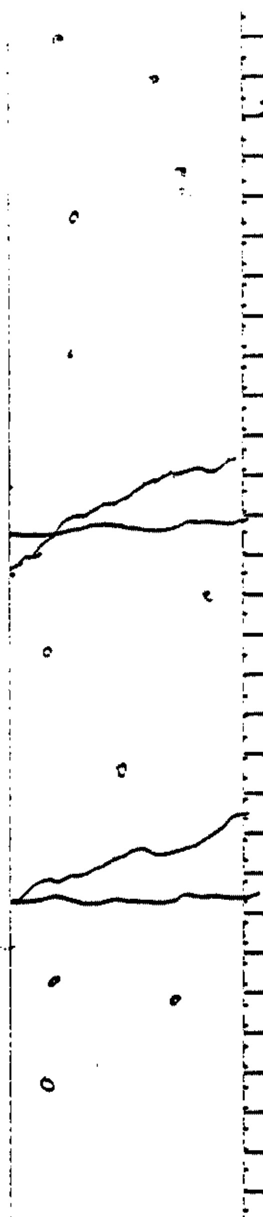
Core Length: 5 (ft.)

Borehole: 8902 D

Sample No.: D02 Z89 02

Cored Interval: 28.3 Top

33.3 Bottom

Depth Below Land Surface (ft.)	Core Diagram	Description
28		Lt Medium Gray Vesicular basalt, vesicles 2-5 mm scattered 2 fracture zones 30.2' to 30.6' and 32' to 32.3'
29		
30		
31		
32		
33		

Remarks:

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89020

FIELD TEAM LEADER'S DAILY LOGBOOK

9 JAN 90

13:00 PARTLY CLOUDY, TEMP:

13:20 SET 10" CONDUCTER TO 17' 10½"

13:50 CEMENTING 10" CONDUCTOR; PUMPED 10 SACKS; SUSPENDED CEMENTING

Thomas A. Matja

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FIELD TEAM LEADER'S DAILY LOGBOOK

WED 10 January 1990

08:35 Partly Cloudy   Began unloading supplies and setting up to finish cementing conductor pipe.

0930 Mixed 20 sacks of Type III cement and pumped into annulus of Borehole to set the 10" Conductor Pipe. Saved about 15 gallons of cement behind rig when the annulus filled up. Attached hoses and HEPA Filters to Compressors Closed out Drill Site at 0120.

[signature] 1/10/90

FIELD TEAM LEADER'S DAILY LOGBOOK

THURS 11 JAN 1990

08:00 ARRIVE RWMC FOR MEETING ON D.O.P REVIEW.

ATTENDEES:

M. BRUMFIELD

T. MATZEN M. DENNING

T CLAWSON J. DENNING

M. TOWLER D JORGENSEN

B HIGGS D. KELSO

B.L. THOMAS T. MILLER

J. BUSTON

SDA CLOSED TO OPERATIONS DUE TO WET/MUDDY CONDITIONS

Thomas A. Matzen

FIELD TEAM LEADER'S DAILY LOGBOOK

MON 15 JAN 1996

NO DRILLING OPERATIONS THIS DAY. SDA CLOSED TO ALL OPERATIONS DUE TO WET/MUDDY CONDITIONS.

Thomas A. Major

FIELD TEAM LEADER'S DAILY LOGBOOK

TUES 16 JAN 1990

NO DRILLING OPERATIONS THIS DAY. SDA CLOSED TO FIELD OPERATIONS DUE TO WET/MUDDY CONDITIONS

Thomas A. Mayer

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FIELD TEAM LEADER'S DAILY LOGBOOK

WED 17 JAN 1990

NO DRILLING OPERATIONS THIS DAY. SDA CLOSED TO OPERATION DUE TO WET/MUDDY CONDITIONS.

Thomas A. Mayton

FIELD TEAM LEADER'S DAILY LOGBOOK

THURS 18 JAN 1990 8902D

NO DRILLING. RWMC MANAGEMENT HAS CLOSED THE SDA TO ALL OPERATIONS DUE TO WET/MUDDY CONDITIONS

Thomas A. Mayer

FIELD TEAM LEADER'S DAILY LOGBOOK

MON 22 JAN 1990 89020

PARTLY CLOUDY, CLEARING, WIND: 1-2 FROM NW [illegible] IN A.M.

07:30 DENNINGS ARRIVE WITH 26 ~~23~~ FT TM OF 8 IN SURFACE CASING.

10:00 DENNINGS TRANSFER CASING FROM THEIR PICKUP TO DRILL TRAILER

TM PLACE HEATER UNDER RIG TO WARM THE DIESEL ENGINE.

10:30 BRING 26 ~~23~~ FT TM SECTION OF 8 IN CASING DOWN TO HIGH BAY FOR STEAM CLEANING

11:00 TAKE CASING BACK OUT TO LOCATION. E.O. IS ATTEMPTING TO START THE GENERATOR.

11:30 E.O. TOOK GENERATOR IN TO SHOP

12:00 LUNCH

13:30 DENNINGS GET RIG STARTED PREPARING TO DRILL. RIG UP CYCLONE, [illegible], RIG UP COMPRESSORS, RIG UP AIR LINES

14:45 E.O. BROUGHT OUT CAM

15:00 BEGIN DRILLING (CLEAN OUT APPROX 6 FT OF FILL IN CONDUCTOR AND BEGIN DRILLING BASALT W/ 9 7/8 IN. BIT)

15:26 REMOVE DRILL ROD AND BHA

15:30 RUN IN HOLE WITH 26 ~~23~~ FT OF 8 IN SURFACE CASING, SET AT 24.5 FT BELOW SURFACE

PREPARE TO MIX CEMENT

16:00 BEGIN MIXING CEMENT.

16:36 COMPLETE CEMENTING 8 IN CASING AND CLEAN UP.

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Thomas A. M[illegible]

FIELD TEAM LEADER'S DAILY LOGBOOK

TUES. 23 JAN 1990 89020

WAIT ON CEMENT

Thomas A. Mayor

FIELD TEAM LEADER'S DAILY LOGBOOK

WED 24 JAN 1990 — 9902D

CLEAR, 20°F, WIND 5-10 FROM WSW.

08:00 BRIEFING, BEGIN SIGN OFFS.

08:30 BEGIN WARMING RIG ENGINE AND SET UP. CUT OFF TOP OF 8" SURFACE CASING.

09:45 RIG STARTED AND WARMING UP. WAITING FOR H.P. TO GET OUT OF MEETING.

11:00 H.P. TOOK SMEARS; COUNTING SMEARS. DENNINGS TRYING TO WARM HYDRAULIC SYSTEM.

13:40 RUNNING IN HOLE WITH CP CORE BARREL

14:10 BEGIN CORING; CEMENT STILL GREEN, CORE BIT WILL NOT CUT.

14:25 ~~RE~~ TA COME OUT OF HOLE WITH CORE ASSEMBLY. PREPARE TO RUN IN HOLE WITH 8 TA IN. TRICONE TO DRILL OUT CEMENT.

15:10 RUN IN HOLE WITH 8 IN. TRICONE, BEGIN DRILLING OUT CEMENT DRILL TO 25 FT. (6 IN. INTO BASALT)

15:35 COME OFF BOTTOM WITH BIT. LEAVE ONE JOINT OF ROD WITH BIT IN HOLE ~~&~~ TA IN ORDER TO CLOSE HOLE FOR THE NIGHT

16:00 SHUT DOWN, CLOSE OUT PROCEDURE

FIELD TEAM LEADER'S DAILY LOGBOCK

Thur 1-25-90 Clear Calm

10:30 equipment started picking up core rods

1300 lunch penetration dropped off

1500 bit not advancing pull tube

1520 recovered 3.3' 1702.3 of vesicular basalt the adjusting nut had backed off at the head causing loss of penetration

1610 drilling on run #2

1630 shutting down tools not cutting will pull out of the hole Monday

FIELD TEAM LEADER'S DAILY LOGBOOK

Mon 1-29-90 clear windy
0945 procedure opened pulling rods
1100 core barrel adjusted rods to be decowned
1300 back in hole
1315 drilling
1515 drilled @ 5' pulling sample
1540 5' of basalt out
1550 new tube down drilling
1615 drilled 1.5' will pull in AM

A5-4
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FIELD TEAM LEADER'S DAILY LOGBOOK

Tue 1-23-90 overcast calm
0930 procedure opened pulling sample
0945 sampler out tube collapsed
no sample recovery
1000 pulled rods some core
left in outer barrel
15 ppm on HNU 5 ppm CCl_4 drager
2 ppm TCE drager Tim Miller
placed an organic vapor badge
in barrel and seale it
1030 based on drilling breaks in
last sample run, 1 ft basalt
2-3 inches of sediment, then 2-3
inches of basalt the decision
was made to cut over to rotary
and head for 90'
1420 Total depth 95'
1435 Rotary Rods out of hole

FIELD TEAM LEADER'S DAILY LOGBOOK

~~Thursday~~ 2/2/90 Friday 2 February 1990 Overcast and Calm

Site Inspected and opened for work at 9:15 am.

Procedure opened at 8:47 by Mike Brumfield

Started Rig at 9:00 am. Begin Tripping 7 7/8 Bit and drill string into hole at 10:20

Begin Drilling at 10:30

First Connection at 10:52 Begin drilling 11:00 kicked in auxiliary compressor. Encountered 110' Interbed at approximately 10:45

Stop for second connection @ 1130

Compressor OFF at 11:32 Stopped for Lunch @ 1155

Started Drilling at 12:28 pm

12:57 Driller Increased WOB

1:07 Stopped Drilling to make connection 1:09 Shut down Air from Auxiliary Compressor 1:10 Connection Complete, engaging secondary compressor and resume drilling

1:37 Stopped Drilling to make connection and swab hole.

1:38 Shut Down Auxiliary Compressor and Break Connection

1:40 - Connection complete and Auxiliary Compressor on line

2:07 Stopped Drilling to make connection and swab hole.

2:08 Shut Down Auxiliary Compressor and break connection

2:09 Connection Complete! 2:10 Auxiliary Compressor on line.

FRIDAY 2 February 1990

FIELD TEAM LEADER'S DAILY LOGBOOK

2:44pm Shut down to make connection and swab hole
2:45 Shut down Auxilliary compressor and BREAK Connection 2:46 Connection complete 2:46 Auxilliary Compressor on line.
3:08 Shut down to make connection and swab hole.
3:09 Shut down Auxilliary Compressor and BREAK Connection 3:11 Connection complete and Auxilliary compressor on line
3:20 pm BREACHED 240' Interbed
3:30 pm Reaming and Swabbing the hole.
3:36pm Break Connection and shut down Auxilliary Compressor. 3:38pm Auxilliary Compressor on line drilling basalt.
3:44pm Auxilliary compressor off for day.
3:45pm TRIPPING out of hole.
Total Depth approximately 246'
Operations Shutdown at 5:00pm

[signature]
2 February 1990

2/14/90

FIELD TEAM LEADER'S DAILY LOGBOOK

TD 238 w-t

1300

A5-4

3x3... 1050

2/23/90

FIELD TEAM LEADER'S DAILY LOGBOOK

12.42pm TAKing Samples for RELEASE of Denny Drilling Rig license # YB11986

8902DD1 VOA - Back of Rig Control Panel
8902DD2 VOA - Drill Pipe.
8902DD3 METAL - Drill Pipe

Rig was Pressure ~~steam~~ cleaned yesterday (2/22/90). These samples are being analyzed for VOA's and Metals, to assure the rig is clean of any Contaminants on the surface or in the subsurface of the SDA.

Delivered to LAB ~~2122~~ 2/23/90 at 1322.

2/23/90

FIELD TEAM LEADER'S DAILY LOGBOOK

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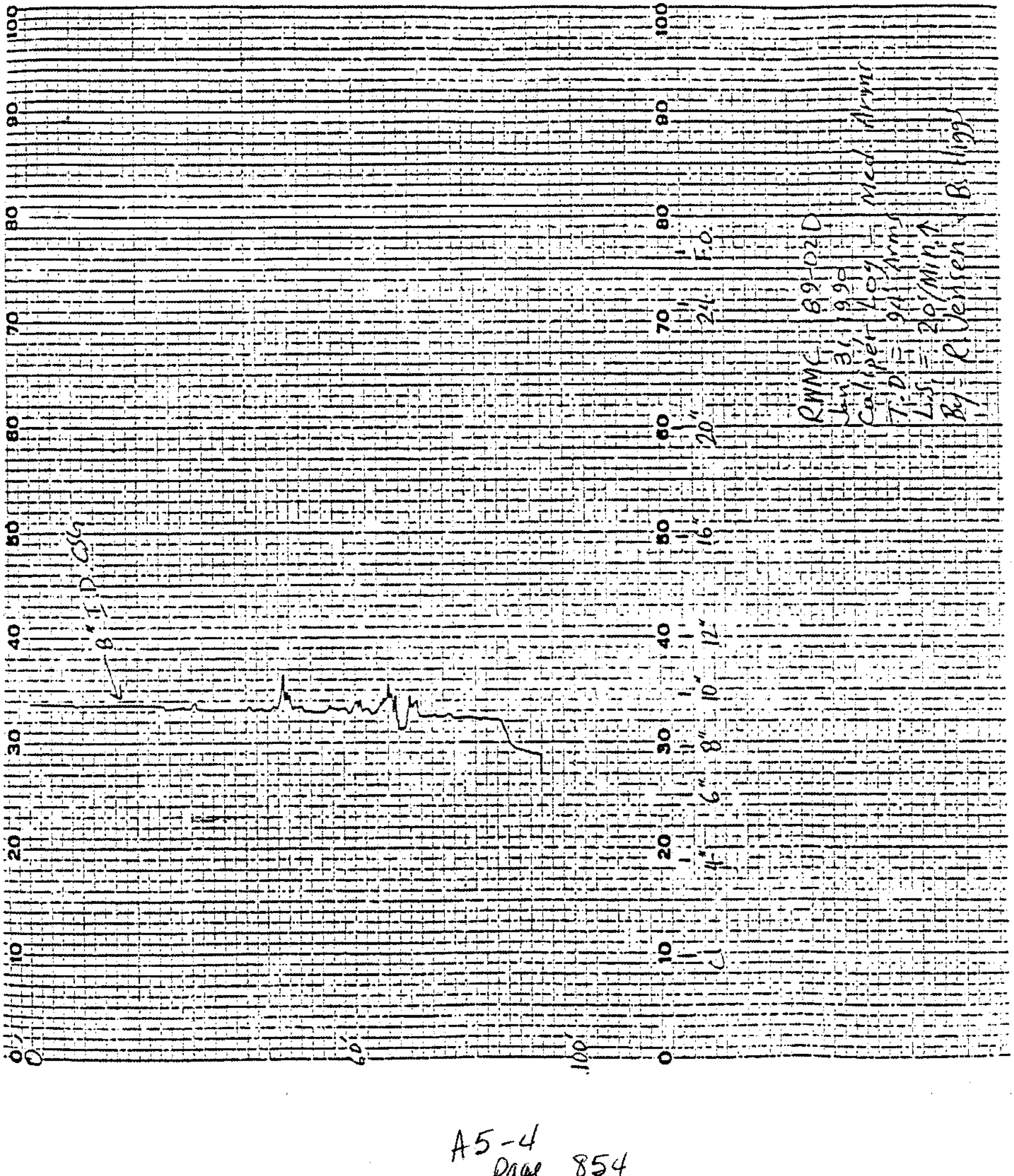
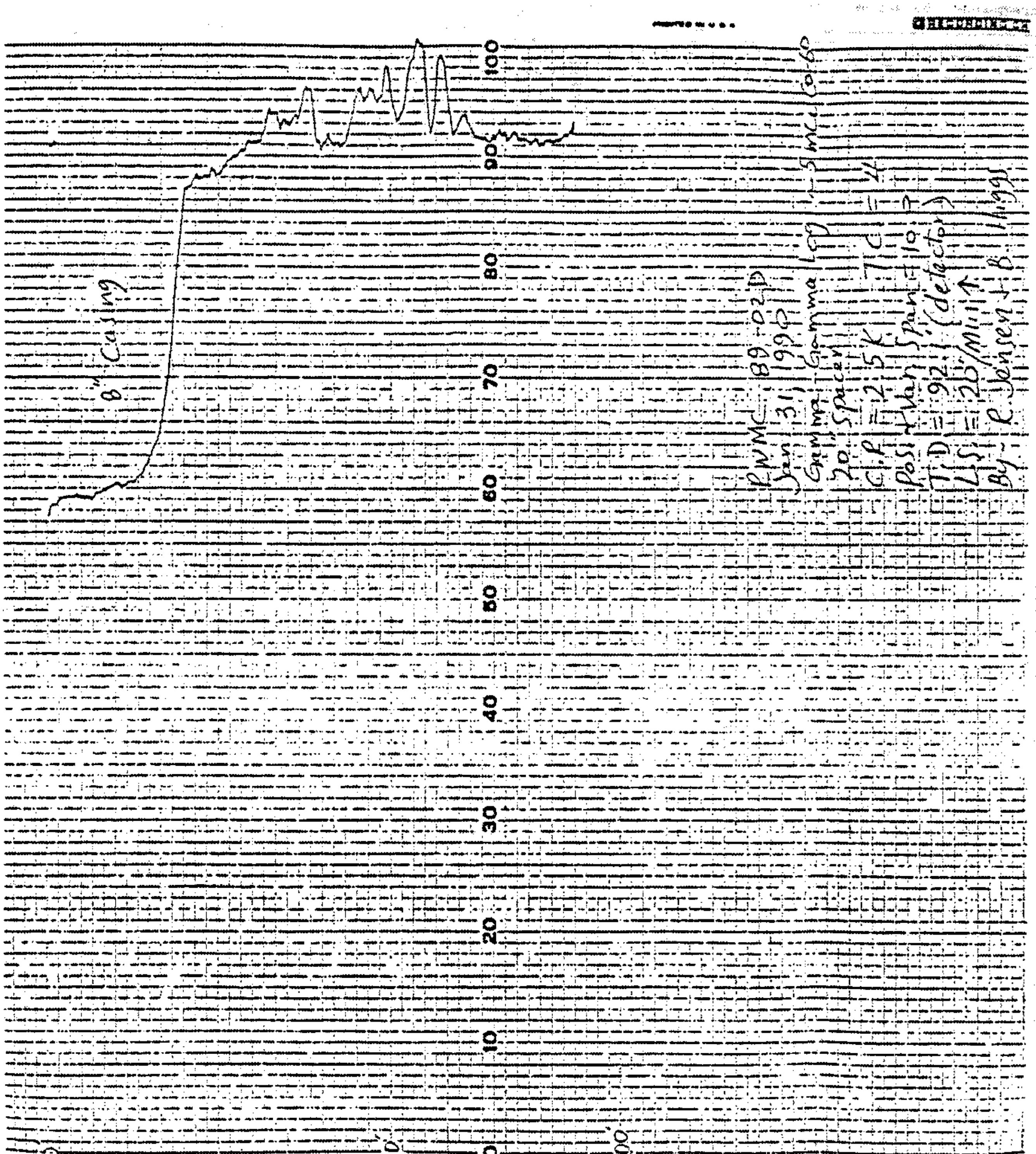

RWMC 89-02D
Jan 31, 1990
Caliper Log - Med Arms
T.D. = 94' Arms
L.S. = 20'/Min
By: R. Jensen & B. Higgs
8" I.D. Csg
0'
60'
100'
CL 4" 6" 8" 10" 12" 16" 20" 24" F.O.


8" Casing
RWMC 89-02D
Jan 31, 1990
Gamma Gamma Log - 5 mci Co-60
20" Spacer
C.R. = 2.5 K, T.C. = 4
Pos. Han Span = 10.7
T.D. = 92' (detector)
LS = 20'/Min ↑
By: R. Jensen & B. Higgs
100
90
80
70
60
50
40
30
20
10
0
60
100

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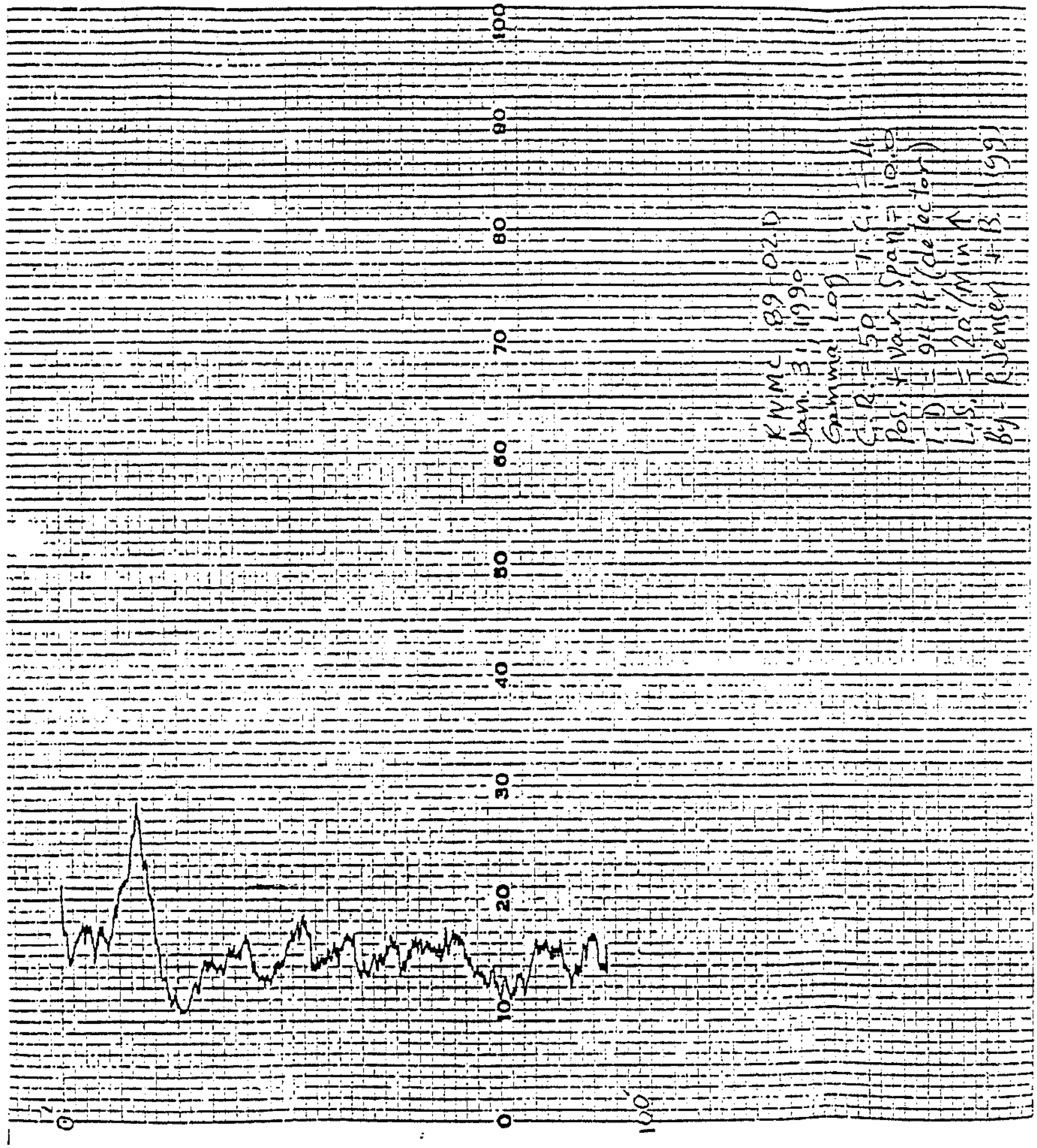
NEW YORK NO.WH-7



A5-4
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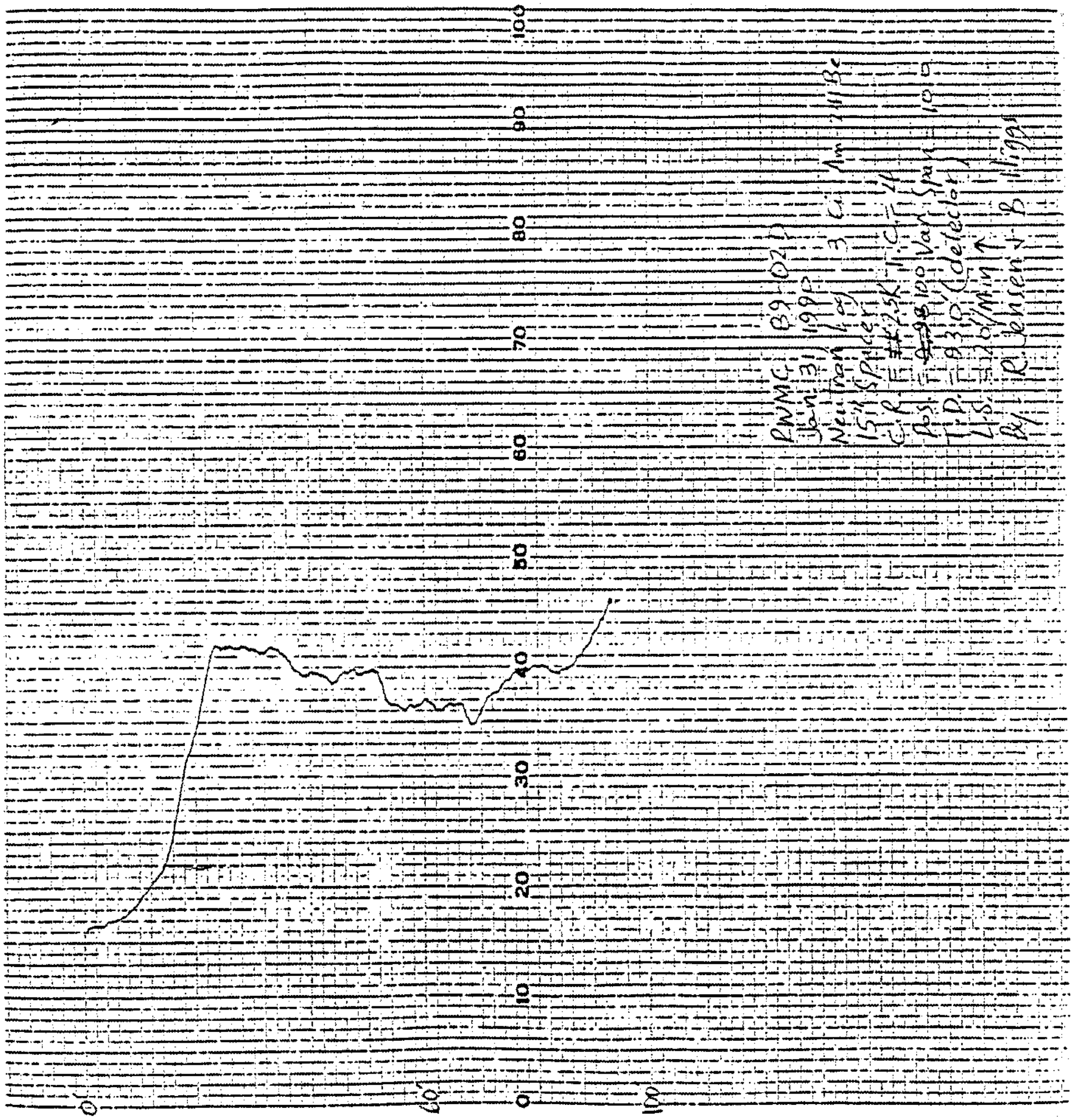
PRINTED IN U.S.A. RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO NEW YORK No. WH-7



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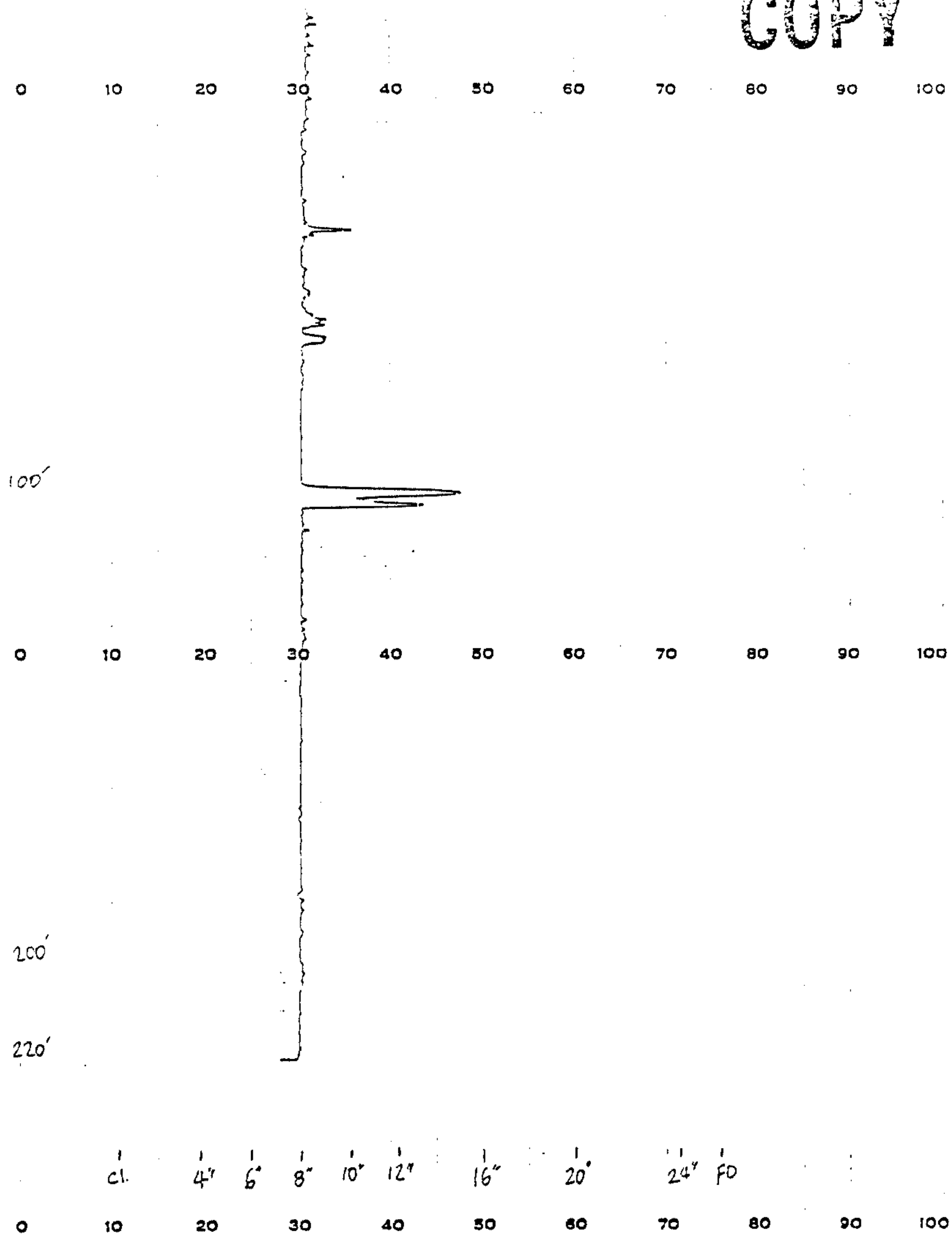
COPY



A5-4
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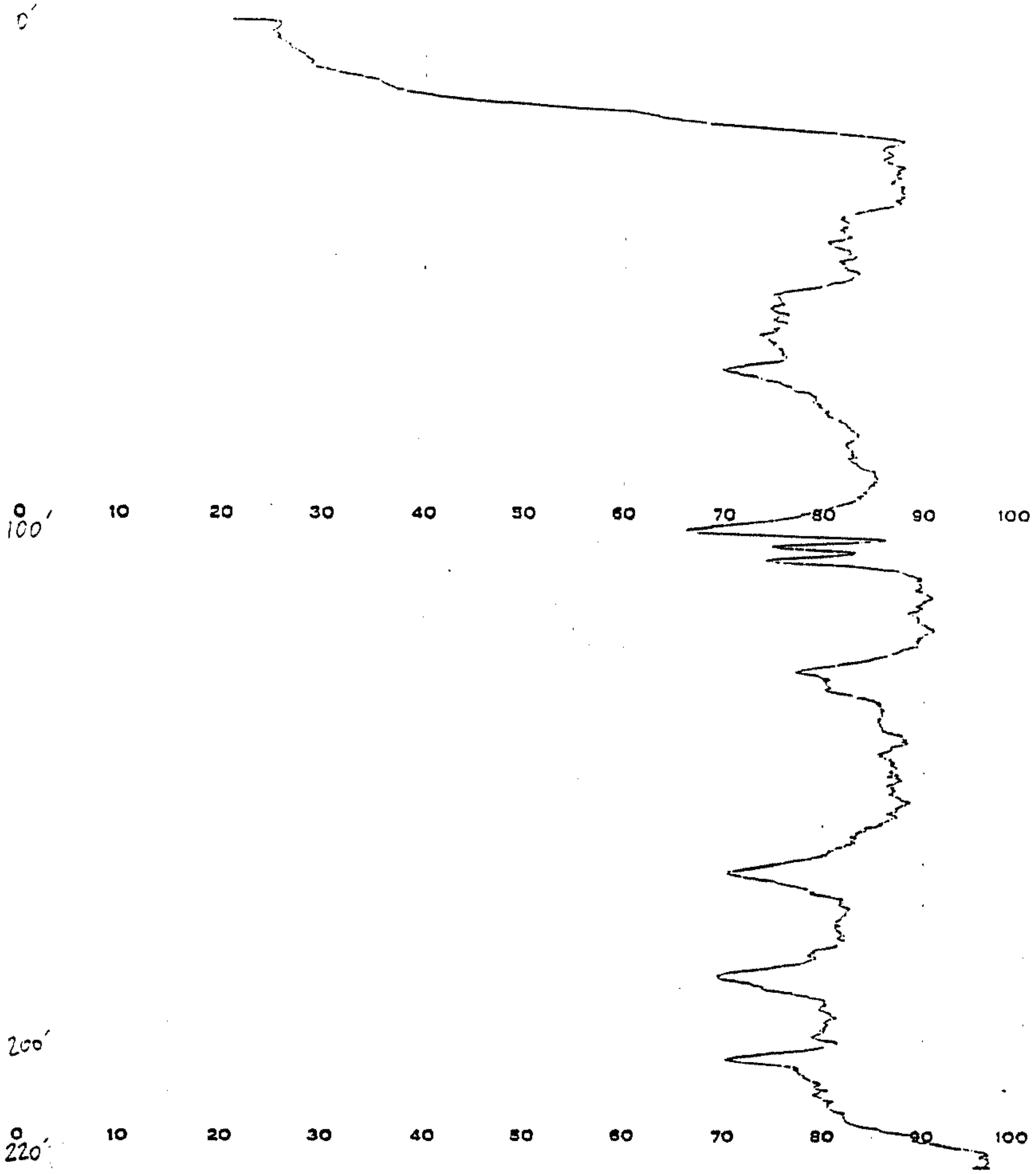
RWMC 89-02D
Feb 6, 1990
Caliper Log – Med. Arms
T.D. = 222.3' Arms
L.S. = 20'/Min ↑
by – R. Jensen & B. Higgs



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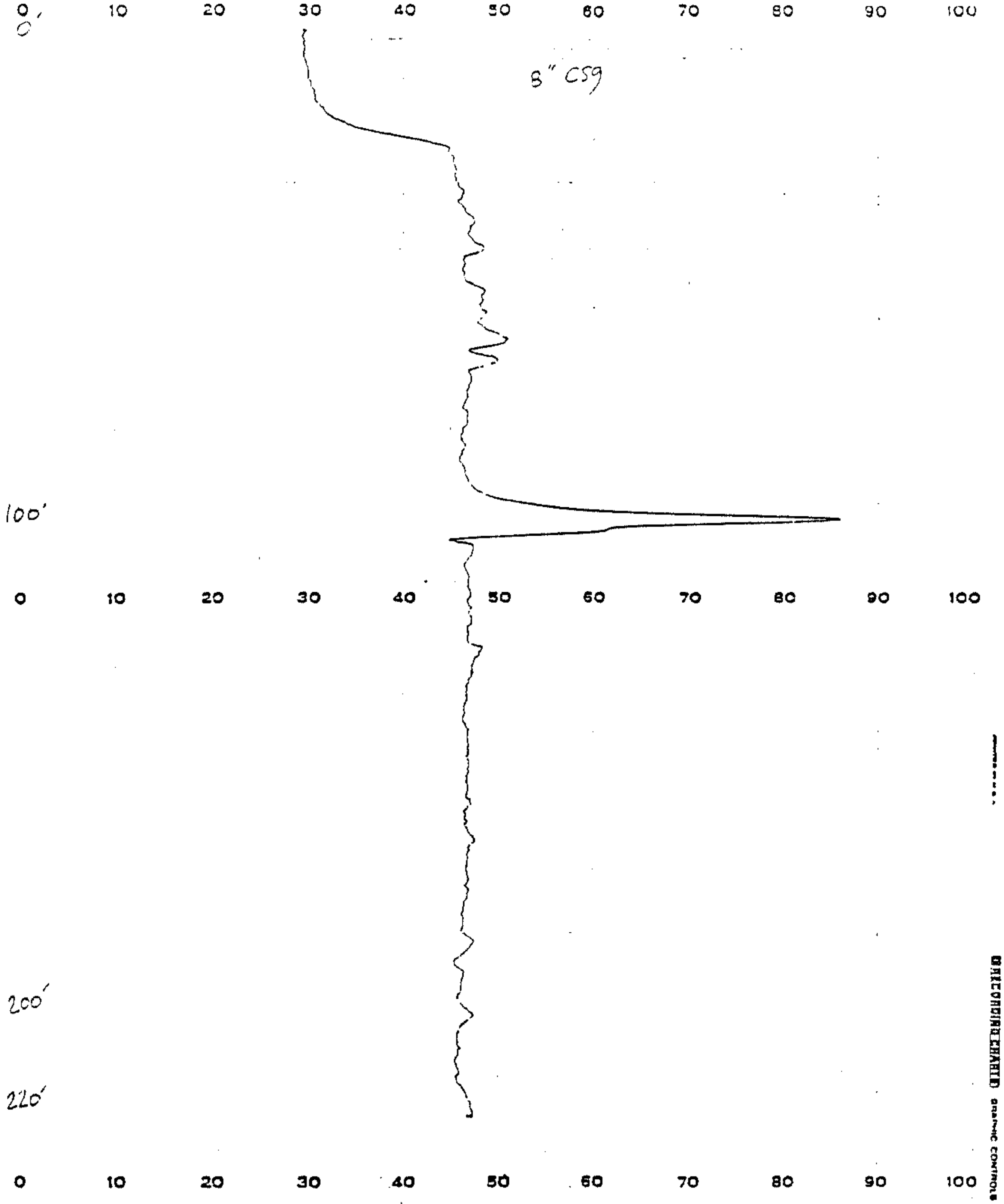
RWMC 89-02D
Feb. 6, 1990
Neutron Log 3 ci Am-241Be
15" Spacer
C.R. = 1K T.C. = 4
pos = 9.98 Var. Span = 10.0
T.D. = 224.0' (detector)
L.S. = 20'/min ↑



RWMC 89-02D
Feb. 6, 1990
Gamma-Gamma Log ~5 mci Co-60
20' Spacer
C.R. = 5K   T.C. = 4
Pos. + Var. Span = 10.0
T.D. = 223.8' (detector) + ~3'
L.S. = 20'/min ↑
By - R. Jensen + B. Higgs

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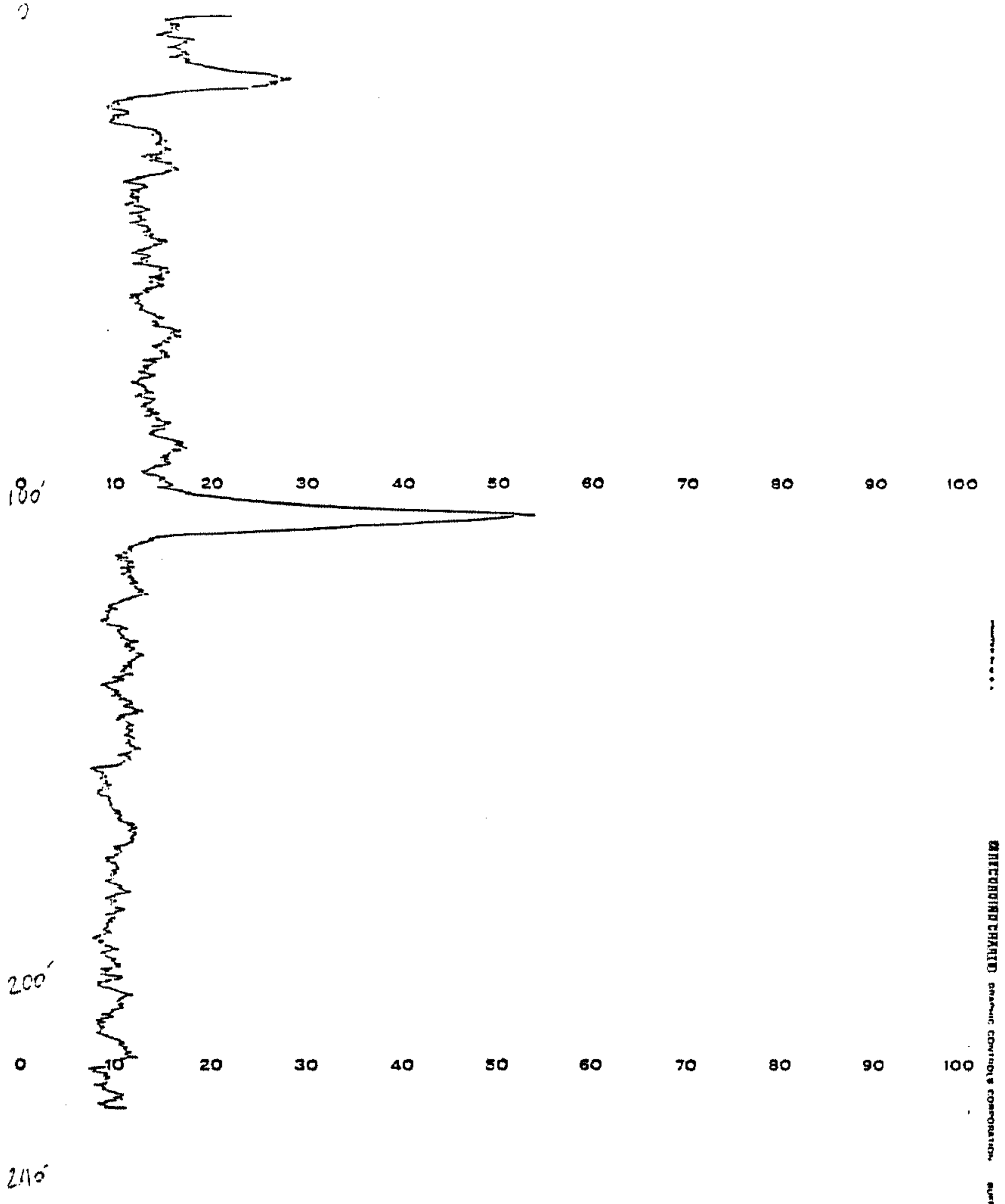

A5-4
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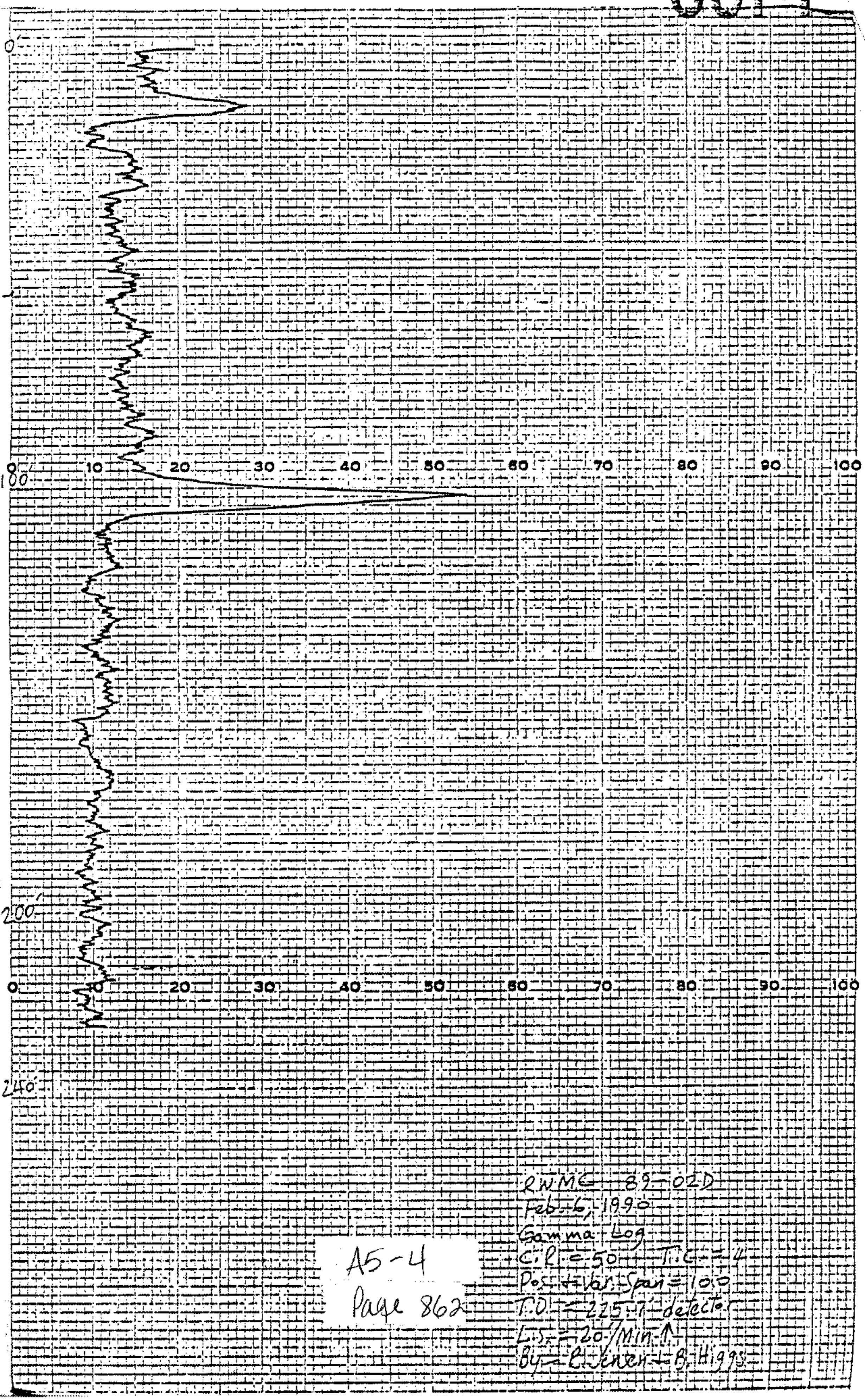
RWMC 89-02D
Feb. 6, 1990
Gamma Log
C.R. = 50 T.C. = 4
Pos. + Var. Span = 10.0
T.D. = 225.7' detector
L.S. = 20'/Min ↑
By - R. Jensen + B. Higgs



0
180
200
240
10
20
30
40
50
60
70
80
90
100
RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO NEW YORK
RWMC 89-02D
Feb. 6, 1990
Gamma Log
C.R. = 50 T.C. = 4
Pos. + Var. Span = 100
T.D. = 225.7' detector
L.S. = 20'/Min. ↑
By - R. Jensen - B. Higgs

A5-4
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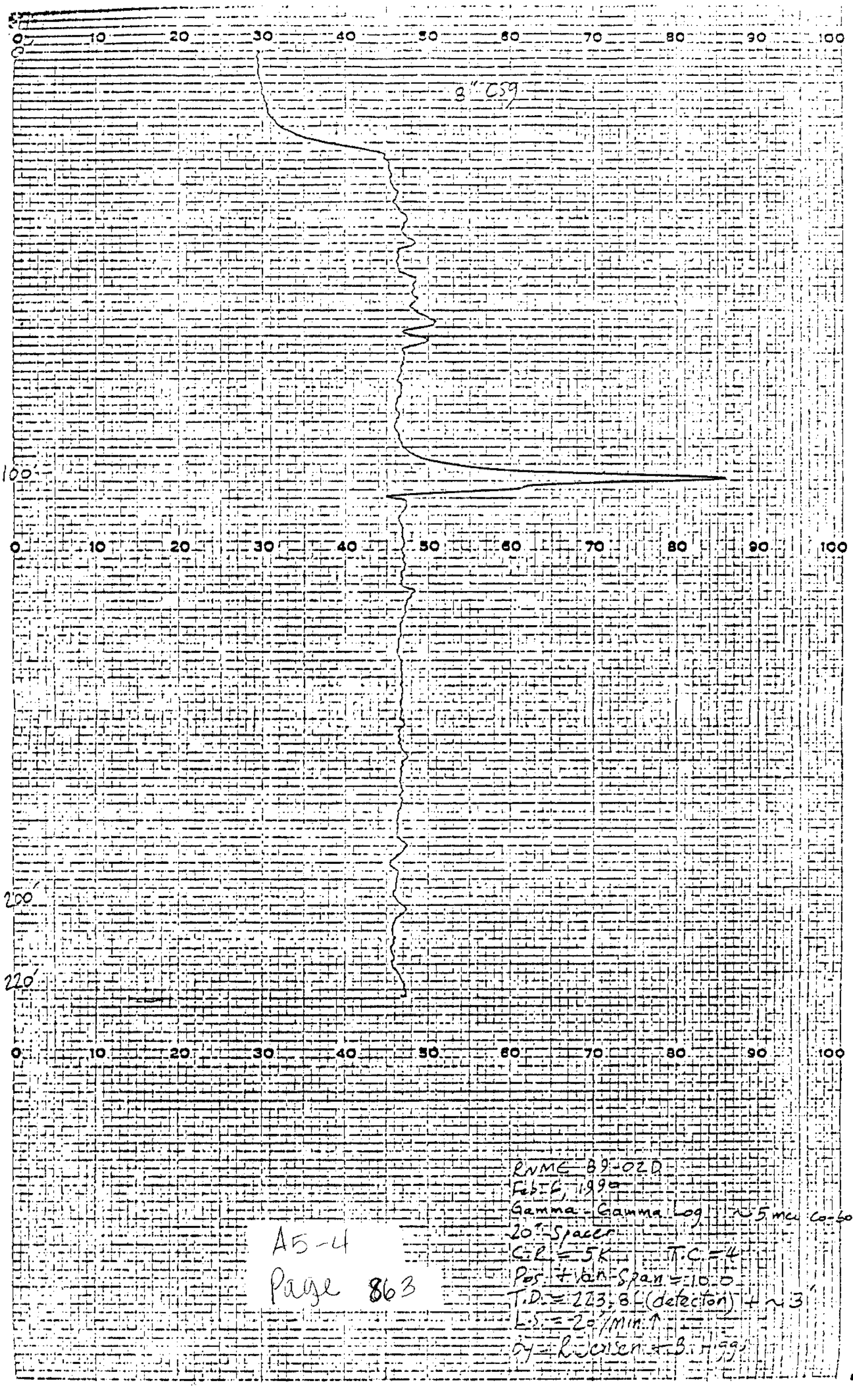
RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO NEW YORK
0 10 20 30 40 50 60 70 80 90 100
8" CSG
100'
200'
220'
RNMC 89-02D
Feb 6, 1990
Gamma - Gamma Log ~5 mci Co-60
20" Spacer
C.R. = 5K T.C. = 4
Pos. + Van Span = 10.0
T.D. = 223.8 (detector) + ~3'
L.S. = 20'/min.↑
by = R. Jansen + B. Higgs
A5-4
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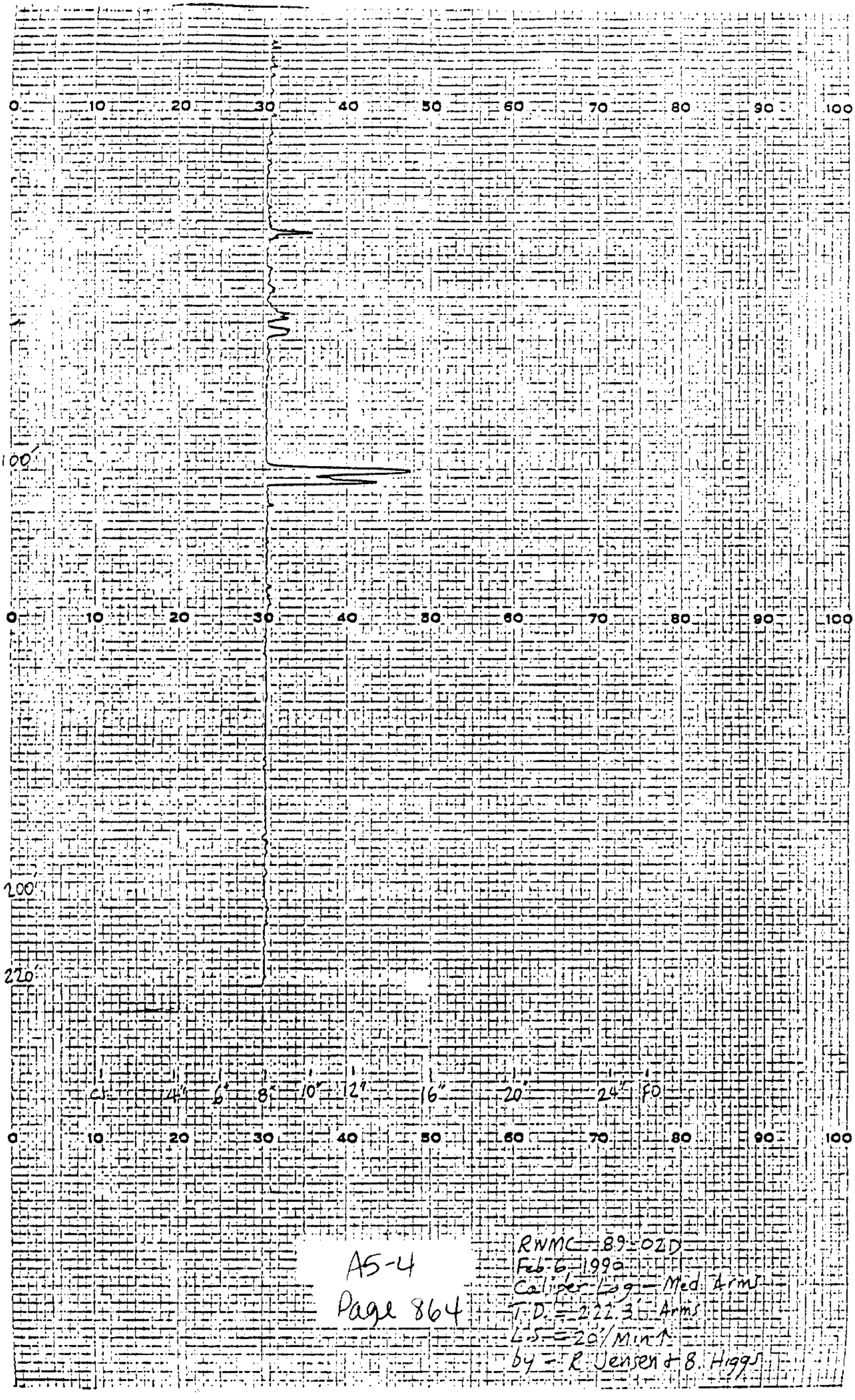
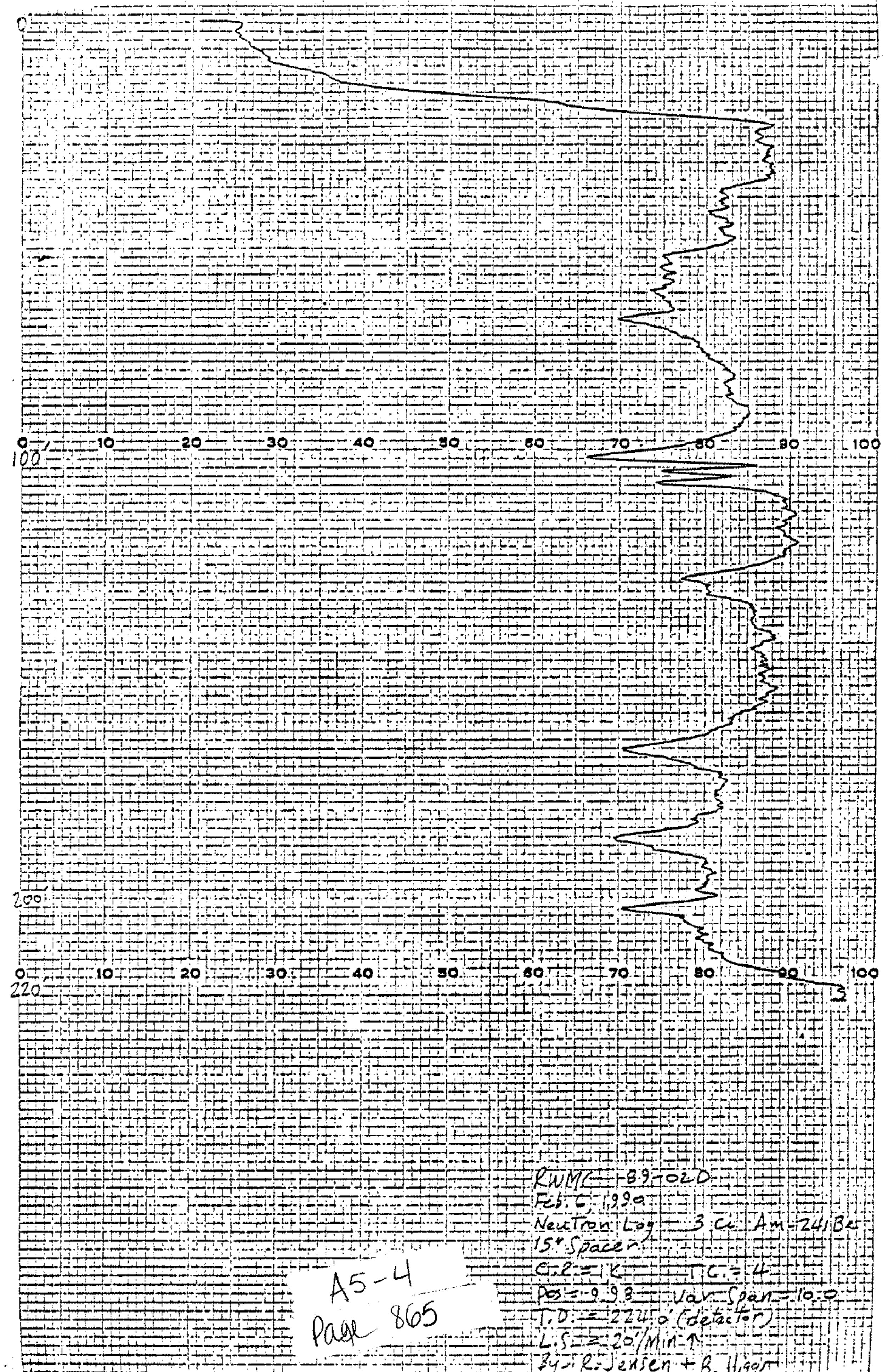


GRAPHIC CONTROLS CORPORATION BUFFALO NEW YORK

No WH-7


0
0 10 20 30 40 50 60 70 80 90 100
100
200
0 10 20 30 40 50 60 70 80 90 100
220
RWMC 89-020
Feb. 6, 1990
Neutron Log 3 Ci. Am-241 Be
15" Spacer
C.R. = 1K T.C. = 4
Pos = 9.93 Var. Span = 10.0
T.D. = 224.0 (detector)
L.S. = 20/Min ↑
By: R. Jensen + B. Hilgar
A5-4
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COPY Record Book 1

0800 5/12/89

LANCE, Chris, DONNA, Bonnie;
SAMple information needs to get to DONNA quickly for our part at the drillsite the PG needs to copy AND MAIL copies of the pertinent SAmple log and other pages of other logs on a daily basis.

D S Clawson

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CME 75, Mayhew 20000?, compressors
Funding

logger
Temp Cal Sp Water res/Temp

A5-4

2/14/90 Instrumenting 8902
weather clear cold
10:30 AM Tagged hole bottom @ 238 ft.
wet sediment no standing water

1300 start running tremie tube 10.2 ft
will run 10 ea 21.2' jnts, 1 ea ~~10.2 ft~~ T/C jnt
and 1 ea 5.2 ft jnt total depth below
ground surface with tremie 226 ft.
1440 noticed strong odor from hole
during tremie installation
Mel Garcia measured 65 ppm CCl_4
at hole nothing in breathing
zone
1443 start materials installation
will place two sacks of sand to
provide clean bottom in the interbed
and then install instrument #1
in the upper section of interbed.
1450 put in 2 sacks of sand filled
in hole to 228.5 will install
instrument at that depth and continue
the sand fill should maintain open hole
pathway in the interbed
~~1600~~ 1530 instrument #1 in at 229'
(tubing measure) poured 2 more
sacks of sand top of sand at 221.4 ft

8902 D Instrumenting 2/15/90

0930 equipment started rigging
up to place bentonite cap
on #1 followed by cement

0945 placed bentonite cap to 217.8'
ready to mix and place cement
Target for cement 203' will
require 15' fillup

1030 mixed & poured 5 sks cement
filled hole to 210 ft

1045 Mixed & poured 5 sks

1100 lunch

1230 Top of cement at 204'

Inst #2 1250 placed bentonite to 199.7 ft

1315 instrument #2 won't pass the 110' IB
pulling tremie back to make room
at that depth

1330 worked inst. passed 110' IB
proceeding to installation depth

1350 tremie run to 190.8 will
lift inst 1' off bottom and
pour sand bottom of inst #2
at 198.7

1355 sand placed top of sand
at 194.5 ft placing

1405 bentonite cap bentonite at 185.5'

~~1450~~ Adjust tremie to place cement
8 Jnt @ 21.2' 1 Jnt @ 10.2 tremie
depth 179.8'

1430 cement at 180.5 will spot 1 sk
bentonite

8902 D 2/15/90

1440 top of bentonite at ~~187 ft~~ 180'
starting in with inst #3
target depth 180' to 175'.
1500 instrument at 179' (bottom of inst)
1505 sand poured top of sand at
175'
1515 bentonite cap placed top of sand
bentonite cap at 171'
1615 Shut down for the day. Poured 20 sacks cement.
Will measure ~~tomorrow~~

[signature]
15 February 1990

FRIDAY 16 February 1990
8902D Instrumentation

0845 HEAVY snow falling with light winds blowing from the east. Tim Miller reports Hnu readings up to 300ppm in the breathing zone above the borehole. Crews will wear respirators within 4' radius of the borehole.

0850 Warming up equipment and preparing to place instrument #4.

0945 MEASURED depth through tremie is 143½' + 3' − 1 = 145'. CEMENT will be added to bring top of cement to approximately 136'

1010 M-scope depth to top of cement is 138'

1020 Placing Bentonite cap

1025 Bentonite cap to 132'

1100 Placing Vapor Port #4 and sand. Bottom of sand pack for #4 is 132'. Vapor Port is at 130'. Top of sand is 124'.

11:10 Bentonite cap placed from 124' to 118'.

11:30 Placed cement on top of Bentonite cap and stopped for lunch.

1340 TAGGED cement at 110'+3' = 113'. Next zone should be cemented to 109'. bentonite to 106, sand from 106-101 and bentonite to 98', for Instrument #5.

1400 - Shut down with cement @ 113'. Will resume w/ instrument #5 Monday.

[signature]
Friday 16 February 1990

Tues 2/20/90 8902D

1100 Tagged cement top at 109.5'
1115 placed bentonite to 106'
#5 1130 starting in with instrument #5
1200 Intrument #5 at 104.5' bottom at
inst. sand top at 99.5' top of
bentonite at 97' ready for cement
Target for top of cement 76' 1.5' pe
will mix and place 13 sks and meas.
1230 cement at 80' mix 2 sks
1300 top of cement at 76
14:40 TOP OF BENTONITE AT 73 FT
14:50 INSTALL PORT # 6 AT 70.5 FT.
15:10 TOP OF SAND AT 68 FT
15:20 TOP OF BENTONITE AT 64.8 FT
15:30 MIX AND PLACE 8 BAGS OF GROUT CEMENT
15:45 TOP OF CEMENT AT 55 FT.
15:55 TOP OF BENTONITE AT 48.6 FT
16:00 INSTALLING PORT # 7 AT 46 FT
16:05 TOP OF SAND AT 43.5 FT.
16:10 TOP OF BENTONITE AT 41 FT
16:15 MIX 4 SACKS CEMENT GROUT
16:25 TOP OF CEMENT AT 34 FT
16:30 CLEAN UP AND SHUT DOWN. WILL RESUME WI[illegible]
PORT # 8 TOMORROW.

Thomas A. Matz
TUES 20 FEB 1990

WED 2/21/90 8902D

[illegible]30 WARM UP EQUIPMENT

[illegible]45 Measured Depth 34.5' to top of Cement

[illegible]50 TOP OF BENTONITE AT 32 FT

10:00 INSTALLING INSTRUMENT # 6 AT 30 FT

[illegible]05 TOP OF SAND AT 25.5 FT

[illegible]6 TOP OF BENTONITE AT 21.5 FT

[illegible]20 MIXING ~~12~~ 15 BAGS CEMENT GROUT TA 21 FEB 90

[illegible]00 TOP OF CEMENT AT APROXIMATELY GROUND LEVEL.

SHUT DOWN AND CLEAN UP INSTRUMENTING OPERATION

[illegible]00 LUNCH

[illegible]00 CLEAN UP, AND PREPARE TO WELD RISER TO TOP OF SURFACE CASING TOMORROW.

14:50 CLEAN UP CONTINUING. EO HAULS OFF DEBRIS INCIDENTAL TO DRILLING. EO REMOVES GENERATOR. SITE IS SURVEYED OUT.

Thomas A. Mafer

WED 21 FEB 1990

A5-4

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8802D (4)

Idaho National Engineering Laboratory

LAB NOTEBOOK

NO. INEL-NBU- 1443

ASSIGNED TO Joel Hubbell

SUBJECT S.I.P. - Drilling Log FY 1988 Volume 2

Samples
Id
8802D

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Page 875

THIS LOGBOOK WAS RECEIVED FROM RWMC

A5-4
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FORM EG&G 3025A
(Rev 05 88)

WELL LOG

Well Number: 8802D

Date: DLM 8 7/29/88 Page: ____ of ____

Measuring Point: ____

Geologist: ____

Surface Elevation: ____ (ft.)

Location (co-ord): 669 435.1 / 267 316.5

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
						2.8' LS to Table Top.
						Moved Rig onto Anderson site, 7/28/88
11:27	Blew out hole					Hawley on site 7/29/88.
11:29	6'			8802D01	∅	19.1 − 13.1 (SU) = 6.0 BLS
11:41	11'					
12:00	0					Tricone Reaming 12 1/4" Bit
12:45	10.7'					Done Reaming 6.3' + 7.2 = 13.5 Steel
						−2.8 SU = 10.7'
14:11	10.7'	TD 10" Casing.				Set casing. ~~7.4'~~ Table ~~above~~ to Top Steel
	10" Casing Top is 10" above LS.					DLM 7/29/88 ~~2.8'~~ LS to Table
						~~10.2'~~ Steel above LS
						4.6 Table to Steel Top
						2.8 LS to Table
						7.4 SUp.
						Total 10' Casing Length = ? was not calculated.
						___ − 7.4 SU = TD of 8" = 10.7
						Cemented 3-4" in bottom of casing,
						then pushed casing in to TD.
						Cemented up sides, annulus to Surface.
						A5-4
						Page 827

Deborah F McElroy
copied from Log book I
Page 797, 8/8/88

#DC2

15.10 - steel + CS
- 5.65 - Stickup

9.45 = TD

CB Assembly = 5.1'
LS to Table = 2.8'

FORM EG&G 3026A
(Rev. 05-88)

WELL LOG

Well Number: 88C2D
Date: 8/5/88 Page: ____ of ____

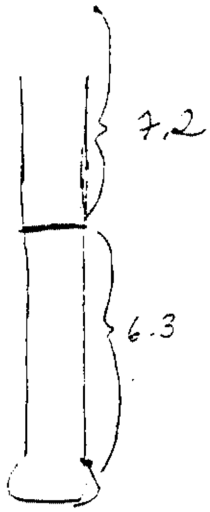
Measuring Point: LS
Geologist: D.L. MCELROY

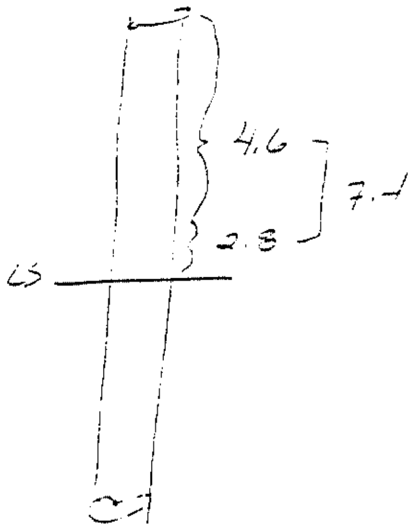
Surface Elevation: ____ (ft.)
Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
9:08					1	ppm in borehole, BZ = OK (0)
				~~88C~~ DLM 8/5/88		Waiting for HP - in class -
11:35						Lunch
11.45	9.5'	4.9	(5)	#8802D02	0.2	(4.1) = Basalt
11:52						Filter change
12:03	14.5'					
~~11:52~~ DLM 8/5/88 ~~12:50~~	~~14.5~~ 14.5 —DLM 8/5/88	4.95'		#8802D03	ϕ.	23+0.3+5.0=SU 5.3 2.8 8.1 =15.0 @ PG 23.1 - Steel 8.1 - SU
13:28	19.5					
13:44	19.9'			8802D04		DLM 8/5/88 5.35 2.81 8.16 ~~28~~.1 - Steel - 8.2 - SU 19.9 PG
						0.65 = Shoe peice
14:03	24.9'					
15:30 DLM 8/5/88						Shut down - gen out of diesel
						A5-4 Page 879

Deborah L McElroy
8/5/88

CALCULATION SHEET





20'
8.4
17.6

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6.3

#D05

25.00
8.1
33.10 steel

5.35
2.8
8.15' SU

33.10
8.15
24.95

3.2
.5
3.7'

3.7
2.8
86.5' SU

~~33.1~~
~~-3.7~~
~~29.4~~

33.1
-6.5
26.6

D06

38.1 - steel

2.8
5.3
8.1 - SU

38.1
-8.1
30.0

D07

343.1
8.1
35.0

A5-4
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FORM EG&G 3026A
(Rev. 05-88)

WELL LOG

Well Number: SSO2D
Date: 8/8/88 Page: ______ of ______

Measuring Point: ______
Geologist: D L McElroy

Surface Elevation: ______ (ft.)
Location (co-ord): ______

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	ppm HNu	Comments, Activity
						MEASURE HOLE
6:30						On Borehole Site. Decon Reaming Steel.
7:46						Steel Deconned (120' on carasel)
					0.5	Check hole
						Taped HOLE, TD = 24.9' (7 7/8" bit)
8:30						Ready to Ream, Smeared Bit & Steel
						Reamed to 23.8', wait for filters
10:10						Resume Reaming
10:30						Reamed to 24.9'
11:40	24.9'			8802D05		CP Wireline Coring.
						5.35' Steel Above table
11:48	26.6'	4.7			φ	@≈3.7' steel " " - soft spot.
						Hit sediment I Bed
11:56	29.9'					
12:10	30.0'			8802D06		5.3' steel
		4.9'			φ	Basalt
12:34	35.0'					
12:52	35.0			8802D07	φ	5.3 Steel
		5.1				Basalt
13:01	40.0'					

A5-4
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FORM EG&G 3026A
(Rev 05-88)

WELL LOG

Well Number: 8802 Date: 8-8-88 Page: ____ of ____

Measuring Point: ____ Geologist: DL McElroy

Surface Elevation: ____ (ft.) Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
13:21	40'	~~40.0~~ DLM 8-8-88 5.25		8802008	∅	5.3 Basalt
13:36	45.0'					
13:53	45.0'	4.8		8802009	∅	Basalt
4:05	50'					
Break 14:53	50'					Measure Hole 47.75 + 5 = 52.75 −2.8 50.0' Taped
15:10	23.8'					Reaming 23.8' - 33
1400	23.3'					Stop for day

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Deborah L McElroy

CALCULATION SHEET

A5-4
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10.2
30.0
20.0
50.2
~~- 2.8~~
~~47.4~~

~~70.2~~

2.6

8-9-86

Reaming

70.2
-21.5
48.7

20.0
-1.3
18.7 - Table to Steel top
2.8 - Table to LS
21.5
13:20

D10
50.0
8.1
58.1 - Steel

SU = 2.8'
+5.3
8.1
Start @ 50.0'

D12
68.1
-8.1
60.0

Taped Hole
67.9
+5.0
72.9 to Table
-2.8 (LS to Table
70.1

Reaming
60.0
2.5
10.25
72.75
-2.8
69.95

70.00
-.25
69.75

2.7

69.75
~~60.2~~
~~9.75~~

69.75
-77.4
2.45

70.2
+2.8
77.4

Reaming
1.3
2.8
4.1

20.0
-1.3
18.7

10.2
40.0
70.2

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FORM EG&G 3026A
(Rev 05-88)

WELL LOG

Well Number: 8802D   Date: 5-9-88   Page: ____ of ____

Measuring Point: ____   Geologist: DL McElroy

Surface Elevation: ____(ft.)   Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:30						ON-SITE
6:50	33'					Begin Reaming (continue), 7 7/8" bit
8:30						13'
9:56	48.7'					25.1 = Barometric pressure
9:36	50'	5.1		8802D10	ϕ	CP Wireline Coring
						Basalt
9:53	55'					
10:25	55'	5.0		8802D11	ϕ	5.3
10:30						Lunch
11:22						Resume Coring
11:34	60'					
11:44	60'	4.4		8802D12	ϕ	5.3 - steel
12:01	65'					
12:18	65'			8802D13		5.3 - steel
12:39	70'					Went on break. Pulled sample out of hole
						@ 13:05
13:30	70.1'					Taped Hole T.D
						Ream w/ 3 (30)'

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1 (10.2)
+ 2.5' into #4 reaming steel

FORM EG&G 3026A
Rev 05-88)

WELL LOG

Well Number: 88C2D Date: 8-10-88 Page: ____ of ____

Measuring Point: ____ Geologist: DL McELROY

Surface Elevation: ____ (ft.) Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:46	48.7'					Begin Reaming. 7 7/8' bit. DLM 8-10-88
	69.9'					End Reaming
	70.0'					CP Coring:
9:17		4.85		8802D14	0	~~Tape Hole:~~ DLM 8-10-88
						5.3 - Steel
						Basalt
9:48 ~~9:40~~	75.0'					
9:55	75.0'	DLM 8-10-88 4.8		8802D15	0	5.3 - Steel
						Basalt
10:17	80.0'					
11:19	80.0'	5.0		8802D16	0	Basalt
11:40	85.0'					
11:55	85.0'			8802D17		Basalt
12:?	90.0'					
12:53	90.0'			8802D18		
13:13	95.1'					
13:51	95.1'					92.9+5 Taped footage = 95.1
						-2.8
14:00						Stop for DAY

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Deborah L McElroy
2/16/88

CALCULATION SHEET

D14

2.8
5.3
8.1 -Sa

8.1
70.0
78.1 - Steel

78.1
-8.1
70.0

D18 - Taped Hole

92.9
5.0
97.9
- 2.8
95.1

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Page 888

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FORM EG&G 3026A
(Rev. 05-88)

WELL LOG

Well Number: 8802D

Date: 8-11-88 Page: ____ of ____

Measuring Point: ____

Geologist: DL McELROY

Surface Elevation: ____ (ft.)

Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
11:30						Warm-up.
12:15	67.9'					Reaming - 7 7/8" tricone bit
15:0	95.0'					End Reaming, Go home.
						(12 hrs up > 20)

Deborah L McElroy
8/11/88

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Page 890

BASALT - - - - - - 97.1

INTERBED

- - - - - - - - 101.8'

Basalt

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FORM EG&G 3025A
(Rev. 05-88)

WELL LOG

DLM 8/15/88

Well Number: 8802D

Date: 8-15-88 Page: ____ of ____

Measuring Point: ____

Geologist: DL McELROY

Surface Elevation: ____ (ft.)

Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:30						Set-up.
7:44	95.0'					Steel = 5.3 soft & 3' into bed
	97.1 - Interbed DLM 8/15/88			8802D19		Stop steel @ 1.3
						Basalt & Interbed
						sent R01 DLM 8/14/88 to Sills for
7:50	99.0'					Analysis so can send App IX (next) to Weston Labs
						Driller turned off air after 10+ min, and pushed & compact into tube.
8:30					7ppm	Leave site. 7ppm in borehole. Could not determine type of gas w/ Draeger tubes.
11:00					Ø	ppm in borehole
						Instituted hole venting via pump, see if gas would reappear.
11:40					5-9 ppm.	Took (2) Gas Sample (Kelly Wright & Donna Bales)
12:00						Winds too high >20 mph. Cancel sampling.
13:00						~~go home.~~
14:42	98.4'			S802D20	Ø	CP Core
						@ 3.4' into core, became harder.
						Steel = ≈3.6'
1451	101.8 ~~101.8~~ DLM 8-15-88					PG. Tape me 103.5 + 5.0 = 108.5
						SO = 3.9 + 2.8 = 6.7
						108.5 - 6.7 = 101.8'
15:45						Gone for Day
						Deborah L McElroy 8/15/88
						A5-4
						Page 892

CALCULATION SHEET

9:41

D19

95.1
8.1
90
98.1
- 2.8
95.3
+ 5
100.3

2.8
5.3
8.1 = SU

95.0 Steel
8.1 CB
103.1

103.1
8.1
95.0

1.3
2.8
4.1 SU

103.1
-4.1
99.0

D20

6.9
2.8
9.7 SU

108.1 Steel
- 9.7
98.4

3.6
2.8
6.4

108.1
- 6.4
101.7

95.4
3.4
101.8

- 6
- 5
- 1

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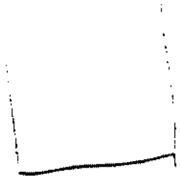
5|17|88



7 7/8" borehole
7.875 = 7.88"
= 0.65' (ft)

1" = 0.08 ft

$V = (\pi r^2) L = \pi (3.94^2) L$
$= \pi\, 15.52\,\text{in}^2 L$
$= \pi (0.006\ \text{ft}^2) L$
$= 0.33\ \text{ft}^2 L$

2.54 cm/in
30.48 cm/ft
28316.8 cm³/ft³

for 1", (0.08') $V = 0.33\ \text{ft}^3$ (1/3 cubic ft)
$V = \cancel{9.6 \times 10^3\ \text{cm}^3}\ 9345\ \text{cm}^3$
$V = 9345\ \text{ml} \approx 1\ l$
So figure $\approx 1\ l$/inch 7 7/8 Diam Borehole

11 x 10 = 110
+0.5 = 110.5 Steel

FORM EG&G 3029A
(Rev 05-88)

WELL LOG

Well Number: 8802D

Date: 5-16-88 Page: ____ of ____

Measuring Point: ~

Geologist: DL McElroy

Surface Elevation: ____________ (ft.)

Location (co-ord): ____________

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:20						On-Site, Set up., IH Survey
7:05					7ppm in borehole	Begin removing CP steel.
						Change to deconned diam bit. (In "hard" rx zone).
8:10				#8802D21 Core barrel down		Put in CP steel w/diam bit
8:30	101.8'	3.2'		8802D21	4ppm	3.5 - Steel above table
						Ring to bottom ring = ~~[illegible]~~ 0.18' DLM 8/16/88
						0.4 = To table
8:50	105.1'					
9:05	105.1'	4.2		8802D22		~~0.75~~ from Top steel. 1.15' DLM 8/16/88
9:27	109.1'					DG
						Pulled CP steel.
						Put in Reaming steel.
11:45						Turned on vent pump - w/steel to 95'.
						Opened top. Vent - min. → ~~[illegible]~~ rose to DLM 8-16-88
					0.4	7ppm - peaked - then went down.
						Stayed at 0.4 ppm > bkgrnd
						Did not gas sample.
12:15	95'					Began Reaming Some gravel in cyclone cuttings - 1-2cm length
12:40	109'?					End Reaming
13:00						USGS Logged Hole, Hole fill'ed in ≈ 4-5'.

Deborah L McElroy
8-16-88

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FORM EG&G 3025A
(Rev 05-88)

WELL LOG

Well Number: 88020

Date: 5-17-88 Page: ____ of ____

Measuring Point: ____

Geologist: DLMcELROY

Surface Elevation: ____ (ft.)

Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:30						Decon Casing Put in 11 pieces of 10', 6" casing + 0.5 shoe = 110.5 ft casing. Tack welded straps of steel to hold joints.
10:15						Have ~~8~~ 4.5' ± infill sand - from hole caving. DLM 5-17-88 Can't blow it all out - blowing down casing. And turning casing. Some gravel blows up with sand. Must be some gravels in the 110' interval.
11:00						Driller says casing on bottom, but @ 103.9' - this is short the 109 he thought he reamed. He looked @ reaming steel, could see the last mark he reamed to, was ≈ 104 1/2'. ⇒ believes he ~~[illegible]~~ DLM 5-17-88 didn't ream far enough. Wasn't cave in, was basalt at bottom of hole.
1245	104.7' bottom of hole 103.9' 6" casing TD before pulled.					Drillers begin to pull casing. Will pull casing, ream hole to 5' below TB, then case.
1400						Stop for Day

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Deborah L McElroy
8-17-88

CALCULATION SHEET

105.0

108.1
105.0
3.1
- 2.8
0.3' above table.

8802D1

108.1 Steel
-6.3
101.8

3.5
2.8
6.3 SU

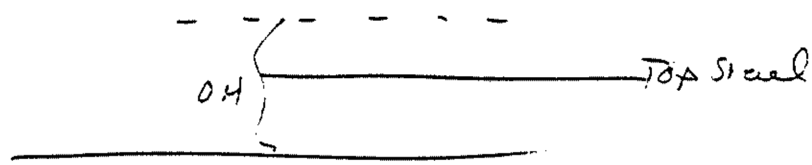
stop 0.22
2.8
3.02 = SP.

105.10
- 3.02
105.08

D22

0.75
0.4
1.15
2.8
3.95 = 4.0' SU

105.1
5.0
113.1 steel
- 4.0
109.1



0.40
- 0.18
0.22 = SU

106.2
5
111.2
-6.5
104.7
101.8
2.9

3.7
2.8
6.5 bottom of hole

110.5

A5-4
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7 Day Casing before placed
3.8
2.8
6.6

110.5
−6.6
103.9

Casir
109.0
103.9
5.1

103.9 ← casing bottom
101.8 ← basalt/sed contact
2.1

~~1.8~~
~~103.9~~

~~10.0~~
~~3.8~~
~~7.2~~

3.8
1.4 , Casing above diverter
5.2

Casing 8/18/88

11 = 110.5
− 1.7 ft Casing Above LS
108.8

~~2.8~~
~~− 1.7~~
~~1.1 ft~~

110.5
−108.6
1.9

9.8
− 1.4 - Divert / T Top
1.4 LS to Top Div
~~1.3~~
1.7 ft above LS Casing

2.8
− 1.9
.9

Reaming 8/18

3.4 → Steel Above table
1.2

3.4
2.8
6.2

110.2
−6.2
104.0

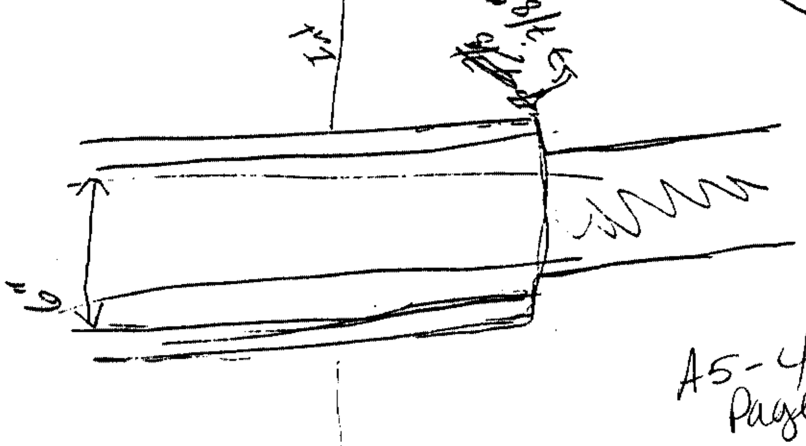
101.8
5.
106.8

~~100.0~~

~~120.0~~
~~10.0~~
~~130.0~~

106.8
−104.0
2.8

110.2
−2.8
107.4
1.2
108.6



108.6
−101.8
6.8

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FORM EG&G 3026A
(Rev 05-88)

WELL LOG

Well Number: S802D

Date: 8-18-88 Page: ____ of ____

Measuring Point: ____

Geologist: DL McELROY

Surface Elevation: ____ (ft.)

Location (co-ord): ____

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:20						Set-up, check hole.
						Proceed with pulling casing.
8:10	104.0'					Ream to 105.6' with 7 7/8" bit
8:37	108.6'					
						Put down casing, 6", Straps welded
						onto casing joints.
11:21	105.8'					TD Casing: 105.8' BLS (PS)
						Pushed in to TD. Pulled up, poured
						in 6 l Bentonite. (≈1 l/inch) Gives
						3" Bentonite in annular space, rest
						fills up rat hole and inner casing.
12:21						Pushed casing back to TD.
						Cut off 6" casing 12" above LS.
						Brass ring - temp seal between 6" & 10" casing
13:19						Winds over 20 mph - Shut down

Deborah L McElroy
8/18/88

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FORM EG&G 3026A
(Rev. 05-88)

WELL LOG

Well Number: ~~~~D
Date: 5-19-88 Page: ____ of ____
Measuring Point:
Geologist: DL McElroy
Surface Elevation: ______ (ft.)
Location (co-ord):

Time	Depth Interval (ft) BLS	Core Length (ft.)	% Recovery	Sample Number	HNu	Comments, Activity
6:15						On Site, Warming, Set up
						Put CT Rod in Hole
7:15	109.1'			8802023		Steel 6.2' Above Table
		5.0			>background	
7:35	114.1'					
7:53	~~109.1~~ 114.1'	DLM	5-19-88	8802024		6.2' Steel Above Table.
		5.05				
8:13	119.1'					
8:37	119.1'	~~5.05~~ 5.00	DLM 5-19-88	8802025		6.2'
9:04	124.1					
9:17	124.1			8802026		6.25'
		2.3				
	~~126.4~~					
9:36	127' (	Collapsed	Tube?	Pulled	up	to check out, TUBE OK. Sample V. ~~vesiculer. Driller had lost circulation~~ ~~tube stuck coming up. Poured oil on steel.~~
9:50	126.4	0.75'		8802027		
					10-8 ppm - HNu	~~Purge~~ CCl4 → sampling port
10:19	128.6'				40-50 ppm	Stopped drilling due to hig organic readings
12:00						Have to decon CP steel because of oil in pipe
						Also need to decon Reaming steel, according to procedures.
						A5-4
						Page 900

BOREHOLE 8902D

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Page 901

A5-4
Page 902

COPY

INEL RCRA/CERCLA INVESTIGATIONS

SITE:

FIELD TEAM LEADER'S DAILY LOGBOOK

8902D

LOGBOOK NO.: BWP-013

LOGBOOK ASSIGNED TO: TED CLAWSON

WHEN COMPLETED RETURN TO:
DONNA KIRCHNER
MS: 1403

A5-4
Page 903

A5-4
Page 904

87036

1

FIELD TEAM LEADER'S DAILY LOGBOOK

~~[illegible]~~ TM

~~[illegible]~~ ~~DENNINGS [illegible]~~ TM

8 JAN 90

09:30 DENNINGS ARRIVED WITH THIER RIG. ~~NO FIELD~~

~~OPERATIONS THIS DAY~~ TM DECONTAMINATED RIG.

A5-4
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FIELD TEAM LEADER'S DAILY LOGBOOK

SAMPLING TEAM

NAME (Print)	SIGNATURE
TED CLAWSON	
TOM MATZEN	
DOUG JORGENSEN	
MIKE TOWLER	
MIKE DENNING	
JODY DENNING	

Visitors Name	Reason for Visit

A5-4
Page 906

CALCULATION SHEET

110
3.1
116.1

D23
115.1 steel

6.2
2.5
9.0 -SU

118.1
9.0
109.1

D24

115.1
5.0
123.1 -Steel
9.0 - SU
114.1' TD

D25
125.1

D26
128.1
5.0
133.1

SU
6.25
2.8
9.05

133.10
-9.05
124.05

D27
133.1 -
- 4.5
128.6

1.2
.5
1.7
2.8
4.5

D28
138.1 Steel
SU

SU 2.8
+

A5-4
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Appendix 5–5

APPENDIX 5-5

APPENDIX IX DATA FROM BOREHOLE 8801D

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page 0

Pesticide/PCB 881D00EBB

1

PESTICIDE ORG SHEET

EPA SAMPLE NO.

881D00EBB

Lab Name: ROY F. WESTON Contract: ______

Lab Code: ______ Case No.: 8806S0 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8806S009002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: ______

Level: (low/med) LOW Date Received: 06/04/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/06/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/20/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

Instrument detection limit / Q or quant limit

CAS NO.	COMPOUND	UG/L	Q
319-84-6	alpha-BHC	0.050	U - not detected at this level.
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
5103-71-9	alpha-Chlordane	0.50	U
5103-74-2	gamma-Chlordane	0.50	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.50	U
11104-28-2	Aroclor-1221	0.50	U
11141-16-5	Aroclor-1232	0.50	U
53469-21-9	Aroclor-1242	0.50	U
12672-29-6	Aroclor-1248	0.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

~~U = Valid Report~~

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Organophosphorous Pesticides & Chlorinated Herbicides 881000EBB

Client: EG&G

Sample ID: 88100EBB

Sampled: 06/03/88
Received: 06/04/88

PFW Job #: 8806s009

CHLORINATED PHENOXY ACID HERBICIDES SM 509B			ORGANOPHOSPHOROUS PESTICIDES EPA 614		
Extracted: 06/08/88	Ext Fact: 100		Extracted: 06/06/88	Ext Fact: 100	
Analyzed: 06/08/88	Dil Fact: 1		Analyzed: 06/16/88	Dil Fact: 1	
Confirmed: NO	Blank ID: QA88164		Confirmed: NO	Blank ID: QA88134	
PFW Lab #: 002	Results (ppb) ug/L	Det Limit Sample ug/L	PFW Lab #: 002	Results (ppb) ug/L	Det Limit Sample ug/L
Compound			Compound		
2,4-D	U	1.00	Phorate	U	0.20
2,4,5-TP (Silvex)	U	0.10	Dimethoate	U	0.20
2,4,5-T	U	0.10	Dioxathion (Delnav)	U	1.00
			Diazinon	U	0.30
			Disulfoton (DiSyston)	U	0.30
			Demeton	U	0.30
			Methyl Parathion	U	0.30
			Malathion	U	0.40
			Ethyl Parathion	U	0.40
			DEF	U	0.50
			Ethion	U	0.50
			Thionazin	U	0.50
			Famphur	U	2.00
			Azinphos-methyl (Guthion)	U	2.00

U = Compound analyzed for but not detected

Approved: ______________________

Declan Cowley
Organic Section Manager

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1D Pesticide/PCB 881DOOEBB

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

881DOOEBB

Lab Name: ROY F. WESTON Contract: ______

Lab Code: ______ Case No.: 8806SO SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8806S009002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: ______

Level: (low/med) LOW Date Received: 06/04/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/06/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/20/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
5103-71-9	alpha-Chlordane	0.50	U
5103-74-2	gamma-Chlordane	0.50	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.50	U
11104-28-2	Aroclor-1221	0.50	U
11141-16-5	Aroclor-1232	0.50	U
53469-21-9	Aroclor-1242	0.50	U
12672-29-6	Aroclor-1248	0.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

881DC00EBC -Metals

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002

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

881DC00EBC

Lab Name: WESTON ANALYTICS Contract: C88131538

Lab Code: WESCA Case No.: 8813 SAS No.: SDG No.: 881DC00

Matrix (soil/water): WATER Lab Sample ID: 8806-009-003

Level (low/med): LOW Date Received: 06/04/88

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	2.5	U		F
7440-38-2	Arsenic	4.4	U		F
7440-39-3	Barium	41.8	U		P
7440-41-7	Beryllium	1.0	B		P
7440-43-9	Cadmium	2.5	U		P
7440-70-2	Calcium				
7440-47-3	Chromium	6.5	U		P
7440-48-4	Cobalt	11.5	U		P
7440-50-8	Copper	9.0	U		P
7439-89-6	Iron				
7439-92-1	Lead	10.6			F
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.40			
7440-02-0	Nickel	15.9	U		P
7440-09-7	Potassium				
7782-49-2	Selenium	4.2	U		F
7440-22-4	Silver	7.7	U	N	P
7440-23-5	Sodium				
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	27.0	U		P
7440-66-6	Zinc	156			P
	Cyanide	25	u		CS

F - graphite furnace

P - ICP

CV = cold vapor

B= value between instr. detec limit & contract req. detec. limit.

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Rev. IFB Amendment One

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H 100688

Lab Code: WESCA Case No.: 8813 K.H 100688 SAS No.: SDG No.: 881000 K.H 1006?

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1074.00	106.3	100.0	103.40	103.4	99.00	99.0	F
Arsenic	47.0	48.20	102.6	50.0			50.30	100.6	F
Barium	1980.0	2023.00	102.2	10000.0	10002.00	100.0	10174.00	101.7	P
Beryllium	481.0	458.00	95.2	200.0	198.60	99.3	198.10	99.0	P
Cadmium	489.0	492.70	100.8	200.0	201.90	101.0	198.40	99.2	P
Calcium	49800.0			99999.0					
Chromium	506.0	478.10	94.5	500.0	467.10	93.4	478.60	95.7	P
Cobalt	474.0	491.00	103.6	2000.0	2177.60	108.9	2077.40	103.9	P
Copper	542.0	507.30	93.6	1000.0	1003.60	100.4			P
Iron	1990.0			5000.0					
Lead	97.9	97.00	99.1	50.0	50.90	101.8	52.50	105.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0	473.30	95.4	2000.0	2168.80	108.4	2152.20	107.6	P
Potassium	50200.0			50000.0					
Selenium	104.0	100.20	96.3	50.0	54.80	109.6	54.10	108.2	F
Silver	509.0	479.90	94.3	500.0	494.30	98.9	492.10	98.4	P
Sodium	50700.0			50000.0					
Thallium	97.3	101.80	104.6	50.0	51.60	103.2	50.30	100.6	F
Vanadium	511.0	475.50	93.1	2000.0	1982.70	99.1	1912.50	95.6	P
Zinc	3100.0	3169.00	102.2	1000.0	1070.00	107.0	1082.00	108.2	P
Cyanide	35.0			25.0					

Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 FH 100688

Lab Code: WESCA Case No.: 8813 FH 100688 SAS No.: SDG No.: 881000 FH 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	101.30	101.3	108.50	108.5	F
Arsenic	47.0			50.0	54.80	109.6	50.40	100.8	F
Barium	1980.0	2093.00	105.7	10000.0	10217.00	102.2	10248.00	102.5	P
Beryllium	481.0	459.90	95.6	200.0	194.80	97.4	195.10	97.6	P
Cadmium	489.0			200.0	199.20	99.6	195.00	97.5	P
Calcium	49800.0			99999.0					
Chromium	506.0	472.10	93.3	500.0	484.50	96.9	513.10	102.6	P
Cobalt	474.0	482.40	101.8	2000.0	2028.70	101.4	2017.30	100.9	P
Copper	542.0	499.00	92.1	1000.0	972.10	97.2	965.80	96.6	P
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.90	103.8	52.90	105.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0	445.70	89.9	2000.0	2062.00	103.1	2081.50	104.1	P
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	52.20	104.4	54.80	109.6	F
Silver	509.0	501.60	98.5	500.0	551.50	110.3	494.40	98.9	P
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	49.40	98.8	46.90	93.8	F
Vanadium	511.0	492.40	96.4	2000.0	1955.90	97.8	1930.30	96.5	P
Zinc	3100.0	3076.00	99.2	1000.0	1024.00	102.4	1051.00	105.1	P
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881000 KA 1006

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	101.90	101.9	106.30	106.3	F
Arsenic	47.0			50.0	52.60	105.2	50.70	101.4	F
Barium	1980.0			10000.0	10464.00	104.6			P
Beryllium	481.0			200.0	190.00	95.0			P
Cadmium	489.0			200.0	194.30	97.2	190.50	95.2	P
Calcium	49800.0			99999.0					
Chromium	506.0			500.0	497.40	99.5			P
Cobalt	474.0			2000.0	2021.70	101.1	1984.40	99.2	P
Copper	542.0			1000.0	966.90	96.7			P
Iron	1990.0			5000.0					
Lead	97.9			50.0	52.10	104.2	51.40	102.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0			4.31	86.2	CV
Nickel	496.0			2000.0	2054.20	102.7	2051.10	102.6	P
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	51.40	102.8	49.20	98.4	F
Silver	509.0			500.0	485.20	97.0	512.40	102.5	P
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	48.20	96.4	51.40	102.8	F
Vanadium	511.0			2000.0	2005.20	100.3	1956.90	97.8	P
Zinc	3100.0			1000.0	1049.00	104.9	1064.00	106.4	P
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 100688

Lab Code: WESCA Case No.: 8813 K.H. 100688 SAS No.: SDG No.: 881000 K.H. 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	105.60	105.6	103.40	103.4	F
Arsenic	47.0			50.0	53.90	107.8	51.70	103.4	F
Barium	1980.0			10000.0	1045.00	10.4			P
Beryllium	481.0			200.0	188.00	94.0			P
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0	501.80	100.4			P
Cobalt	474.0			2000.0					
Copper	542.0			1000.0	932.80	93.3			P
Iron	1990.0			5000.0					
Lead	97.3			50.0	48.60	97.2	50.60	101.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0	4.65	93.0			CV
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	47.10	94.2	48.20	96.4	F
Silver	509.0			500.0	504.30	100.9			P
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	51.20	102.4	52.00	104.0	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	95.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881D00 KH 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	99.50	99.5			F
Arsenic	47.0			50.0	50.90	101.8	51.60	103.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.30	102.6	51.60	103.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2	5.12	98.5	5.0	5.35	107.0			CV
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	49.00	98.0	47.20	94.4	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3	97.40	100.1	50.0	48.80	97.6	50.80	101.6	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H 100688

Lab Code: WESCA Case No.: 8813 K.H 100688 SAS No.: SDG No.: 881D00 K.H 1006

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1013.00	100.3	100.0	97.00	97.0	102.10	102.1	F
Arsenic	47.0			50.0	51.60	103.2	53.00	106.0	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	53.90	107.8			F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2	4.87	93.7	5.0	5.03	100.6			CV
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	106.00	101.9	50.0	50.70	101.4	48.60	97.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	50.00	100.0	48.70	97.4	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881000 KH 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	108.60	108.6			F
Arsenic	47.0	48.10	102.3	50.0	48.80	97.6			F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9	100.40	102.6	50.0	49.80	99.6	50.10	100.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	104.75	100.7	50.0	48.40	96.8	49.00	98.0	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	48.70	97.4			F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 F.H. 100688

Lab Code: WESCA Case No.: 8813 F.H. 100688 SAS No.: 1 SDG No.: 881D00 F.H.

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1037.00	102.7	100.0	96.80	96.8	98.20	98.2	F
Arsenic	47.0	49.00	104.3	50.0	50.30	100.6	50.50	101.0	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	50.80	101.6	51.20	102.4	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	48.20	96.4	47.60	95.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3	97.80	100.5	50.0	50.30	100.6	48.60	97.2	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	35.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881D00 KH 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	95.40	95.4	101.00	101.0	F
Arsenic	47.0			50.0	49.50	99.0	49.10	98.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	52.30	104.6	50.60	101.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	45.50	91.0			F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	49.70	99.4	50.40	100.8	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 100688

Lab Code: WESCA Case No.: 8813 K.H. 100688 SAS No.: SDG No.: 881DOO K.H. 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	96.60	96.6	95.20	95.2	F
Arsenic	47.0			50.0	48.70	97.4	50.00	100.0	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9	108.20	110.5	50.0	52.70	105.4	53.00	106.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	105.25	101.2	50.0	50.50	101.0	48.70	97.4	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	49.60	99.2			F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	95.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 K.H. 100688 SAS No.: SDG No.: 881D00 K.H 1006

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	100.30	100.3			F
Arsenic	47.0			50.0	51.80	103.6	48.60	97.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	50.40	100.8	49.90	99.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	48.80	97.6	46.40	92.8	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3	100.40	103.2	50.0	47.10	94.2	48.80	97.6	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881000 K 1006

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	97.60	97.6	96.90	96.9	F
Arsenic	47.0			50.0	49.40	98.8	48.70	97.4	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	49.00	98.0	52.90	105.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	100.25	96.4	50.0	48.50	97.0	49.10	98.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	95.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 100688

Lab Code: WESCA Case No.: 8813 K.H. 100688 SAS No.: SDG No.: 881DOO K.H. 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	100.30	100.3			F
Arsenic	47.0			50.0	48.10	96.2	48.30	96.6	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.30	102.6	49.20	98.4	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	51.80	103.6	49.80	99.6	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 KH 10688 SAS No.: SDG No.: 880100 KH 10688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1010.00	100.0	100.0	106.80	106.8	99.10	99.1	F
Arsenic	47.0			50.0	47.70	95.4	46.60	93.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	50.30	100.6	51.50	103.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	107.29	103.2	50.0	51.40	102.8	51.10	102.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 10688

Lab Code: WESCA Case No.: 8813 K.H. 10688 SAS No.: SDG No.: 881D00 K.H

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0			50.0	47.80	95.6	46.20	92.4	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	53.80	107.6	54.30	108.6	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 K.H 10688 SAS No.: SDG No.: 881BOO K. 1068

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0			50.0	45.70	91.4	46.10	92.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	53.40	106.8	51.00	102.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS   Contract: C88131538 K.H. 10688

Lab Code: WESCA   Case No.: 8813 K.H. 10688   SAS No.:   SDG No.: 881000 K.H. 10688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0	47.90	101.9	50.0	49.30	98.6			F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.20	102.4	49.70	99.4	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 10688

Lab Code: WESCA Case No.: 8813 KH 10688 SAS No.: SDG No.: 881000 KH 10688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0	49.70	105.7	50.0	47.10	94.2	48.40	96.8	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.3			50.0	50.70	101.4			F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 K.H. 10688 SAS No.: 1 SDG No.: 881D00 K 106

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0			50.0					
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9	97.00	99.1	50.0	51.30	102.6	50.00	100.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIP-BLANK

L Name: ROY F. WESTON   Contract: C88-131538

Lab Code: WESCA   Case No.: 7S099   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) WATER   Lab Sample ID: 8807S099-003V

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 88M1VO2482

Level: (low/med) LOW   Date Received: 07/27/88

% Moisture: not dec. ____   Date Analyzed: 08/09/88

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	BJ
67-64-1	Acetone	8	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TRIP-BLANK

L Name: ROY F. WESTON Contract: C88-131538

Lab Code: WESCA Case No.: 7S099 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8807S099-003V

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO2482

Level: (low/med) LOW Date Received: 07/27/88

% Moisture: not dec. ____ Date Analyzed: 08/09/88

Column (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0-00-0	UNKNOWN	6.23	6.0	JX

Organophosphorous Pesticides + Herbicides
8802DOEB

Client: EG&G

Sample ID: 8802DOEB

Sampled: 08/05/88 Matrix: WATER

Received: 08/06/88 RFW Job #: 8808s016

CHLORINATED PHENOXY ACID HERBICIDES SM 509B

Extracted: 08/01/88 Ext Fact: 100
Analyzed: 08/16/88 Dil Fact: 1
Confirmed: NC Blank ID:QA88181

RFW Lab #: 001

Compound	Results (ppb) ug/L	Det Limit Sample ug/L
2.4-D	U	1.00
2.4.5-TP (Silvex)	U	0.10
2.4.5-T	U	0.10

ORGANOPHOSPHOROUS PESTICIDES EPA 614

Extracted: 08/08/88 Ext Fact: 100
Analyzed: 08/23/88 Dil Fact: 1
Confirmed: NC Blank ID:QA88270

RFW Lab #: 001

Compound	Results (ppb) ug/L	Det Limit Sample ug/L
Phorate	U	0.20
Dimethoate	U	0.20
Dioxathion (Delnav)	U	1.00
Diazinon	U	0.30
Disulfoton (DiSyston)	U	0.30
Demeton	U	0.30
Methyl Parathion	U	0.30
Malathion	U	0.40
Ethyl Parathion	U	0.40
DEF	U	0.50
Ethion	U	0.50
Thionazin	U	0.50
Famphur	U	2.00
Azinphos-methyl (Guthion)	U	2.00

U = Compound analyzed for but not detected

Approved:
Declan Cowley
Organic Section Manager

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Pesticide/PCB 8802DOEB

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

8802DOEB

Lab Name: ROY F. WESTON Contract: 68-01-7413

Lab Code: WESCA Case No.: 8SO16 SAS No.: ____ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016 001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: ____

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/29/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
5103-71-9	alpha-Chlordane	0.50	U
5103-74-2	gamma-Chlordane	0.50	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.50	U
11104-28-2	Aroclor-1221	0.50	U
11141-16-5	Aroclor-1232	0.50	U
53469-21-9	Aroclor-1242	0.50	U
12672-29-6	Aroclor-1248	0.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

NON-CLP Semi-VOA 8802DOEB

WESTON ANALYTICS
7720 LORRAINE AVE. SUITE 102
STOCKTON CA 95210 209 957-3405

GC/MS SEMI-VOLATILE ORGANICS ANALYSIS

LAB REFERENCE NUMBER : 8808S016-1
CLIENT SAMPLE ID : 8802SDOEB
REPORT DATE : 08-27-1988

CLIENT NAME : EG&G-RWMC
METHOD : 8270
BLANK ID : 88M3BN1552
SAMPLE TYPE : WATER

DATE SAMPLED : 08/05/88
DATE RECEIVED : 08/06/88
DATE EXTRACTED : 08/08/88
DATE ANALYSED : 08/29/88

108-39-4	10 U	3-METHYLPHENOL	99-35-4	10 U	1,3,5-TRINITROBENZENE
930-55-2	10 U	N-NITROSOPYRROLIDINE	2303-16-4	10 U	DIALLATE
98-86-2	10 U	ACETOPHENONE	62-44-2	10 U	PHENACETIN
59-89-2	10 U	N-NITROSOMORPHOLINE	122-39-4	10 U	DIPHENYLAMINE
95-53-4	10 U	o-TOLUIDINE	99-55-8	10 U	5-NITRO-O-TOLUIDINE
100-75-4	50 U	N-NITROSOPIPERIDINE	92-67-1	10 U	4-AMINOBIPHENYL
122-09-8	10 U	N,N-DIMETHYLPHENETHYLAMINE	23950-58-5	10 U	PRONAMIDE
87-65-0	10 U	2,6-DICHLOROPHENOL	88-85-7	50 U	2-SEC-BUTYL-4,6-DINITROPHENOL
1888-71-7	10 U	HEXACHLOROPROPENE	82-68-8	50 U	PENTACHLORONITROBENZENE
106-50-3	10 U	p-PHENYLENEDIAMINE	56-57-5	20 U	4-NITROQUINOLINE-1-OXIDE
924-16-3	10 U	N-NITROSO-DI-N-BUTYLAMINE	91-80-5	10 U	METHAPYRILENE
94-59-7	10 U	SAFROLE	140-57-8	20 U	ARAMITE
95-94-3	10 U	1,2,4,5-TETRACHLOROBENZENE	510-15-6	10 U	CHLOROBENZILATE
120-58-1	10 U	ISOSAFROLE	60-11-7	10 U	p-DIMETHYLAMINOAZOBEZENE
130-15-4	10 U	1,4-NAPHTHOQUINONE	119-93-7	10 U	3,3'-DIMETHYLBENZIDINE
99-65-0	10 U	1,3-DINITROBENZENE	53-96-3	10 U	2-ACETYLAMINOFLUORENE
608-93-5	10 U	PENTACHLOROBENZENE	57-97-6	10 U	7,12-DIMETHYLBENZ[A]ANTHRACENE
134-32-7	10 U	1-NAPHTHYLAMINE	70-30-4	90 U	HEXACHLOROPHENE
91-59-8	10 U	2-NAPHTHYLAMINE	56-49-5	10 U	3-METHYLCHOLANTHRENE
58-90-2	10 U	2,3,4,6-TETRACHLOROPHENOL			

RESULT UNITS : UG/L

DILUTION FACTOR : 1

U = indicates the compound was analysed for, but not detected.
The numerical value preceeding 'U' is the limit of detection for that compound, based on dilution.
J = indicates an estimated trace value.

ANALYST : ____________

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APPROVED BY : ____________

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

8802DOEB

Lab Name: ROY F. WESTON   Contract: 88131538

Lab Code: WESCA   Case No.: 8S016   SAS No.: ______   SDG No.: 8802DO

Matrix: (soil/water) WATER   Lab Sample ID: 8808S016-1

Sample wt/vol: 1000 (g/mL) ML   Lab File ID: 88M3BN1553

Level: (low/med) LOW   Date Received: 08/06/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 08/08/88

Extraction: (SepF/Cont/Sonc) CONT   Date Analyzed: 08/29/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

8802DOEB

Lab Name: ROY F. WESTON Contract: 88131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-1

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 88M3BN1553

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 08/29/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-10-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-Octylphthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

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(1) - Cannot be separated from Diphenylamine

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8802DOEB

Lab Name: ROY F. WESTON Contract: 88131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-1

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 88M3BN1553

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 08/29/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1/87 Rev.

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

8802DOSB

Lab Name: ROY F. WESTON   Contract: C88-131538

Lab Code: WESCA   Case No.: 8S016   SAS No.: ______   SDG No.: 8802DO

Matrix: (soil/water) WATER   Lab Sample ID: 8808S016-003V

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 88M1VO2517

Level: (low/med) LOW   Date Received: 08/06/88

% Moisture: not dec. ____   Date Analyzed: 08/11/88

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	21	
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	45	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	110	
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	9	
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	81	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	140	
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	72	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

B found in blank
J est value

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8802DOSB

Lab Name: ROY F. WESTON Contract: C88-131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-003V

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO2517

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ Date Analyzed: 08/11/88

Column (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

Metals Data 881DC00EBC
Revised Data Package

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: WESTON ANALYTICS Contract: C8813538

Lab Code: WESCA Case No.: 8813 SAS No.: ______ SDG No.: 88

SOW No.: 7/87

Lab ID. ~~EPA Sample No.~~	EPA Sample No. ~~Lab Sample ID.~~
8806-009-003	881D00EBC
8806-009-003D	881D00EBCD
8806-009-003S	881D00EBCS

Were ICP interelement corrections applied? Yes/No N

Were ICP background corrections applied? Yes/No N
If yes-were raw data generated before
application of background corrections? Yes/No ___

Comments:

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [signature]

Date: 10/7/88

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

88IDC00EC

Lab Name: WESTON ANALYTICS

Contract: 68131538 4/20/88

Lab Code: WESCA   Case No.: 8813 CH 100688   SAS No.:   SDG No.: 881

Matrix (soil/water): WATER   Lab Sample ID: 8806-00

Level (low/med): LOW   Date Received: 06/04/8

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	2.5	U		F
7440-38-2	Arsenic	2.0 ~~4.1~~	U		F
7440-39-3	Barium	41.8	U		P
7440-41-7	Beryllium	1.0	B		P
7440-43-9	Cadmium	2.5	U		P
7440-70-2	Calcium				
7440-47-3	Chromium	6.5	U		P
7440-48-4	Cobalt	11.5	U		P
7440-50-8	Copper	9.0	U		P
7439-89-6	Iron				
7439-92-1	Lead	10.6			F
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.40			
7440-02-0	Nickel	15.9	U		P
7440-09-7	Potassium				
7782-49-2	Selenium	4.2	U		F
7440-22-4	Silver	7.7	U	N	P
7440-23-5	Sodium				
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	27.0	U		P
7440-66-6	Zinc	156			P
	Cyanide	25	u		CA

Color Before: COLORLESS   Clarity Before: CLEAR   Texture:

Color After: COLORLESS   Clarity After: CLEAR   Artifacts:

Comments:

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FORM I - IN

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS   Contract: C88131538 K.H. 100088

Lab Code: WESCA   Case No.: 8813 K.H. 100088   SAS No.:   SDG No.: 881000

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1074.00	106.3	100.0	103.40	103.4	99.00	99.0	F
Arsenic	47.0	48.20	102.6	50.0			50.30	100.6	F
Barium	1980.0	2023.00	102.2	10000.0	10002.00	100.0	10174.00	101.7	P
Beryllium	481.0	458.00	95.2	200.0	198.60	99.3	198.10	99.0	P
Cadmium	489.0	492.70	100.8	200.0	201.90	101.0	198.40	99.2	P
Calcium	49800.0			99999.0					
Chromium	506.0	478.10	94.5	500.0	467.10	93.4	478.60	95.7	P
Cobalt	474.0	491.00	103.6	2000.0	2177.60	108.9	2077.40	103.9	P
Copper	542.0	507.30	93.6	1000.0	1003.60	100.4			P
Iron	1990.0			5000.0					
Lead	97.9	97.00	99.[illegible]	50.0	50.90	101.[illegible]	52.50	105.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0	473.30	95.4	2000.0	2168.30	108.4	2152.20	107.6	P
Potassium	50200.0			50000.0					
Selenium	104.0	100.20	96.3	50.0	54.80	109.6	54.10	108.2	F
Silver	509.0	479.90	94.3	500.0	494.30	98.9	492.10	98.4	P
Sodium	50700.0			50000.0					
Thallium	97.3	101.80	104.6	50.0	51.60	103.2	50.30	100.6	F
Vanadium	511.0	475.50	93.1	2000.0	1982.70	99.1	1912.50	95.6	P
Zinc	3100.0	3169.00	102.2	1000.0	1070.00	107.[illegible]	1082.00	108.2	P
Cyanide	18 ~~25.0~~	15.6	87%	25.0	22.1	88.4			

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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Metals analysis

1α

1

001

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: WESTON Analytics Contract: C88B1538

Lab Code: WESCA Case No.: ~~883~~ [illegible] 85016 SAS No.: ______ SDG No.: 8802D

SOW No.: 787

EPA Sample No.	Lab Sample ID.
8802D0EB	88085016-001
8802D05B	88085016-003

Were ICP interelement corrections applied? Yes/No N

Were ICP background corrections applied? Yes/No No
If yes-were raw data generated before
application of background corrections? Yes/No __

Comments:

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [signature]

Date: 10/7/88

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Metals analysis
8802D0SB
Revised data package

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE
8802D0SB

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 88016 SAS No.: ______ SDG No.: 8[illegible]

Matrix (soil/water): Water Lab Sample ID: 8808S01[illegible]

Level (low/med): Low Date Received: 8/6/8[illegible]

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum				
7440-36-0	Antimony	60.0	u	F	
7440-38-2	Arsenic	48.3		F	
7440-39-3	Barium	200	u	P	
7440-41-7	Beryllium	49.0		P	
7440-43-9	Cadmium	14.2		P	
7440-70-2	Calcium				
7440-47-3	Chromium	43.3		P	
7440-48-4	Cobalt	53.2		P	
7440-50-8	Copper	43.3		P	
7439-89-6	Iron				
7439-92-1	Lead	56.4		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	3.8		CV	N~~*~~
7440-02-0	Nickel	53.7		P	
7440-09-7	Potassium				
7782-49-2	Selenium	12.5		F	
7440-22-4	Silver	10	u	P	N
7440-23-5	Sodium				
7440-28-0	Thallium	10.0	u	F	
7440-62-2	Vanadium	106		P	
7440-66-6	Zinc	~~KP~~ 8 44		P	
	Cyanide				
	TIN	1000	u	P	

Color Before: ________ Clarity Before: ______ Texture: ____

Color After: ________ Clarity After: ______ Artifacts: ____

Comments:

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

8802DOEB

Lab Name: ROY F. WESTON Contract: C88-131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-001V

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO2518

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ Date Analyzed: 08/11/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	8	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8802DOEB

Lab Name: ROY F. WESTON Contract: C88-131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-001V

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO2518

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ Date Analyzed: 08/11/88

Column (pack/cap) PACK Dilution Factor: 1.00

CONCENTRATION UNITS:
Number TICs found: 0 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

8802DOTB

Lab Name: ROY F. WESTON Contract: C88-131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-002V

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO2516

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ Date Analyzed: 08/11/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	8	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

8802DOTB

Lab Name: ROY F. WESTON Contract: C88-131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DO

Matrix: (soil/water) WATER Lab Sample ID: 8808S016-002V

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO2516

Level: (low/med) LOW Date Received: 08/06/88

% Moisture: not dec. ____ Date Analyzed: 08/11/88

Column (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOA 881D00EBA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

881D00EBA (alt)
~~881DEBA~~

Lab Name: ROY F. WESTON Contract: C88131538

Lab Code: WESCA Case No.: EG G09 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-01

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1V01670

Level: (low/med) LOW Date Received: ______

% Moisture: not dec. ____ Date Analyzed: 06/07/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	13	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

88ID00EBA (alt)
~~881DEBA~~ 6/21/88

Lab Name: ROY F. WESTON Contract: C88131538

Lab Code: WESCA Case No.: EG G09 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-01

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO1670

Level: (low/med) LOW Date Received: ______

% Moisture: not dec. ____ Date Analyzed: 06/07/88

Column (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 96-37-7	CYCLOPENTANE, METHYL-	10.30	260	JX
2. 00-00-0	PENTANE, METHYL-	11.84	35	JX
3. 00-00-0	PENTANE, METHYL-	13.30	1700	JX

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VOA 881DOOTBA

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

881D00TBA (ab) ~~881DTBA~~ 6/21/88

Lab Name: ROY F. WESTON Contract: C88131538

Lab Code: WESCA Case No.: EG G09 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-07

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1VO1669

Level: (low/med) LOW Date Received: ______

% Moisture: not dec. ____ Date Analyzed: 06/07/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

881D00TBA (ali)
~~881DTBA~~

Lab Name: ROY F. WESTON Contract: C88131538

Lab Code: WESCA Case No.: EG G09 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-07

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 88M1V01669

Level: (low/med) LOW Date Received: ______

% Moisture: not dec. ____ Date Analyzed: 06/07/88

Column (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NOT FOUND			

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Semi-VOA 881D00EBB

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

881D00EBB

Lab Name: ROY F. WESTON Contract: ______

Lab Code: WESCA Case No.: 06S09 SAS No.: ______ SDG No.: EBB

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 88M3BN1010

Level: (low/med) LOW Date Received: 06/04/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/06/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 06/17/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

881D00EBB

Lab Name: ROY F. WESTON Contract: ____

Lab Code: WESCA Case No.: 06S09 SAS No.: ____ SDG No.: EBB

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 88M3BN1010

Level: (low/med) LOW Date Received: 06/04/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/06/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 06/17/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-10-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	4	J
117-84-0	Di-n-Octylphthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

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1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

881D00EBB

Lab Name: ROY F. WESTON Contract: ______

Lab Code: WESCA Case No.: 06S09 SAS No.: ______ SDG No.: EBB

Matrix: (soil/water) WATER Lab Sample ID: 8806S09-02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 88M3BN1010

Level: (low/med) LOW Date Received: 06/04/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 06/06/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 06/17/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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881D00EBB

Laboratory Name WESTON

Case No 8806509

Sample Number
881D00 EBB

8806509-02

88M3 BN1010

APPENDIX IX REPORT FORM

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	NONE FOUND			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30				

WESTON ANALYTICS
INORGANIC
DATA SUMMARY REPORT

RFW Batch Number: 8806-009   Client: E G & G

Sample Information

RFW Batch ID: 8806-009-006
Customer ID: 881D00EBF
Matrix: Water

Sample Information

Chloride...........................			
Cyanide, Total.....................			
Fluoride...........................	0.4	U	mg/l
Nitrate-Nitrite-Nitrogen...........			
Total Organic Carbon...............			
pH.................................			
Sulfate............................			
Specific Conductance...............			
Turbidity..........................			
Sulfide............................			
Oil and Grease.....................			
Ignitability.......................			
% Solids...........................			
Total Dissolved Solids.............			
HCO3-..............................			
CO3=...............................			
Suspended Solids...................			
Hexavalent Chromium (Cr+6).........			

WESTON ANALYTICS
INORGANIC
DATA SUMMARY REPORT

FW Batch Number: 8806-009 Client: E G & G Page: 1

ample Information

RFW Batch ID:	8806-009-0001BL	8806-009-0001BS	8806-009-005
Customer ID:	BLANK	BLANK SPIKE	881D00EBE
Matrix:	Water	Water	Water

ample Information

iloride..........................			
'anide, Total.....................			
.uoride..........................	0.4 U mg/l	96 % mg/l	
'trate-Nitrite-Nitrogen...........			
otal Organic Carbon..............			
|................................			
ilfate...........................			
ecific Conductance...............			
:rbidity.........................			
.lfide...........................	1.0 U mg/l	100 % mg/l	1.0 U mg/l
l and Grease.....................			
nitability.......................			
Solids...........................			
tal Dissolved Solids.............			
03-			
3=...............................			
spended Solids...................			
xavalent Chromium (Cr+6).........			

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WESTON ANALYTICS
DIOXINS/FURANS DATA SUMMARY

RFW Batch Number: 8809-738		Client:	EG & G		Page: 2
Sample Information	Client ID:	8802D0EB	BLANK (177)	B.S. (177)	B.S.D. (177)
	RFW#:	003	BLANK	B.S.	B.S.D.
	D.F.:	1	1	1	1
	Matrix:	Water	Water	Water	Water
	Units:	Ng/L	Ng/L	Ng/L	Ng/L
C-13 TCDD RECOVERY:		54%	80%	83%	72%
C-13 OCDD RECOVERY:		55%	86%	89%	72%

	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD
PCDD'S										
2,3,7,8-TCDD..............	ND	0.59	ND	0.13	44	NA	50	NA		
TCDD......................	ND	0.17	ND	0.13	44	NA	50	NA		
PeCDD.....................	ND	0.16	ND	0.12	ND	0.13	ND	0.11		
HxCDD.....................	ND	0.15	ND	0.10	ND	0.03	ND	0.08		
HpCDD.....................	ND	0.26	ND	0.33	ND	0.08	ND	0.20		
OCDD......................	ND	0.44	ND	0.18	84	NA	92	NA		
PCDF'S										
2,3,7,8-TCDF..............	ND	0.08	ND	0.08	ND	0.12	ND	0.05		
TCDF......................	ND	0.08	ND	0.08	ND	0.12	ND	0.05		
PeCDF.....................	ND	0.10	ND	0.14	ND	0.05	ND	0.15		
HxCDF.....................	ND	0.13	ND	0.11	ND	0.03	ND	0.07		
HpCDF.....................	ND	0.30	ND	0.24	ND	0.13	ND	0.15		
OCDF......................	ND	0.39	ND	0.24	ND	0.05	ND	0.06		

CONC CONCENTRATION
ND NONE DETECTED
NA NOT APPLICABLE
LOD LIMIT OF DETECTION

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WESTON ANALYTICS
DIOXINS/FURANS DATA SUMMARY

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RFW Batch Number: 8809-738 Client: EG & G Page: 1

Sample Information						
	Client ID:	8801D48C	8801D49C	BLANK (176)	B.S. (176)	8801D48C
	RFW#:	001	002	BLANK	B.S.	001 MS
	D.F.:	1	1	1	1	1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	Units:	Ng/g	Ng/g	Ng/g	Ng/g	Ng/g
C-13 TCDD RECOVERY:		40%	46%	54%	50%	42%
C-13 OCDD RECOVERY:		25%	54%	36%	17%	65%

	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD
PCDD'S										
2,3,7,8-TCDD..............	ND	0.02	ND	0.05	ND	0.03	4.4	NA	3.9	NA
TCDD......................	ND	0.02	ND	0.05	ND	0.03	4.4	NA	3.9	NA
PeCDD.....................	ND	0.03	ND	0.05	ND	0.05	ND	0.06	ND	0.04
HxCDD.....................	ND	0.02	ND	0.06	ND	0.02	ND	0.02	ND	0.06
HpCDD.....................	ND	0.09	ND	0.04	ND	1.4	ND	0.62	ND	0.02
OCDD......................	1.6	NA	ND	0.05	ND	0.09	7.5	NA	7.5	NA
PCDF'S										
2,3,7,8-TCDF..............	ND	0.01	ND	0.04	ND	0.03	ND	0.03	ND	0.03
TCDF......................	ND	0.01	ND	0.04	ND	0.03	ND	0.03	ND	0.03
PeCDF.....................	ND	0.02	ND	0.03	ND	0.03	ND	0.04	ND	0.04
HxCDF.....................	ND	0.03	ND	0.07	ND	0.03	ND	0.04	ND	0.07
HpCDF.....................	ND	0.07	ND	0.07	ND	0.20	ND	0.40	ND	0.05
OCDF......................	ND	0.11	ND	0.07	ND	0.03	ND	0.15	ND	0.06

Copy 2

CONC CONCENTRATION
ND NONE DETECTED
NA NOT APPLICABLE
LOD LIMIT OF DETECTION

8802DOEB
old package

03

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO
8802DOEB

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802

Matrix (soil/water): water Lab Sample ID: 8808S016-0

Level (low/med): Low Date Received: 08/06/88

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic	10.0	u	F	
7440-39-3	Barium	200	u	P	
7440-41-7	Beryllium	5	u	P	
7440-43-9	Cadmium	5	u	P	
7440-70-2	Calcium				
7440-47-3	Chromium	10	u	P	
7440-48-4	Cobalt	50	u	P	
7440-50-8	Copper	25	u	P	
7439-89-6	Iron				
7439-92-1	Lead	29.8		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel	40	u	P	
7440-09-7	Potassium				
7782-49-2	Selenium	5.0	u	F	
7440-22-4	Silver	10	u	P	
7440-23-5	Sodium				
7440-28-0	Thallium	10.0	u	F	
7440-62-2	Vanadium	50.0	u	P	
7440-66-6	Zinc	20	u	P	
	Cyanide	2.5	u	UV	
~~Fin~~	Tin	1000	u	P	
	Fluoride	500	u	IC	

Color Before: ______ Clarity Before: ______ Texture: ______

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

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8802-D05B
Old package

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO. 8802D05B

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 88016 SAS No.: ______ SDG No.: 8802

Matrix (soil/water): Water Lab Sample ID: 8808S016-

Level (low/med): Low Date Received: 8/6/88

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic	48.3		F	
7440-39-3	Barium	200	u	P	
7440-41-7	Beryllium	49.0		P	
7440-43-9	Cadmium	14.2		P	
7440-70-2	Calcium				
7440-47-3	Chromium	43.3		P	
7440-48-4	Cobalt	53.2		P	
7440-50-8	Copper	43.3		P	
7439-89-6	Iron				
7439-92-1	Lead	56.4		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel	53.7		P	
7440-09-7	Potassium				
7782-49-2	Selenium	12.5		F	
7440-22-4	Silver	10	u	P	
7440-23-5	Sodium				
7440-28-0	Thallium	10.0	U	F	
7440-62-2	Vanadium	106		P	
7440-66-6	Zinc	~~KP~~ 3.44		P	
	Cyanide				
	TIN	1000	u	P	

Color Before: ______ Clarity Before: ______ Texture: ______

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

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Metals Data
8802D0EB
OLD PACKAGE

Copy

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
8802D0EB

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802D

Matrix (soil/water): Water Lab Sample ID: 8808S016-00

Level (low/med): Low Date Received: 08/06/88

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic	10.0	U	F	
7440-39-3	Barium	200	U	P	
7440-41-7	Beryllium	5	U	P	
7440-43-9	Cadmium	5	U	P	
7440-70-2	Calcium				
7440-47-3	Chromium	10	U	P	
7440-48-4	Cobalt	50	U	P	
7440-50-8	Copper	25	U	P	
7439-89-6	Iron				
7439-92-1	Lead	29.8		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel	40	U	P	
7440-09-7	Potassium				
7782-49-2	Selenium	5.0	U	F	
7440-22-4	Silver	10	U	P	
7440-23-5	Sodium				
7440-28-0	Thallium	10.0	U	F	
7440-62-2	Vanadium	50.0	U	P	
7440-66-6	Zinc	20	U	P	
	Cyanide	2.5	U	UV	
~~Tin~~	TIN	1000	U	P	
	Fluoride	500	U	IC	

Color Before: ______ Clarity Before: ______ Texture: ______

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

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8802D05B
Copy

3

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

8802D05B

Lab Name: WESTON Analytics   Contract: C88131538

Lab Code: WESCA   Case No.: 88016   SAS No.: ______   SDG No.: 8802D

Matrix (soil/water): Water   Lab Sample ID: 88085016-0C

Level (low/med): Low   Date Received: 8/6/88

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic	48.3		F	
7440-39-3	Barium	200	U	P	
7440-41-7	Beryllium	49.0		P	
7440-43-9	Cadmium	14.2		P	
7440-70-2	Calcium				
7440-47-3	Chromium	43.3		P	
7440-48-4	Cobalt	53.2		P	
7440-50-8	Copper	43.3		P	
7439-89-6	Iron				
7439-92-1	Lead	56.4		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel	53.7		P	
7440-09-7	Potassium				
7782-49-2	Selenium	12.5		F	
7440-22-4	Silver	10	U	P	
7440-23-5	Sodium				
7440-28-0	Thallium	10.0	U	F	
7440-62-2	Vanadium	106		P	
7440-66-6	Zinc	KP & 44		P	
	Cyanide				
	TIN	1000	U	P	

Color Before: ______   Clarity Before: ______   Texture: ______

Color After: ______   Clarity After: ______   Artifacts: ______

Comments:

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802D0E

Initial Calibration Source: EMSL - LV

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									
Antimony									
Arsenic	50.0	50.1	100	50.0	51.2	102	48.6	97	F
Barium	2010	2024	99	10,000	10003	100	10229	102	P
Beryllium	501	468.2	93	200	197.7	99	204.6	102	P
Cadmium	492	487.8	99	200	191.2	95	195.8	98	P
Calcium									
Chromium	503	472.9	94	500	511.5	102	527.8	105	P
Cobalt	498	487.3	98	2000	1917.2	96	1946.3	97	P
Copper	520	497.4	96	1000	994.5	99	1022.3	102	P
Iron									
Lead	25.0	25.7	103	25	25.7	103	24.1	96	F
Magnesium									
Manganese									
Mercury									
Nickel	485	4581	94	2000	1903.5	95	1947.6	97	P
Potassium									
Selenium	50.0	54.8	110	50.0	50.3	101	47.5	95	F
Silver	484	494.0	102	500	490.8	98	486.1	97	P
Sodium									
Thallium	25	25.7	103	25	25.1	100	23.1	92	F
Vanadium	505	502	99	2000	2081	104	2044	102	P
Zinc	2920	2969	102	1000	1013	101	1024	102	P
Cyanide	50.0	48.0	96	50.0	43.8	88			
TIN	~~50~~ 5000	5114	103	5000	5080	102	5063	101	P

Jewh

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802D0E

Initial Calibration Source: EMSL-LV

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									
Antimony									
Arsenic									
Barium				10000	10104	101	10197	102	P
Beryllium				200	214	107	208	104	P
Cadmium				200	202	101	207	105	P
Calcium									
Chromium				500	545	109	526	105	P
Cobalt				2000	1971	98	2032	102	P
Copper				1000	1074	107	1060	106	P
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel				2000	1990	99	2059	103	P
Potassium									
Selenium									
Silver				500	485	97	475	95	P
Sodium									
Thallium									
Vanadium				2000	2030	101	1991	99	P
Zinc				1006	1025	102	1020	102	P
Cyanide									

Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2B

CRDL STANDARD FOR AA AND ICP

Lab Name: WESTON ANALITICS Contract: C88131538

Lab Code: WESCH Case No.: 8016 SAS No.: ______ SDG No.: 8807DUE

AA CRDL Standard Source: Johnson Mathey

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA True	CRDL Standard for AA Found	CRDL Standard for AA %R	CRDL Standard for ICP True	Initial Found	Initial %R	Final Found	Final %R
Aluminum								
Antimony								
Arsenic	10	11.1	111					
Barium					-220		220	NR
Beryllium				10	9.4	94.	10.6	106
Cadmium				10	10.6	106	13.7	137
Calcium								
Chromium				20	18.3	91	17.5	87
Cobalt				100	98.0	98	113.4	113
Copper				50	51.1	102	50.4	101
Iron								
Lead	5.0	4.6	92					
Magnesium								
Manganese								
Mercury								
Nickel				80	82.6	103	94.6	118
Potassium								
Selenium	5.0	4.6	92					
Silver				20	17.2	86	21.8	109
Sodium								
Thallium	10.0	11.0	110					
Vanadium				100	97.0	97	91.0	91
Zinc				40	98.0	245	92.0	230
TIN								

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3
BLANKS

Lab Name: WESTON ANALYTICS Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802D06

Preparation Blank Matrix (soil/water): Water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											
Antimony											
Arsenic	10.0	U	10.0	U	10.0	U			10.0	U	F
Barium	~~40~~ 200	U	200	U	200	U	200	U	200	U	P
Beryllium	5	U	5	U	5	U	5	U	5	U	P
Cadmium	5	U	5	U	5	U	5	U	5	U	P
Calcium											
Chromium	10	U	10	U	10	U	10	U	10	U	P
Cobalt	50	U	50	U	50	U	50	U	50	U	P
Copper	25	U	25	U	25	U	25	U	25	U	P
Iron											
Lead	5.0 ~~10.0~~	U	5.0	U	5.0	U			5.0	U	F
Magnesium											
Manganese											
Mercury											
Nickel	40	U	40	U	40	U	40	U	40	U	P
Potassium											
Selenium	5.0	U	5.0	U	5.0	U			5.0	U	F
Silver	10	U	10	U	10	U	10	U	10	U	P
Sodium											
Thallium	10.0	U	10.0	U	10.0	U			10.0	U	F
Vanadium	50	U	50	U	50	U	50	U	50	U	P
Zinc	20	U	20	U	20	U	20	U	20	U	P
Cyanide	2.5	U	2.5	U					2.5	U	VV
TIN	1000	U	1000	U					1000	U	P

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3
BLANKS

Lab Name: WESTON ANALYTICS   Contract: C88131538

Lab Code: WESCA   Case No.: 85016   SAS No.: ______   SDG No. 8802D6E

Preparation Blank Matrix (soil/water): Water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium	200	u	200	u							P
Beryllium	5	u	5	u							P
Cadmium	5	u	5	u							P
Calcium											
Chromium	10	u	10	u							P
Cobalt	50	u	50	u							P
Copper	25	u	25	u							P
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel	40	u	40	u							P
Potassium											
Selenium											
Silver	10	u	10	u	10	u			10	u	P
Sodium											
Thallium											
Vanadium	50	u	50	u	50	u					P
Zinc	20	u	20	u							P
Cyanide											
TIN	1000	u	1000	u							P

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: WESTON ANALYTICS Contract: 68D13158

Lab Code: WESCH Case No: 8506 SAS No.: ______ SDG No.: 880200E

ICP ID Number: ICP6500 ICS Source: EMSL-LV

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium	0	483	35	478	99	13	493	102
Beryllium	0	474	1.3	419	88	1.8	450	95
Cadmium	0	909	135.3	1013	111	142.8	1009	111
Calcium								
Chromium	0	513	75.6	510	99	73.6	546	106
Cobalt	0	478	38.6	467.6	98	41.2	469.0	98
Copper	0	534	3.0	488	91	1.2	515.3	96
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel	0	916	55.5	843.2	92	54.9	[illegible]	94
Potassium								
Selenium								
Silver	0	934	-8.3	1016	109	-14.5	1050	112
Sodium								
Thallium								
Vanadium	0	475	48	504	106	38	512	108
Zinc	0	973	88	954	98	800	919	94
TIN			NR	NR		NR	NR	

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.: 8802D0EB

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802D0E

Matrix (soil/water): Water Level (low/med): Low

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									
Antimony									
Arsenic									
Barium	75-125	1972		200	U	2000	98.6		P
Beryllium	75-125	51.1		5.0	U	50.0	102		P
Cadmium	75-125	50.7		5.0	U	50.0	101		P
Calcium									
Chromium	75-125	203		100	U	200.	101		P
Cobalt	75-125	495.3		50.0	U	500	99.1		P
Copper	75-125	272		25.0	U	250	109		P
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel	75-125	477.8		40.0	U	500	96		P
Potassium									
Selenium									
Silver	75-125	10.0	U	10.0	U	50.0	0		P
Sodium									
Thallium									
Vanadium	75-125	463		~~500~~ 50.0	U	500	92.6		P
Zinc	75-125	479		20.0	U	500	96		P
Cyanide									
TIN	75-125	1000	U	1000	U	5000	NR		P

Comments:

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5B
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: WESTON Analytics Contract: C88B1538

Lab Code: WESCA Case No.: 8501b SAS No.: ______ SDG No.: 8802D0E

Matrix (soil/water): Water Level (low/med): Low

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

8802D0EB

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802D0E

Matrix (soil/water): Water Level (low/med): Low

% Solids for Sample: 0 % Solids for Duplicate: 0

Concentration Units (ug/L or mg/kg dry weight): ug/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								
Antimony								
Arsenic								
Barium	20	200	U	200	U	NC		P
Beryllium	20	5.0	U	5.0	U	NC		P
Cadmium	20	5.0	U	5.0	U	NC		P
Calcium								
Chromium	20	10.0	U	10.0	U	NC		P
Cobalt	20	50.0	U	50.0	U	NC		P
Copper	20	25.0	U	25.0	U	NC		P
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel	20	40.0	U	40.0	U	NC		P
Potassium								
Selenium								
Silver	20	10.0	U	10.0	U	NC		P
Sodium								
Thallium								
Vanadium	20	50.0	U	50.0	U	NC		P
Zinc	20	20.0	U	20.0	U	NC		P
Cyanide								
TIN	20	1000	U	1000	U	NC		P

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7
LABORATORY CONTROL SAMPLE

Lab Name: Weston Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802DOE

Solid LCS Source: ____________

Aqueous LCS Source: SPEX

	Aqueous (ug/L)			Solid (mg/kg)					
Analyte	True	Found	%R	True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic	50.0	50.6	103						
Barium	10000	9966	99						
Beryllium	200	198	99						
Cadmium	200	189	94						
Calcium									
Chromium	500	478	96						
Cobalt	2000	1849	92						
Copper	1000	968	97						
Iron									
Lead	50.0	50.3	101						
Magnesium									
Manganese									
Mercury									
Nickel	2000	1772	89						
Potassium									
Selenium	50.0	52.[illegible]	105						
Silver	500 ~~496~~	496	99						
Sodium									
Thallium	50.0	45.7	90						
Vanadium	2000	1899	95						
Zinc	2000	2640	88						
Cyanide									
TIN	5000	4906	99						

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8
STANDARD ADDITION RESULTS

Lab Name: Weston Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No.: 8802DOE

Concentration Units: ug/L

EPA Sample No.	An	Dil	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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9
ICP SERIAL DILUTIONS

EPA SAMPLE NO.

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCIA Case No.: 85016 SAS No.: ______ SDG No.: 8802DOE

Matrix (soil/water): Water Level (low/med): Low

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							
Antimony							
Arsenic							
Barium					NR		P
Beryllium					NR		P
Cadmium					NR		P
Calcium							
Chromium					NR		P
Cobalt					NR		P
Copper					NR		P
Iron							
Lead							
Magnesium							
Manganese							
Mercury							
Nickel					NR		P
Potassium							
Selenium							
Silver					NR		P
Sodium							
Thallium					~~NR~~		
Vanadium					NR		P
Zinc					NR		P
TIN					NR		P

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10
HOLDING TIMES

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 8S016 SAS No.: ______ SDG No.: 8802DOE

EPA Sample No.	Matrix	Date Received	Mercury Prep Date	Mercury Holding Time	Cyanide Prep Date	Cyanide Holding Time
8802DOE13	WATER	08/06/88	08/15/88	9	08/10/88	4
8802DOSB	WATER	08/06/88	08/15/88	9	~~08/15/88~~ Rco 10h	

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11
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 8546 SAS No.: ______ SDG No. 8802 D0(

ICP ID Number: ICP6500 Date: 10/7/88

Flame AA ID Number: ~~PE30302~~ 10/7

Furnace AA ID Number: PE3030Z

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		
Antimony			60		
Arsenic	193.70	BZ	10		
Barium	455.40		200	200	P
Beryllium	313.04		5	5	P
Cadmium	214.44		5	5	P
Calcium			5000		
Chromium	267.72		10	10	P
Cobalt	228.62		50	50	P
Copper	324.75		25	25	P
Iron			100		
Lead	283.3	BZ	5		
Magnesium			5000		
Manganese			15		
Mercury			0.2		
Nickel	231.60		40	40	P
Potassium			5000		
Selenium	196.0	BZ	5		
Silver	328.07		10	10	P
Sodium			5000		
Thallium	276.8	BZ	10		
Vanadium	292.40		50	50	P
Zinc	213.86		20	20	P
TIN	189.926		5000	5000	P

Comments:

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12A
ICP INTERELEMENT CORRECTION FACTORS (QUARTERLY)

Lab Name: WESTON ANALYTICS   Contract: C88131538

Lab Code: WESCA   Case No.: 88016   SAS No.: ______   SDG No.: 8802DOE

ICP ID Number: ICP6500   Date: 10/7/88

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	__
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

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12B
ICP INTERELEMENT CORRECTION FACTORS (QUARTERLY)

Lab Name: WESTON Analytics   Contract: C88131538

Lab Code: WESCA   Case No.: 85016   SAS No.: ______   SDG No.: 8802D0E

ICP ID Number: ICP6SDO   Date: 10/7/88

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		__	__	__	__	__
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

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13
ICP LINEAR RANGES (QUARTERLY)

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 85016 SAS No.: ______ SDG No. 8802DOE

ICP ID Number: ICP6500 Date: 10/7/88

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum			
Antimony			
Arsenic			
Barium			
Beryllium			
Cadmium			
Calcium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Nickel			
Potassium			
Selenium			
Silver			
Sodium			
Thallium			
Vanadium			
Zinc			

Comments:

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Metals Data
881DOOEBC
Old package

002

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EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

881DC00EBC

Lab Name: WESTON ANALYTICS   Contract: C88131538

Lab Code: WESCA   Case No.: 8813   SAS No.:   SDG No.: 881DOO

Matrix (soil/water): WATER   Lab Sample ID: 8806-009-005

Level (low/med): LOW   Date Received: 06/04/88

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	2.5	U		F
7440-38-2	Arsenic	4.4	U		F
7440-39-3	Barium	41.8	U		P
7440-41-7	Beryllium	1.0	B		P
7440-43-9	Cadmium	2.5	U		P
7440-70-2	Calcium				
7440-47-3	Chromium	6.5	U		P
7440-48-4	Cobalt	11.5	U		P
7440-50-8	Copper	9.0	U		P
7439-89-6	Iron				
7439-92-1	Lead	10.6			F
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.40			
7440-02-0	Nickel	15.9	U		P
7440-09-7	Potassium				
7782-49-2	Selenium	4.2	U		F
7440-22-4	Silver	7.7	U	N	P
7440-23-5	Sodium				
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	27.0	U		P
7440-66-6	Zinc	156			P
	Cyanide	25	u		CA

Color Before: COLORLESS   Clarity Before: CLEAR   Texture:

Color After: COLORLESS   Clarity After: CLEAR   Artifacts:

Comments:

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H 100688

Lab Code: WESCA Case No.: 8813 K.H 100688 SAS No.: SDG No.: 881D00 K.H 100

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1074.00	106.3	100.0	103.40	103.4	99.00	99.0	F
Arsenic	47.0	48.20	102.6	50.0			50.30	100.6	F
Barium	1980.0	2023.00	102.2	10000.0	10002.00	100.0	10174.00	101.7	P
Beryllium	481.0	458.00	95.2	200.0	198.60	99.3	198.10	99.0	P
Cadmium	489.0	492.70	100.8	200.0	201.90	101.0	198.40	99.2	P
Calcium	49800.0			99999.0					
Chromium	506.0	478.10	94.5	500.0	467.10	93.4	478.60	95.7	P
Cobalt	474.0	491.00	103.6	2000.0	2177.60	108.9	2077.40	103.9	P
Copper	542.0	507.30	93.6	1000.0	1003.60	100.4			P
Iron	1990.0			5000.0					
Lead	97.9	97.00	99.1	50.0	50.90	101.8	52.50	105.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0	473.30	95.4	2000.0	2168.80	108.4	2152.20	107.6	P
Potassium	50200.0			50000.0					
Selenium	104.0	100.20	96.3	50.0	54.80	109.6	54.10	108.2	F
Silver	509.0	479.90	94.3	500.0	494.30	98.9	492.10	98.4	P
Sodium	50700.0			50000.0					
Thallium	97.3	101.80	104.6	50.0	51.60	103.2	50.30	100.6	F
Vanadium	511.0	475.50	93.1	2000.0	1982.70	99.1	1912.50	95.6	P
Zinc	3100.0	3169.00	102.2	1000.0	1070.00	107.0	1082.00	108.2	P
Cyanide	35.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 FH 100688

Lab Code: WESCA Case No.: 8813 FH 100688 SAS No.: SDG No.: ~~881000~~ FH 100

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	101.30	101.3	108.50	108.5	F
Arsenic	47.0			50.0	54.80	109.6	50.40	100.8	F
Barium	1980.0	2093.00	105.7	10000.0	10217.00	102.2	10248.00	102.5	P
Beryllium	481.0	459.90	95.6	200.0	194.80	97.4	195.10	[illegible]	P
Cadmium	489.0			200.0	199.20	99.6	195.00	97.5	P
Calcium	49800.0			99999.0					
Chromium	506.0	472.10	93.3	500.0	484.50	96.9	513.10	102.6	P
Cobalt	474.0	482.40	101.8	2000.0	2028.70	101.4	2017.30	100.9	P
Copper	542.0	499.00	92.1	1000.0	972.10	97.2	965.80	96.6	P
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.90	103.8	52.90	105.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0	445.70	89.9	2000.0	2062.00	103.1	2081.50	104.1	P
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	52.20	104.4	54.80	109.6	F
Silver	509.0	501.60	98.5	500.0	551.50	110.3	494.40	98.9	P
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	49.40	98.8	46.90	93.8	F
Vanadium	511.0	492.40	96.4	2000.0	1955.90	97.8	1930.30	96.5	P
Zinc	3100.0	3076.00	99.2	1000.0	1024.00	102.4	1051.00	105.1	P
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K-H 100688

Lab Code: WESCA Case No.: 8813 K-H 100688 SAS No.: SDG No.: 881000 K-H 10

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	101.90	101.9	106.30	106.3	F
Arsenic	47.0			50.0	52.60	105.2	50.70	101.4	F
Barium	1980.0			10000.0	10464.00	104.6			P
Beryllium	481.0			200.0	190.00	95.0			P
Cadmium	489.0			200.0	194.30	97.2	190.50	95.2	P
Calcium	49800.0			99999.0					
Chromium	506.0			500.0	497.40	99.5			P
Cobalt	474.0			2000.0	2021.70	101.1	1984.40	99.2	P
Copper	542.0			1000.0	966.90	96.7			P
Iron	1990.0			5000.0					
Lead	97.3			50.0	52.10	104.2	51.40	102.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0			4.31	86.2	CV
Nickel	496.0			2000.0	2054.20	102.7	2051.10	102.6	P
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	51.40	102.8	49.20	98.4	F
Silver	509.0			500.0	485.20	97.0	512.40	102.5	P
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	48.20	96.4	51.40	102.8	F
Vanadium	511.0			2000.0	2005.20	100.3	1956.90	97.8	P
Zinc	3100.0			1000.0	1049.00	104.9	1064.00	106.4	P
Cyanide	95.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881000 KH 100

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	105.60	105.6	103.40	103.4	F
Arsenic	47.0			50.0	53.90	107.8	51.70	103.4	F
Barium	1980.0			10000.0	1045.00	10.4			P
Beryllium	481.0			200.0	188.00	94.0			P
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0	501.80	100.4			P
Cobalt	474.0			2000.0					
Copper	542.0			1000.0	932.80	93.3			P
Iron	1990.0			5000.0					
Lead	97.3			50.0	48.60	97.2	50.60	101.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0	4.65	93.0			CV
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	47.10	94.2	48.20	96.4	F
Silver	509.0			500.0	504.30	100.9			P
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	51.20	102.4	52.00	104.0	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	95.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10.06.88

Lab Code: WESCA Case No.: 8813 K.H. 10.06.88 SAS No.: SDG No.: 881D00 K.H. 10.06.88

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	99.50	99.5			F
Arsenic	47.0			50.0	50.90	101.8	51.60	103.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.30	102.6	51.60	103.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2	5.12	98.5	5.0	5.35	107.0			CV
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	49.00	98.0	47.20	94.4	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3	97.40	100.1	50.0	48.80	97.6	50.80	101.6	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS   Contract: C88131538 K.H. 100688

Lab Code: WESCA   Case No.: 8813 K.H. 100688   SAS No.:   SDG No.: 881D00 K.H.

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1013.00	100.3	100.0	97.00	97.0	102.10	102.1	F
Arsenic	47.0			50.0	51.60	103.2	53.00	106.0	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	53.90	107.8			F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2	4.87	93.7	5.0	5.03	100.6			CV
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	106.00	101.9	50.0	50.70	101.4	48.60	97.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	50.00	100.0	48.70	97.4	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	35.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881000 KH 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	108.60	108.6			F
Arsenic	47.0	48.10	102.3	50.0	48.80	97.6			F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9	100.40	102.6	50.0	49.80	99.6	50.10	100.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	104.75	100.7	50.0	48.40	96.8	49.00	98.0	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	48.70	97.4			F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	95.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 F.H00688

Lab Code: WESCA Case No.: 8813 F.H00688 SAS No.: 1 SDG No.: 881DCC

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1037.00	102.7	100.0	96.80	96.8	98.20	98.2	F
Arsenic	47.0	49.00	104.3	50.0	50.30	100.6	50.50	101.0	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	50.80	101.6	51.20	102.4	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	48.20	96.4	47.60	95.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3	97.80	100.5	50.0	50.30	100.6	48.60	97.2	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 FH 100688

Lab Code: WESCA Case No.: 8813 FH 100688 SAS No.: SDG No.: 881D00 FH 100

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	95.40	95.4	101.00	101.0	F
Arsenic	47.0			50.0	49.50	99.0	49.10	98.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	52.30	104.6	50.60	101.2	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	45.50	91.0			F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	49.70	99.4	50.40	100.8	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881D00

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	96.60	96.6	95.20	95.2	F
Arsenic	47.0			50.0	48.70	97.4	50.00	100.0	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.3	108.20	110.5	50.0	52.70	105.4	53.00	106.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	105.25	101.2	50.0	50.50	101.0	48.70	97.4	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0	49.60	99.2			F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: 68813L538 K.H. 100688

Lab Code: WESCA Case No.: 8813 K.H. 100688 SAS No.: SDG No.: 881D00 K.H. 100688

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	100.30	100.3			F
Arsenic	47.0			50.0	51.80	103.6	48.60	97.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.3			50.0	50.40	100.8	49.90	99.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	48.80	97.6	46.40	92.8	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3	100.40	103.2	50.0	47.10	94.2	48.80	97.6	F
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 KH 100688

Lab Code: WESCA Case No.: 8813 KH 100688 SAS No.: SDG No.: 881000

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	97.60	97.6	96.90	96.9	F
Arsenic	47.0			50.0	49.40	98.8	48.70	97.4	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	37.9			50.0	49.00	98.0	52.90	105.8	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	100.25	96.4	50.0	48.50	97.0	49.10	98.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88B1538 K.H. 100688

Lab Code: WESCA Case No.: 8813 K.H. 100688 SAS No.: SDG No.: 881000 K. 1006

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0	100.30	100.3			F
Arsenic	47.0			50.0	48.10	96.2	48.30	96.6	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.30	102.6	49.20	98.4	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0	51.80	103.6	49.80	99.6	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 KH 10688 SAS No.: SDG No.: 880100

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0	1010.00	100.0	100.0	106.90	106.9	99.10	99.1	F
Arsenic	47.0			50.0	47.70	95.4	46.60	93.2	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	50.30	100.6	51.50	103.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0	107.29	103.2	50.0	51.40	102.8	51.10	102.2	F
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C8813153 8 K.H. 10688

Lab Code: WESCA Case No.: 8813 K.H. 10688 SAS No.: SDG No.: 881000k

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0			50.0	47.80	95.6	46.20	92.4	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	53.90	107.8	54.30	108.6	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 K.H 10688 SAS No.: SDG No.: 881800

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0			50.0	45.70	91.4	46.10	92.2	[illegible]
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	53.40	106.8	51.00	102.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 K.H. 10688 SAS No.: SDG No.: 881D00 K.H. 1068

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0	47.90	101.9	50.0	49.30	98.6			F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.9			50.0	51.20	102.4	49.70	99.4	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS　　　　Contract: C88131538 KH 10688

Lab Code: WESCA　　Case No.: 8813 KH 10688　　SAS No.:　　SDG No.: 881000 K 1068

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0	49.70	105.7	50.0	47.10	94.2	48.40	96.8	F
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.3			50.0	50.70	101.4			F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WESTON ANALYTICS Contract: C88131538 K.H. 10688

Lab Code: WESCA Case No.: 8813 K.H. 10688 SAS No.: 1 SDG No.: 88TP00 KH

Initial Calibration Source: EPA-EMSL

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	1980.0			5000.0					
Antimony	1010.0			100.0					
Arsenic	47.0			50.0					
Barium	1980.0			10000.0					
Beryllium	481.0			200.0					
Cadmium	489.0			200.0					
Calcium	49800.0			99999.0					
Chromium	506.0			500.0					
Cobalt	474.0			2000.0					
Copper	542.0			1000.0					
Iron	1990.0			5000.0					
Lead	97.3	97.00	99.7	50.0	51.30	102.6	50.00	100.0	F
Magnesium	25000.0			99999.0					
Manganese	513.0			500.0					
Mercury	5.2			5.0					
Nickel	496.0			2000.0					
Potassium	50200.0			50000.0					
Selenium	104.0			50.0					
Silver	509.0			500.0					
Sodium	50700.0			50000.0					
Thallium	97.3			50.0					
Vanadium	511.0			2000.0					
Zinc	3100.0			1000.0					
Cyanide	85.0			25.0					

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE

8801D49E

Lab Name: WESTON Analytics Contract: C88131538

Lab Code: WESCA Case No.: 75099 SAS No.: ______ SDG No.: 8801E

Matrix (soil/water): Soil Lab Sample ID: 8807S099a

Level (low/med): Low Date Received: 7/21/8.

% Solids: 80.5

Concentration Units (ug/L or mg/kg dry weight): MG/Kg

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum				
7440-36-0	Antimony	14.4	U	F	N
7440-38-2	Arsenic	14.3		F	NS
7440-39-3	Barium	348		P	
7440-41-7	Beryllium	1.6		P	
7440-43-9	Cadmium	7.8		P	*
7440-70-2	Calcium				
7440-47-3	Chromium	33.4		P	
7440-48-4	Cobalt	13.4		P	
7440-50-8	Copper	30.3		P	
7439-89-6	Iron				
7439-92-1	Lead	~~14.C~~ 14.6		F	S
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.12	U	CV	N*
7440-02-0	Nickel	27.9		P	
7440-09-7	Potassium				
7782-49-2	Selenium	1.0	U	F	
7440-22-4	Silver	2.4	U	P	
7440-23-5	Sodium				
7440-28-0	Thallium	2.4	U	F	
7440-62-2	Vanadium	49.5		P	
7440-66-6	Zinc	67.4		P	E
	Cyanide	1.25	U	Color	
	TN	237	U	P	
	Sulfide	1.0	U	TITRATE	

Color Before: ________ Clarity Before: ______ Texture: ______

Color After: ________ Clarity After: ______ Artifacts: ______

Comments:

Appendix 5–6

APPENDIX 5-6

DATA QUALIFICATION REPORT--8801D APPENDIX IX DATA

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Quality Assessment
for the Subsurface Investigation Program
Conducted for the Idaho National Engineering Laboratory
Idaho Falls, Idaho

Prepared for
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October 8, 1990

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1. DATA QUALITY ASSESSMENT

1.1 INTRODUCTION

A standardized quality assurance/quality control (QA/QC) program was followed during the Subsurface Investigation Program conducted for EG&G, Inc. at the Idaho National Engineering Laboratories (INEL) located near Idaho Falls, Idaho to ensure that analytical results and the decisions based on these results were representative of the environmental condition at the sites. The data validation worksheets are located within the appropriate section. The QC checks and results are summarized below.

1.1.1 Data Quality Summary

The following sections summarize the data quality objectives (DQOs) for precision, accuracy, representativeness, comparability, and completeness (PARCC) obtained during the Subsurface Investigation Program conducted for EG&G, Inc. at the INEL.

1.1.1.1 Precision

Precision was defined as the reproducibility, or degree of agreement, among replicate measurements of the same quantity. The closer the numerical values of the measurements are to each other, the more precise the measurement. Analytical precision was expressed as the percentage of the difference between results of duplicate samples for a given compound or element. Relative percent difference (RPD) was calculated as:

$$Precision = RPD = \frac{C_1 - C_2 x 100 percent}{\frac{C_1 + C_2}{2}}$$

where:

C_1 = Concentration of the compound or element in the sample

C_2 = Concentration of the compound or element in the duplicate/replicate.

Precision was determined using matrix spike/matrix spike duplicate (MS/MSD) analyses conducted on samples collected at the INEL. The laboratory selected 1 sample in 20 and split the sample into 3 aliquots. The first aliquot was analyzed routinely for the parameters of interest, while the other two aliquots were spiked with known quantities of the parameters of interest before analysis. The RPD between the two spike results was calculated and used as an indication of the precision of the analyses performed.

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Sample collection reproducibility and media variability were measured in the laboratory by the analysis of field replicates. One sample in 10 similar matrices was collected, and sample collection reproducibility and media variability were evaluated based on the RPD values of the two duplicates. No corrective action was taken based on RPD values. Based on the evaluation of the MS/MSD results presented on Tables 3-6, 3-7, 3-12, and 3-13, the overall laboratory precision is acceptable.

1.1.1.2 Accuracy

Accuracy was defined as the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement approaches the true value, or actual concentration, the more accurate the measurement. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at a known concentration before analysis. The following equation was used to calculate percent recovery:

$$Accuracy = Percent recovery = \frac{A_r - A_o x 100 percent}{A_f}$$

where:

A_r = Total compound or element concentration detected in the spiked sample

A_o = Concentration of the compound or element detected in the unspiked sample

A_f = Concentration of the compound or element added to the sample.

Laboratory accuracy also was assessed by evaluating method blank surrogate recovery, initial and continuing calibration, and MS/MSD results calculated from all analyses. Based on the evaluation of the laboratory QC blank, surrogate recovery, MS/MSD, and initial and continuing calibration results summarized in Section 3, the overall laboratory accuracy is acceptable.

Trip blanks and field blanks were prepared to ensure that all samples represented the particular site from which they were collected and to assess any cross-contamination that may have occurred. Based on an evaluation of the compounds detected in the field QC blanks, the overall field accuracy is acceptable.

1.1.1.3 Representativeness

Representativeness was defined as the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a

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sampling location, a process condition, or an environmental condition. Sample representativeness was ensured during the Subsurface Investigation Program by collecting sufficient samples of a population medium, properly distributed with respect to location and time. Representativeness was assessed by evaluating the concentrations of interferents detected in the field and laboratory QC blanks, since replicate samples were not collected. The reproducibility of a representative set of samples reflects the degree of heterogeneity of the sampled medium, as well as the effectiveness of the sampling techniques. Based on the evaluation of the factors described above and summarized in Section 3, the samples collected during the Subsurface Investigation Program are considered to be representative of the environmental condition at the INEL.

1.1.1.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another and is limited to the other PARCC parameters, because only when precision and accuracy are known can one data set be compared to another. To optimize comparability, only the specific methods and protocols that were specified in the Subsurface Investigation Program QAPjP were used to collect and analyze samples during the Subsurface Investigation Program at the INEL. By using consistent sampling and analysis procedures, all data sets were comparable within the sites at the INEL, between sites at the installation, or among U.S. Department of Energy (DOE) facilities nationwide, to ensure that remedial action decisions and priorities were based on a consistent data base. Comparability also was ensured by the analysis of U.S. Environmental Protection Agency (EPA) reference materials, establishing that the analytical procedures used were generating valid data. Based on the precision and accuracy assessment presented above, the data collected during the Subsurface Investigation Program are generally considered to be comparable with the data collected during previous investigations.

1.1.1.5 Completeness

Completeness was defined as the percentage of valid data obtained from a measurement system. For data to be considered valid, they must have met all acceptance criteria, including accuracy and precision, as well as any other criteria specified by the analytical methods used. Based on the evaluation of the field and laboratory QC results presented in Sections 2 and 3, these data were considered equal to 79 percent and as such, were used as the basis of all recommendations presented in this report.

Project completeness was defined as the percentage of data used to prepare a baseline risk assessment and upon which recommendations for site remediation are based. For analytical data to be considered usable for risk assessment and remediation recommendations, they must be satisfactorily validated. Values and concentrations reported for all analyses conducted that are labeled with the laboratory or validation qualifier "R" (i.e., unusable) were not used in the risk estimates or for remediation recommendations. Based on an evaluation of the field and laboratory results, no data were determined to be unusable.

2. FIELD QUALITY CONTROL ASSESSMENT

Five trip blanks and two equipment blanks were collected and analyzed for the same compounds and using the same laboratory techniques as those used for the nine environmental samples. The analytical results obtained from the field QC blanks are used to assess the efficiency and effectiveness of the sample collection, handling, and equipment decontamination procedures used in the field. Table 2-1 contains a cross-reference of environmental samples to the associated field QC blank sample.

2.1 TRIP BLANKS

Trip blanks were prepared by the Roy F. Weston (Weston) Laboratory located in Stockton, California. These blanks were prepared with laboratory-grade water, sent to the INEL, stored with the unused sample bottles, and returned to the Laboratory with each cooler containing the environmental samples to be analyzed for volatile organic compounds (VOCs) using the EPA Contract Laboratory Program (CLP) February 1988 Statement Of Work (SOW). Five trip blanks were collected during the sample collection event (i.e., 881D00TBA, 8801D22TBA, 8801D22TBB, TRIP BLANK, and 8802D0TB) and were analyzed for VOCs using the February 1988 SOW. Table 2-2 presents the results of the trip blank samples collected during the Subsurface Investigation Program.

Volatile Organic Compound Analysis (SOW 2/88)--Methylene chloride was detected in samples 8801D22TBA and 8801D22TBB associated with the soil samples collected during the sample collection event at concentrations of 6 µg/L and 12 µg/L, respectively. No other VOCs were detected in these trip blanks. Since methylene chloride was detected in the associated method blank in both cases, the presence of this VOC is not considered to be significant or representative of the environmental condition at the INEL.

2.2 EQUIPMENT BLANKS

Equipment blanks were collected to provide baseline analytical data for the water used for equipment decontamination and in the steamcleaner equipment. Equipment blanks were collected by randomly selecting sample containers from the supply, filling them with the appropriate water source, and then preserving and analyzing these blanks for the same compounds and using the same laboratory methods as those used for the associated environmental samples. Although there were only two equipment blank samples, sample 881D00EB is actually a composite of samples 881D00EBA, 881D00EBB, and 881D00EBC which were tested for VOCs; Pesticides/polychlorinated biphenyls (PCBs), hydrocarbons, and semivolatile organic compounds (SVOCs); and metals, respectively. Table 2-3 presents the analytical results of the equipment blanks collected at the INEL.

Volatile Organic Compound Analysis--Two equipment blanks (i.e., 881D00EB(A) and 8802D0EB) were collected during the sample collection event and analyzed for VOCs using the February 1988 SOW. No VOCs were detected in 8802D0EB. Acetone was detected in 881D00EB(A) at 13 µg/L. This result had no adverse effects on the environmental samples, since no relationship between this sample and any environmental sample could be established from the chain-of-custody forms.

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TABLE 2-1. FIELD QC TO ENVIRONMENTAL SAMPLE CROSS-REFERENCE

SAIC Sample ID	Laboratory Sample ID	Associated Trip Blank	Associated Equipment Blank
WATER SAMPLES			
881D00EBA	8806S09-01	881D00TBA	NA
881D00EBB	8806S09-02	881D00TBA	NA
881D00EBC	8806-009-003	881D00TBA	NA
SBLK	LAB BLANK 6/17	NA	NA
881D00TBA	8806S09-07	NA	881D00EB
VBLK	WATER BLANK 6/07	NA	NA
8801D22TBA	8806S79-02	NA	*Not Avail.
8801D22TBB	8806S79-03	NA	*Not Avail.
VBLK	WATER BLANK 7/06	NA	NA
VBLK	WATER BLANK 7/07	NA	NA
VBLK	WATER BLANK 8/06	NA	NA
VBLK	WATER BLANK 8/09	NA	NA
TRIP BLANK	8807S099-003V	NA	*Not Avail.
++8802D0EB	8808S016-001V	8802D0TB	NA
	8809-738-003	8802D0TB	NA
SBLK01	WATER-BLANK 8/29	NA	NA
8802D0TB	8808S016-002V	NA	8802D0EB
VBLK	WATER BLANK 8/11	NA	NA
LAB BLANK	BLANK (177)	NA	NA
PBLK	PBLK 880606	NA	NA
PBLK	PBLK 880702	NA	NA
PBLK	PBLK 880729	NA	NA
PBLK	PBLK 880808	NA	NA
SOIL SAMPLES			
8801D22A	8806S79-01	8801D22TB	*Not Avail.
8801D22B	8806S79-01	8801D22TB	*Not Avail.
8801D48A	8807S099-001V	Trip Blank	8802D0EB
8801D48B	8807S099-001M	Trip Blank	8802D0EB
++8801D48C	8809-738-001	Trip Blank	8802D0EB
	8807S099 001X	Trip Blank	8802D0EB
8801D49A	8807S099-002V	Trip Blank	8802D0EB
8801D49B	8807S099-002M	Trip Blank	8802D0EB
++8801D49C	8807S099-01	Trip Blank	8802D0EB
	8809-738-002	Trip Blank	8802D0EB
	8807S099 002X	Trip Blank	8802D0EB
8801D49CRE	8807S099-02RE	Trip Blank	8802D0EB
88065015-003	8807-006-001	*Not Avail.	*Not Avail.
88065015-006	8807-006-002	*Not Avail.	*Not Avail.
88065015-011	8807-006-003	*Not Avail.	*Not Avail.
88065015-013	8807-006-004	*Not Avail.	*Not Avail.
88065015-015	8807-006-005	*Not Avail.	*Not Avail.
88065079-001X	8807-006-006	*Not Avail.	*Not Avail.
SBLK01	SOIL-BLANK 8/24	NA	NA
SBLK02	BLANK-SOIL 9/01	NA	NA
LAB BLANK	BLANK (777)	NA	NA
LAB BLANK	BLANK (176)	NA	NA

NA - Not Applicable
*Not Avail. - Information was not available
++ - These samples were given different Laboratory Sample ID numbers for different analysis types (VOCs, SVOCs, etc.)

Note: Sample 881D00EB is actually a composite of samples 881D00EBA, 881D00EBB, and 881D00EBC.
Sample 8801D22TB is actually a composite of samples 8801D22TBA and 8801D22TBB.

Note: There were no Field Blank samples taken for this project.

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TABLE 2-2. TRIP BLANK SUMMARY FOR IDAHO NATIONAL ENGINEERING LABORATORY

Parameter	Units	Lower Limit of Detection	881D00TBA	8801D22TBA	8801D22TBB	TRIP BLANK	8802D0TB
Collection Date			6/03/88	6/27/88	6/27/88	7/25/88	8/05/88
VOLATILE COMPOUNDS							
Methylene Chloride	µg/L	5	ND	6 B	12 B	ND	ND

ND - Not Detected
Data Qualifiers:
B - analyte found in associated laboratory blank (VBLK 7/06) as well as in environmental sample

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TABLE 2-3. EQUIPMENT BLANK SUMMARY FOR IDAHO NATIONAL ENGINEERING LABORATORY

Parameter	Units	Lower Limit of Detection	881D00EB	8802D0EB
Collection Date			6/03/88	8/05/88
METALS				
Lead	µg/L	1.0	10.6 F	29.8 F
Mercury	µg/L	0.2	0.40	ND
Zinc	µg/L	15.3	156 P	ND
VOLATILE COMPOUNDS				
Acetone	µg/L	10	13	ND

ND - Not Detected
Data Qualifiers:
F - analysis performed with Furnace AA
P - analysis performed with ICP
Note: Sample 881D00EB is actually a composite of samples 881D00EBA, 881D00EBB, and 881D00EBC which were tested for VOAs, Pesticides/PCBs and SVOAs, and METALS respectively.

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Semivolatile Organic Compound Analysis--Two equipment blanks (i.e., 881D00EB(B) and 8802D0EB) were collected during the sample collection event and were analyzed for SVOCs using EPA Method 3510/8270. No SVOCs were detected in either sample and, therefore, had no effect on any of the environmental samples.

Dioxin/Furan Analysis--Of the two equipment blanks collected for the sampling event at the INEL, only one (8802D0EB) was analyzed for Dioxins/Furans. This was performed using EPA Method 8280. No compounds were detected for either TCDD or TCDF analysis.

Pesticides/PCB Analysis--Two equipment blank samples (i.e., 881D00EB(B) and 8802D0EB) were collected during the collection event at the INEL and were analyzed for Pesticides/PCBs using EPA Method 3550/8080. No Pesticides/PCBs were detected in either 881D00EB(B) or 8802D0EB and, therefore, had no effect on the environmental samples.

Inorganic Compound Analysis--Two equipment blanks (i.e., 881D00EB(C) and 8802D0EB) were collected during the sample collection event and were analyzed for Inorganics using the July 1988 SOW. In sample 881D00EB(C), lead, mercury, and zinc were detected in concentrations of 10.6, 0.40, and 156 µg/L, respectively. Lead was also detected in sample 8802D0EB at a concentration of 29.8 µg/L. However, since trace heavy metals are relatively nonvolatile, the concentrations detected were contributed solely by the water. Also, at least several orders of magnitude exist between the lowest metal concentration detected in the soil samples and the highest concentration of the same metal detected in the associated equipment blank. Finally, the concentration of metals detected in water samples is measured in mass per volume ratios (µg/L) and that in soils is measured in mass per mass (mg/kg). Therefore, the compounds detected in the equipment blanks should have no effect on the environmental samples.

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3. LABORATORY QUALITY CONTROL ASSESSMENT

All soil samples and field QC blanks collected at the INEL were analyzed using the February 1988 SOW for organic analyses using gas chromatography/mass spectrometry (GC/MS) and GC, the July 1988 CLP SOW for inorganic analyses, EPA solid waste test methods, and EPA general chemical methodology from the following references:

- *Statement Of Work For Organic Analysis, Multi-Media, Multi-Concentrations*, EPA Contract Laboratory Program, February 1988
- *Statement Of Work For Inorganic Analysis, Multi-Media, Multi-Concentrations*, EPA Contract Laboratory Program, July 1988
- *Test Methods For Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, September 1986, with 1989 revisions
- *Methods For Chemical Analyses Of Water And Wastes*, EPA 600/4-79-020, EPA 1983, with revisions.

3.1 ORGANIC ANALYSES

Nine soil samples were submitted to the Weston Laboratory for VOC, SVOC, and pesticide/PCB analyses using the February 1988 CLP SOW and TCDD/TCDF analyses using EPA Method 8280. A data quality assessment is presented in the following subsections.

3.1.1 Volatile Organic Compound Analysis (February 1988 SOW)

Three soil samples and seven QC blanks (i.e., five trip blanks and two equipment blanks) were collected and analyzed using the February 1988 SOW. Data quality will be evaluated using the guidelines and control limits specified for holding times, tuning and mass calibration results, initial and continuing calibration verification, method blank spikes, method blanks, surrogate recoveries, internal standard areas, and MS/MSDs. Tables 3-1, 3-2, and 3-3 present the VOC validation worksheets.

Holding Times--Holding times were defined as the maximum amount of time allowed to elapse between the date and time of sample collection and the date and time of sample analysis. The Weston Laboratory was required by the SOW prepared for the Subsurface Investigation Program to meet holding times of 7 days for unpreserved water samples; 14 days for preserved (i.e., sufficient hydrochloric acid to lower the pH to 2) water samples; and 14 days for soil samples collected for VOC analysis. Analysis of samples that have exceeded the method-recommended holdtimes may result in the following: 1) undetected concentrations of compounds that would have been detected ordinarily due to chemical transformation, compound volatilization, or biodegradation; 2) reported concentrations lower than that originally present due to the factor previously stated; or 3) reported concentrations greater than those originally present in the sample due to external contamination of water samples or changes in soil moisture content. Based on an evaluation of all environmental samples and field QC blanks analyzed for VOCs using the February 1988 SOW, all holding time criteria were met.

TABLE 3-1. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS

SAIC Sample Number	Laboratory Identification Number	Collection Date	Analysis Date	Volatile Surrogate Recovery	Volatile MS/MSD Analyses	Volatile Blank Analyses	Volatile Tuning/Mass Calibration	Initial Calibration Check
WATERS								
881D00EBA	8806S09-01	6/03/88	6/07/88	All OK	ALL WITHIN LIMITS EXCEPT TOLUENE RPD=14%	NONE DETECTED TIC TOTAL=0	ALL BFB CRITERIA WITHIN CONTROL LIMITS	5/27/88 (CASE # EG G09) DAILY TUNE IN CONTROL: ALL SPCC RRF > 0.300 TBME > 0.250 CCC %RSD < 30% RRF: MEK < 0.3; VA < 0.3; DCPEc12 < 0.3; HX02 < 0.3 %RSD: MEK > 30%; HX02 > 30% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS
881D00EBA MS	8806S09-01MS	6/03/88	6/07/88					
881D00EBA MSD	8806S09-01MSD	6/03/88	6/07/88					
881D00TBA	8806S09-07	6/03/88	6/07/88					
VBLK	WATER BLANK 6/07	NA	6/07/88					
WATERS								
8801D22TBA	8806S79-02	6/27/88	7/06/88	All OK	ALL WITHIN LIMITS	MTLNCL=4Jμg/L ALL OTHERS=ND	ALL BFB CRITERIA WITHIN CONTROL LIMITS	7/06/88 (CASE # EG G79) DAILY TUNE IN CONTROL: ALL SPCC RRF > 0.300 TBME > 0.250 CCC %RSD < 30% RRF: MEK < 0.3; DCPEc12 < 0.3 %RSD: ACE > 30%; MEK > 30% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS
VBLK	WATER BLANK 7/06	NA	7/06/88					
8801D22TBB	8806S79-03	6/27/88	7/06/88					
8801D22TBB MS	8806S79-03MS	6/27/88	7/06/88					
8801D22TBB MSD	8806S79-03MSD	6/27/88	7/06/88					
SOILS								
VBLK	WATER BLANK 7/07	NA	7/07/88	All OK		NONE DETECTED TIC TOTAL=0	ALL BFB CRITERIA WITHIN CONTROL LIMITS	
METHANOL BLANK	*Not Avail.	*Not Avail.	*Not Avail.					
8801D22A	8806S79-01	6/27/88	7/07/88					

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TABLE 3-1. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Continuing Calibration Check	Volatile Internal Standard	Trip Blank Analysis	Equipment Blank Analysis
WATERS					
881D00EBA	8806S09-01	6/07/88 (CASE # EG G09) DAILY TUNE IN CONTROL: ALL SPCC RRF50 > 0.300 TBME > 0.250 CCC %D < 25% RRF50: MEK < 0.3; VA < 0.3; DCPEc12 < 0.3; TCA112 < 0.3; 4ME2PENT < 0.3; HXO2 <0.3 %D: CDS > 25%; DCA12 > 25%; MEK > 25%; TCA > 25%; VA > 25%; TCE > 25%; DBCME > 25%; TCA112 > 25%; BZ > 25%; 4ME2PENT > 25%; HXO2 > 25%; PCE > 25%; DCE > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)	881D00TBA	NA
881D00EBA MS	8806S09-01MS			881D00TBA	NA
881D00EBA MSD	8806S09-01MSD			881D00TBA	NA
881D00TBA	8806S09-07			NA	881D00EBA
VBLK	WATER BLANK 6/07			NA	NA
WATERS					
8801D22TBA	8806S79-02	7/06/88 (CASE # EG G79) DAILY TUNE IN CONTROL: ALL SPCC RRF50 > 0.300 TBME > 0.250 CCC %D < 25% RRF50: MEK < 0.3; DCPEc12 < 0.3; TCA112 < 0.3; HXO2 < 0.3; %D: VA > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)	NA	*Not Avail.
VBLK	WATER BLANK 7/06			NA	NA
8801D22TBB	8806S79-03			NA	*Not Avail.
8801D22TBB MS	8806S79-03MS			NA	*Not Avail.
8801D22TBB MSD	8806S79-03MSD			NA	*Not Avail.
		7/07/88 (CASE # EG G79) DAILY TUNE IN CONTROL: ALL SPCC RRF50 > 0.300 TBME > 0.250 CCC %D < 25% RRF50: MEK < 0.3; VA < 0.3; DCPEc12 < 0.3; TCA112 < 0.3; HXO2 < 0.3 %D: VA > 25%; 4ME2PENT > 25%; HXO2 > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS			
SOILS					
VBLK	WATER BLANK 7/07		ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)	NA	NA
METHANOL BLANK	*Not Avail.			*Not Avail.	*Not Avail.
8801D22A	8806S79-01			8801D22TB	*Not Avail.

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TABLE 3-1. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Significant Sample Results	Tentatively Identified Compounds
WATERS			
881D00EBA	8806S09-01	ACE=13 µg/L	1995 (3)
881D00EBA MS	8806S09-01MS	Not Applicable	Not Analyzed
881D00EBA MSD	8806S09-01MSD	Not Applicable	Not Analyzed
881D00TBA	8806S09-07	None Detected	0 (0)
VBLK	WATER BLANK 6/07	None Detected	0 (0)
WATERS			
8801D22TBA	8806S79-02	MTLNCL=6B µg/L	0 (0)
VBLK	WATER BLANK 7/06	MTLNCL=4J µg/L	0 (0)
8801D22TBB	8806S79-03	MTLNCL=12B µg/L	0 (0)
8801D22TBB MS	8806S79-03MS	Not Applicable	Not Analyzed
8801D22TBB MSD	8806S79-03MSD	Not Applicable	Not Analyzed
SOILS			
VBLK	WATER BLANK 7/07	None Detected	0 (0)
METHANOL BLANK	*Not Avail.	Not Analyzed	Not Analyzed
8801D22A	8806S79-01	MTLNCL=42/ACE=11/TCLME=120/TCA=3J/ CTCL=78/TCE=81/PCE=4J µg/Kg	0 (0)

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TABLE 3-2. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS

SAIC Sample Number	Laboratory Identification Number	Collection Date	Analysis Date	Volatile Surrogate Recovery	Volatile MS/MSD Analyses	Volatile Blank Analyses	Volatile Tuning/Mass Calibration	Initial Calibration Check
WATERS								
8802DOEB	8808S016-001V	8/05/88	8/11/88	All OK	ALL WITHIN LIMITS	ACE=5Jµg/L ALL OTHERS=0	ALL BFB CRITERIA WITHIN CONTROL LIMITS	8/05/88 (CASE # 8S016) DAILY TUNE IN CONTROL: ALL SPCC RRF > 0.300 TBME > 0.250 CCC %RSD < 30% RRF: DCE12 < 0.3; MEK < 0.3; DCPEc12 < 0.3; DCP13t < 0.3 ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS
8802DOEB MS	8808S016-1MS	8/05/88	8/11/88					
8802DOEB MSD	8808S016-1MSD	8/05/88	8/11/88					
8802DOTB	8808S016-002V	8/05/88	8/11/88					
8802DOSB	8808S016-003V	8/05/88	8/11/88					
VBLK	WATER BLANK 8/11	NA	8/11/88					
SOILS								
VBLK	WATER BLANK 8/06	NA	8/06/88	All OK		ACE=5Jµg/L ALL OTHERS=0	ALL BFB CRITERIA WITHIN CONTROL LIMITS	8/05/88 (CASE # 7S099) DAILY TUNE IN CONTROL: ALL SPCC RRF > 0.300 TBME > 0.250 CCC %RSD < 30% RRF: DCE12 < 0.3; MEK < 0.3; DCPEc12 < 0.3; DCP13t < 0.3 ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS
8801D48A	8807S099-001V	7/25/88	8/06/88					
8801D49A	8807S099-002V	7/25/88	8/06/88					

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TABLE 3-2. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Continuing Calibration Check	Volatile Internal Standard	Trip Blank Analysis	Equipment Blank Analysis
WATERS					
8802D0EB	8808S016-001V	8/11/88 (CASE # 8S016) DAILY TUNE IN CONTROL:	ALL AREAS WERE WITHIN CONTROL LIMITS	8802D0TB	NA
8802D0EB MS	8808S016-1MS	ALL SPCC RRF50 > 0.300 TBME > 0.250	(RETENTION TIMES WERE NOT TESTED)	8802D0TB	NA
8802D0EB MSD	8808S016-1MSD	CCC %D < 25% RRF50: MEK < 0.3; HXO2 < 0.3		8802D0TB	NA
8802D0TB	8808S016-002V	%D: ACE > 25%; DCE12 > 25%; MEK > 25%; VA > 25%;		NA	8802D0EB
8802D0SB	8808S016-003V	DBCME > 25%; 4ME2PENT > 25%; HXO2 > 25%		8802D0TB	8802D0EB
VBLK	WATER BLANK 8/11	ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS		NA	NA
SOILS					
VBLK	WATER BLANK 8/06	8/06/88 (CASE # 7S099) DAILY TUNE IN CONTROL:	ALL AREAS WERE WITHIN CONTROL LIMITS	NA	NA
8801D48A	8807S099-001V	ALL SPCC RRF50 > 0.300 TBME > 0.250	(RETENTION TIMES WERE NOT TESTED)	Trip Blank	8802D0EB
8801D49A	8807S099-002V	CCC %D < 25% RRF50: MEK < 0.3 %D: DCE12 > 25%; VA > 25%; HXO2 > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS		Trip Blank	8802D0EB
		8/09/88 (CASE # 7S099) DAILY TUNE IN CONTROL: ALL SPCC RRF50 > 0.300 TBME > 0.250 CCC %D < 25% RRF50: MEK < 0.3; VA < 0.3; TCA112 < 0.3; 4ME2PENT < 0.3; HXO2 < 0.3 %D: ACE > 25%; DCE12 > 25%; MEK > 25%; VA > 25%; DBCME > 25%; TCA112 > 25%; 4ME2PENT > 25%; HXO2 > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS			

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TABLE 3-2. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Significant Sample Results	Tentatively Identified Compounds
WATERS			
8802D0EB	8808S016-001V	MTLNCL=4J/ACE=8BJ µg/L	0 (0)
8802D0EB MS	8808S016-1MS	Not Applicable	Not Analyzed
8802D0EB MSD	8808S016-1MSD	Not Applicable	Not Analyzed
8802D0TB	8808S016-002V	MTLNCL=2J/ACE=8BJ µg/L	0 (0)
8802D0SB	8808S016-003V	Not Applicable	0 (0)
VBLK	WATER BLANK 8/11	ACE=5J µg/L	0 (0)
SOILS			
VBLK	WATER BLANK 8/06	ACE=5J µg/L	0 (0)
8801D48A	8807S099-001V	MTLNCL=4J/ACE=14B µg/Kg	6.2 (1)
8801D49A	8807S099-002V	MTLNCL=2J/ACE=9BJ/TCLME=8/CTCL=3J/ TCE=49/PCE=3J µg/Kg	0 (0)

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TABLE 3-3. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS

SAIC Sample Number	Laboratory Identification Number	Collection Date	Analysis Date	Volatile Surrogate Recovery	Volatile MS/MSD Analyses	Volatile Blank Analyses	Volatile Tuning/Mass Calibration	Initial Calibration Check
SOILS								
VBLK	WATER BLANK 8/09	NA	8/09/88	All OK	ALL WITHIN LIMITS	CLME=1Jµg/L MTLNCL=3Jµg/L ACE=19µg/L ALL OTHERS=0	ALL BFB CRITERIA WITHIN CONTROL LIMITS	
8801D48A MS	8807S099-001V MS	7/25/88	8/09/88					
8801D48A MSD	8807S099-001V MSD	7/25/88	8/09/88					
TRIP BLANK	8807S099-003V	7/25/88	8/09/88					

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TABLE 3-3. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Continuing Calibration Check	Volatile Internal Standard	Trip Blank Analysis	Equipment Blank Analysis
SOILS					
VBLK	WATER BLANK 8/09		ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)	NA	NA
8801D48A MS	8807S099-001V MS			Trip Blank	8802DOEB
8801D48A MSD	8807S099-001V MSD			Trip Blank	8802DOEB
TRIP BLANK	8807S099-003V			NA	*Not Avail.

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TABLE 3-3. DATA VALIDATION TABLES: VOLATILE ORGANIC COMPOUNDS (Continued)			
SAIC Sample Number	Laboratory Identification Number	Significant Sample Results	Tentatively Identified Compounds
SOILS VBLK	WATER BLANK 8/09	CLME=1J/MTLNCL=3J/ACE=19 µg/L	0 (0)
8801D48A MS	8807S099-001V MS	Not Applicable	Not Analyzed
8801D48A MSD	8807S099-001V MSD	Not Applicable	Not Analyzed
TRIP BLANK	8807S099-003V	MTLNCL=1BJ/ACE=8BJ µg/L	6 (1)

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FOOTNOTES TO TABLES 3-1, 3-2, AND 3-3

Note: Sample 8801D22TB is actually a composite of samples 8801D22TBA and 8801D22TBB.
Note: There were no Field Blank samples taken for this project.

NA - Not Applicable
*Not Avail. - Information was not available
Control Limits for Water VOA Surrogate Recoveries
  d8-Toluene: 88-110
  Bromofluorobenzene: 86-115
  d4-1,2-Dichloroethane: 76-114
Control Limits for Soil VOA Surrogate Recoveries
  d8-Toluene: 81-117
  Bromofluorobenzene: 74-121
  d4-1,2-Dichloroethane: 70-121
Control Limits for Water VOA MS/MSD Percent Recoveries
  1,1-Dichloroethene: 61-145, %RPD= 14
  Trichloroethene: 71-120, %RPD= 14
  Benzene: 76-127, %RPD= 11
  Toluene: 76-125, %RPD= 13
  Chlorobenzene: 75-130, %RPD= 13
Control Limits for Soil VOA MS/MSD Percent Recoveries
  1,1-Dichloroethene: 59-172, %RPD= 22
  Trichloroethene: 62-137, %RPD= 24
  Benzene: 66-142, %RPD= 21
  Toluene: 59-139, %RPD= 21
  Chlorobenzene: 60-133, %RPD= 21
Tuning and mass calibration performed with bromofluorobenzene (BFB).
System Performance Check Compounds (SPCCs):
  Chloromethane (CLME), 1,1-Dichloroethane (DCA11), Bromoform (TBME), 1,1,2,2-Tetrachloroethane (PCA), and Chlorobenzene (CLBZ).
Calibration Check Compounds (CCCs):
  Vinyl Chloride (VC), 1,1-Dichloroethene (DCE11), Chloroform (TCLME), 1,2-Dichloropropane (DCPA12), Toluene (BZME), and Ethylbenzene (EBZ).
Volatile Internal Standard Area Summary Compounds:
  Bromochloromethane (BCM)
  1,4-Difluorobenzene (DFB)
  Chlorobenzene (CBZ)
Significant sample result data qualifiers:
  B - analyte found in associated laboratory blank as well as in environmental sample
  J - analyte present between lower detection limit of instrument and lower quantitation limit

Tuning and Mass Calibration Results--The first step in the calibration of the GC/MS system is the demonstration of satisfactory ionization and fragmentation of standard mass spectral tuning compounds. This was accomplished, in addition to a sensitivity check, using 4-bromofluorobenzene (4-BFB) injected at a concentration near the instrument detection limit for the February 1988 SOW protocol. This standard was analyzed every 12 hours to ensure that the GC/MS was tuned correctly. Tuning and mass calibration requirements used to evaluate the acceptable instrument operation are described in the February 1988 SOW. Based on an evaluation of the ionization and fragmentation criteria, in addition to the instrument tune frequency, all 4-BFB tuning and mass calibration criteria requirements were met.

Initial Calibration Results--Calibration of the GC/MS was established and validated by injecting EPA-traceable standards at five concentrations spanning the expected sample concentration range. Following the initial calibration, system performance check compounds (SPCCs) and calibration check compounds (CCCs) were evaluated to verify the validity of the initial calibration. Calibration criteria requirements (i.e., relative response factors [RRFs] for SPCCs and relative standard deviation [RSD] for CCCs) for VOC analyses were described in the February 1988 SOW. Based on an evaluation of the initial calibrations conducted for VOC analyses, all SPCC and CCC criteria requirements were met.

Continuing Calibration Results--A continuing calibration verification (CCV) standard was analyzed daily and every 12 hours. Following the standard analysis, SPCCs and CCCs were evaluated to verify that the current calibration remained acceptable. RRF and percent difference requirements used to evaluate the calibration acceptability are described in the February 1988 SOW. Based on an evaluation of the continuing calibrations conducted for VOC analyses, all SPCC and CCC criteria requirements were met.

Internal Standard Summaries--Three internal standards (i.e., bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5) were added to each sample immediately before analysis as indicators of instrumental operating variations. The concentration of VOCs detected were calculated with reference to the RF of the internal standard for each sample. Internal standard area requirements were described in the February 1988 SOW. Based on an evaluation of all analyses, all internal standard areas were within acceptable limits.

Surrogate Recoveries--Three radio-labeled compounds (i.e., toluene-d_8, 4-BFB, and 1,2-dichloroethane-d_4) were added to each sample immediately before analysis. The control limits for surrogate recoveries in soil and water samples were described in the February 1988 SOW. All surrogate recoveries were within the control limits. Tables 3-4 and 3-5 summarize the surrogate recovery results for water and soil samples, respectively.

Method Blank Results--One method blank analysis was conducted with each batch of environmental samples analyzed for VOCs. Each method blank was evaluated for interferents that might potentially interfere with accurate quantitation of a target compound. According to CLP method blank criteria, a laboratory blank may not contain methylene chloride, 2-butanone, toluene, or acetone in concentrations 10 times greater than the contract required quantitation limit (CRQL) or any other target compound in concentrations greater than the CRQL. Based on an evaluation of all method blanks analyzed for VOCs using the February 1988 SOW, the only interferents detected were methylene

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TABLE 3-4. LABORATORY QUALITY CONTROL SUMMARY: SURROGATE RECOVERY-VOLATILE ORGANIC COMPOUNDS (WATER SAMPLES) AT IDAHO NATIONAL ENGINEERING LABORATORIES, IDAHO FALLS, IDAHO

Parameter	Total Number Analyses	Percent Recovery Ranges	Percent Recovery Control Limits	No.Accept Analyses*	No.Unaccept Analyses*
VOCs					
Toluene-d8	21	93-100	(88-110)	21	0
Bromofluorobenzene	21	92-109	(86-115)	21	0
1,2-Dichloroethane	21	90-105	(76-114)	21	0

* - Acceptable and unacceptable are based on control limits only.

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TABLE 3-5. LABORATORY QUALITY CONTROL SUMMARY: SURROGATE RECOVERY-VOLATILE ORGANIC COMPOUNDS (SOIL SAMPLES) AT IDAHO NATIONAL ENGINEERING LABORATORIES, IDAHO FALLS, IDAHO

Parameter	Total Number Analyses	Percent Recovery Ranges	Percent Recovery Control Limits	No.Accept Analyses*	No.Unaccept Analyses*
VOCs					
Toluene-d8	5	101-111	(81-117)	5	0
Bromofluorobenzene	5	86-100	(74-121)	5	0
1,2-Dichloroethane	5	91-100	(70-121)	5	0

* - Acceptable and unacceptable are based on control limits only.

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chloride (4J) in VBLK 7/06; acetone (5J) in VBLK 8/11 and VBLK 8/06; and chloromethane (1J), methylene chloride (3J), and acetone (19) in VBLK 8/09.

Matrix Spike/Matrix Spike Duplicate Results--MS/MSD analyses were conducted to assess the accuracy and precision of the laboratory and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. Accuracy was expressed as the percent recovery of the spike compounds. Precision was expressed as the RPD of the concentrations of the spike compounds in the MS/MSD samples. The control limits for percent recoveries in soil samples were described in the February 1988 SOW. One MS/MSD analysis was required for each set of 20 samples of similar matrix, excluding dilutions and re-analyses conducted. One MS/MSD analysis (of three soil samples received by the laboratory) was conducted on soil samples (i.e., 8801D48A). All percent recoveries and RPDs were within the required control limits. Tables 3-6 and 3-7 summarize the MS/MSD results for water and soil analyses, respectively.

3.1.2 <u>Semivolatile Organic Compound Analysis (February 1988 SOW)</u>

Two soil samples and two field QC blanks (i.e., equipment blanks) were collected and analyzed using the February 1988 SOW. Data quality will be evaluated using the guidelines and control limits specified for holding times, tuning and mass calibration results, initial and continuing calibration verification, method blank spikes, method blanks, surrogate recoveries, internal standard areas, and MS/MSDs. Tables 3-8 and 3-9 present the SVOC validation worksheets.

Holding Times--Holding times were defined as the maximum amount of time allowed to elapse between the date and time of sample collection and the date and time the sample was extracted. Holding times were further defined as the maximum amount of time allowed to elapse between the dae and time of extraction and sample analysis. The Weston Laboratory was required to meet extraction holding times of 7 days for water samples and 14 days for soil samples collected for SVOC analysis. All analyses were required within 40 days of extraction. Based on an evaluation of all environmental samples and field QC blanks analyzed for SVOCs using the February 1988 SOW, all holding time criteria were met.

Tuning and Mass Calibration Results--The first step in the calibration of the GC/MS system is the demonstration of satisfactory ionization and fragmentation of standard mass spectral tuning compounds. This was accomplished, in addition to a sensitivity check, using decafluorotriphenylphosphine (DFTPP) injected at a concentration near the instrument detection limit for the February 1988 SOW protocol. This standard was analyzed every 12 hours to ensure that the GC/MS was tuned correctly. Tuning and mass calibration requirements used to evaluate the acceptable instrument operation are described in the February 1988 SOW. Based on an evaluation of the ionization and fragmentation criteria, in addition to the instrument tune frequency, all DFTPP tuning and mass calibration criteria requirements were met.

Initial Calibration Results--Calibration of the GC/MS was established and validated by injecting EPA-traceable standards at five concentrations spanning the expected sample concentration range. Following the initial calibration, SPCCs and CCCs were evaluated to verify the validity of the initial calibration. Calibration criteria requirements (i.e., RRFs for SPCCs and RSD for CCCs) for

TABLE 3-6. LABORATORY QUALTITY CONTROL SUMMARY: MS/MSD-VOLATILE ORGANIC COMPOUNDS (WATER SAMPLES) FOR IDAHO NATIONAL LABORATORIES, IDAHO FALLS, IDAHO

	ACCURACY					PRECISION				
Parameter	MS Total No. Analyses	Percent Recovery Ranges	%R Control Limits	%R No.Accept Analyses	%R No.Unaccept Analyses	MSD Total No. Analyses	Range RPD	RPD Limits	RPD No.Accept Analyses*	RPD No.Unaccept Analyses*
VOCs										
1,1-Dichloroethene	6	82-98	(61-145)	6	0	3	1-6	14	3	0
Trichloroethene	6	79-99	(71-120)	6	0	3	2-7	14	3	0
Benzene	6	82-92	(76-127)	6	0	3	3-8	11	3	0
Toluene	6	81-94	(76-125)	6	0	3	3-14	13	2	1
Chlorobenzene	6	87-100	(75-130)	6	0	3	1-10	13	3	0

* - Acceptable and unacceptable based on control limits only.
Samples 881D00EBA, 8801D22TBB, and 8802D0EB were used for matrix effects evaluations.

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TABLE 3-7. LABORATORY QUALTITY CONTROL SUMMARY: MS/MSD-VOLATILE ORGANIC COMPOUNDS (SOIL SAMPLES) FOR IDAHO NATIONAL LABORATORIES, IDAHO FALLS, IDAHO

	ACCURACY					PRECISION				
Parameter	MS Total No. Analyses	Percent Recovery Ranges	%R Control Limits	%R No.Accept Analyses	%R No.Unaccept Analyses	MSD Total No. Analyses	Range RPD	RPD Limits	RPD No.Accept Analyses*	RPD No.Unaccept Analyses*
VOCs										
1,1-Dichloroethene	2	106	(59-172)	2	0	1	0	22	1	0
Trichloroethene	2	101-104	(62-137)	2	0	1	3	24	1	0
Benzene	2	91-96	(66-142)	2	0	1	5	21	1	0
Toluene	2	98-103	(59-139)	2	0	1	5	21	1	0
Chlorobenzene	2	100-104	(60-133)	2	0	1	4	21	1	0

* - Acceptable and unacceptable based on control limits only.
Sample 8801D48A was used for matrix effects evaluations.

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TABLE 3-8. DATA VALIDATION WORKSHEETS: SEMIVOLATILE ORGANIC COMPOUNDS

SAIC Sample Number	Laboratory Identification Number	Date Collected	Date Extracted	Date Analyzed	Semivolatile Surrogate Recovery	Semivolatile MS/MSD Analyses	Semivolatile Blank Analyses	Semivolatile Tuning/Mass Calibration	Semivolatile Internal Standards
WATER									
881D00EBB	8806S09-02	6/03/88	6/06/88	6/17/88	All OK	ALL WITHIN LIMITS	BZACID=5J µg/L ALL OTHERS=ND	ALL DFTPP CRITERIA WITHIN CONTROL LIMITS	ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)
881D00EBB MS	8806S09-02MS	6/03/88	6/06/88	6/17/88					
881D00EBB MSD	8806S09-02MSD	6/03/88	6/06/88	6/17/88					
SBLK	LAB BLANK 6/17	NA	6/06/88	6/17/88					
SOIL									
8801D22B	8806S79-01	6/27/88	7/01/88	7/19/88	All OK	ALL WITHIN LIMITS	BZACID=63J/ NNSPH=46J µg/Kg TIC TOTAL=630 ALL OTHERS=ND	ALL DFTPP CRITERIA WITHIN CONTROL LIMITS	AREA FOR PRY ABOVE CONTROL LIMIT FOR ALL SAMPLES IN BATCH, ALL OTHER AREAS WERE WITHIN LIMITS (RETENTION TIMES WERE NOT TESTED)
8801D22B MS	8806S79-01MS	6/27/88	7/01/88	7/19/88					
8801D22B MSD	8806S79-01MSD	6/27/88	7/01/88	7/19/88					
SBLK	SBLK 7/19	NA	7/01/88	7/19/88					
SOIL									
SBLK01	SOIL BLANK 8/24	NA	8/01/88	8/24/88	All OK	ALL WITHIN LIMITS EXCEPT: PHENOL MS%R=129, MSD%R=167; CLPH2 MS%R=115, MSD%R=148; NNSPR MSD%R=128; C4M3PH MS%R=115, MSD%R=130; NTPH4 MSD%R=115; DNT24 MS%R=125, MSD%R=142; PCP MS%R=135, MSD%R=164; PYR MSD%R=176	NONE DETECTED TIC TOTAL=300	ALL DFTPP CRITERIA WITHIN CONTROL LIMITS	ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)
8801D49C	8807S099-01	7/25/88	8/01/88	8/24/88					
8801D49CRE MS	8807S099-02MS	7/25/88	8/01/88	8/24/88					
8801D49CRE MSD	8807S099-02MSD	7/25/88	8/01/88	8/24/88					

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TABLE 3-8. DATA VALIDATION WORKSHEETS: SEMIVOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Initial Calib. SPCC/CCC	Contin. Calib. SPCC/CCC	Equipment Blank Analysis
WATER				
881D00EBB	8806S09-02	6/14/88 (CASE # 06S09) DAILY TUNE IN CONTROL:	6/17/88 (CASE # 06S09) DAILY TUNE IN CONTROL:	NA
881D00EBB MS	8806S09-02MS	ALL SPCC RRF > 0.050 CCC %RSD < 30%	ALL SPCC RRF50 > 0.050 CCC %D < 25%	NA
881D00EBB MSD	8806S09-02MSD	%RSD: BZLAL > 30%; 4NO2AN > 30% ALL REMAINING TCLs AND SURROGATE	%D: BZLAL > 25%; b2CLISOE > 25%; 4MPH > 25%; BZACID > 25%;	NA
SBLK	LAB BLANK 6/17	COMPOUNDS WITHIN CONTROL LIMITS	2NO2AN > 25%; 4NO2AN > 25%; PHL > 25%; 2FP > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	NA
SOIL				
8801D22B	8806S79-01	7/18/88 (CASE # 06S79) DAILY TUNE IN CONTROL: ALL SPCC RRF > 0.050	7/19/88 (CASE # 9744) DAILY TUNE IN CONTROL: ALL SPCC RRF50 > 0.050	*Not Avail.
8801D22B MS	8806S79-01MS	CCC %RSD < 30% %RSD: BZACID > 30%	CCC %D < 25% %D: b2CLISOE > 25%; BZBF > 25%;	*Not Avail.
8801D22B MSD	8806S79-01MSD	ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	BZKF > 25%; INP123 > 25%; DBAHA > 25%; BZGHIP > 25%	*Not Avail.
SBLK	SBLK 7/19		ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	NA
SOIL				
SBLK01	SOIL BLANK 8/24	8/23/88 (CASE # 7S099) DAILY TUNE IN CONTROL:	8/24/88 (CASE # 7S099) DAILY TUNE IN CONTROL:	NA
8801D49C	8807S099-01	ALL SPCC RRF > 0.050 CCC %RSD < 30% %RSD: HCLBZ > 30%; TBP > 30%	ALL SPCC RRF50 > 0.050 CCC %D < 25% %D: BPPE4 > 25%; HCLBZ > 25%;	8802D0EB
8801D49CRE MS	8807S099-02MS	ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	BIS2EHP > 25%; TBP > 25% ALL REMAINING TCLs AND SURROGATE	8802D0EB
8801D49CRE MSD	8807S099-02MSD		COMPOUNDS WITHIN CONTROL LIMITS	8802D0EB

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TABLE 3-8. DATA VALIDATION WORKSHEETS: SEMIVOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Significant Sample Results	Tentatively Identified Compounds
WATER			
881D00EBB	8806S09-02	BIS2EHP=4J µg/L	0 (0)
881D00EBB MS	8806S09-02MS	Not Applicable	0 (0)
881D00EBB MSD	8806S09-02MSD	Not Applicable	0 (0)
SBLK	LAB BLANK 6/17	BZACID=5J µg/L	0 (0)
SOIL			
8801D22B	8806S79-01	PHENOL=170J/BZACID=93BJ/NNSPH=62BJ/ BIS2EHP=190J µg/Kg	2490 (8)
8801D22B MS	8806S79-01MS	Not Applicable	Not Analyzed
8801D22B MSD	8806S79-01MSD	Not Applicable	Not Analyzed
SBLK	SBLK 7/19	BZACID=63J/NNSPH=46J µg/Kg	630 (3)
SOIL			
SBLK01	SOIL BLANK 8/24	None Detected	300 (1)
8801D49C	8807S099-01	BZACID=110J/PCP=120J/BZKF=44J/ BZAP=44J µg/Kg	1110 (3)
8801D49CRE MS	8807S099-02MS	Not Applicable	Not Analyzed
8801D49CRE MSD	8807S099-02MSD	Not Applicable	Not Analyzed

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TABLE 3-9. DATA VALIDATION WORKSHEETS: SEMIVOLATILE ORGANIC COMPOUNDS

SAIC Sample Number	Laboratory Identification Number	Date Collected	Date Extracted	Date Analyzed	Semivolatile Surrogate Recovery	Semivolatile MS/MSD Analyses	Semivolatile Blank Analyses	Semivolatile Tuning/Mass Calibration	Semivolatile Internal Standards
WATER									
SBLK01	WATER BLANK 8/29	NA	8/08/88	8/29/88	FBP BELOW CONTROL LIMIT; ALL OTHER SURROGATES OK	ALL WITHIN LIMITS EXCEPT: NNSPR MSD%R=40; TCB124 MS%R=32, MSD%R=36; ACNP MS%R=42, MSD%R=42	NONE DETECTED TIC TOTAL=310	ALL DFTPP CRITERIA WITHIN CONTROL LIMITS	AREA FOR NPT FOR SAMPLE 8802DOEB-MS ABOVE CONTROL LIMIT, ALL OTHER AREAS WITHIN LIMITS (RETENTION TIMES WERE NOT TESTED)
8802DOEB	8808S016-1	8/05/88	8/08/88	8/29/88					
8802DOEB MS	8808S016-1MS	8/05/88	8/08/88	8/29/88					
8802DOEB MSD	8808S016-1MSD	8/05/88	8/08/88	8/29/88					
SOIL									
SBLK02	BLANK SOIL 9/01	NA	8/30/88	9/01/88	TPH AND 2FP ABOVE CONTROL LIMITS; ALL OTHER SURROGATES OK		BZACID=74J/ INP123=46J/ DBAHA=45J µg/Kg ALL OTHERS=ND	ALL DFTPP CRITERIA WITHIN CONTROL LIMITS	ALL AREAS WERE WITHIN CONTROL LIMITS (RETENTION TIMES WERE NOT TESTED)
8801D49CRE	8807S099-02RE	7/25/88	8/30/88	9/01/88					

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TABLE 3-9. DATA VALIDATION WORKSHEETS: SEMIVOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Initial Calib. SPCC/CCC	Contin. Calib. SPCC/CCC	Equipment Blank Analysis
WATER				
SBLK01	WATER BLANK 8/29	8/25/88 (CASE # 8S016) DAILY TUNE IN CONTROL:	8/29/88 (CASE # 8S016) DAILY TUNE IN CONTROL:	NA
8802DOEB	8808S016-1	ALL SPCC RRF > 0.050 CCC %RSD < 30%	ALL SPCC RRF50 > 0.050 CCC %D < 25%	NA
8802DOEB MS	8808S016-1MS	%RSD: 3NO2AN > 30% ALL REMAINING TCLs AND SURROGATE	%D: BZLAL > 25%; 3NO2AN > 25%; BPPE4 > 25%; HCLBZ > 25%;	NA
8802DOEB MSD	8808S016-1MSD	COMPOUNDS WITHIN CONTROL LIMITS	BTBZNATE > 25%; BIS2EHP > 25%; TBP > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	NA
SOIL				
SBLK02	BLANK SOIL 9/01	8/25/88 (CASE # 7S099) DAILY TUNE IN CONTROL:	9/01/88 (CASE # 7S099) DAILY TUNE IN CONTROL:	NA
8801D49CRE	8807S099-02RE	ALL SPCC RRF > 0.050 CCC %RSD < 30% %RSD: 3NO2AN > 30% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	ALL SPCC RRF50 > 0.050 CCC %D < 25% %D: BZLAL > 25%; BZACID > 25%; 4CLAN > 25%; 3NO2AN > 25%; BTBZNATE > 25%; TBP > 25% ALL REMAINING TCLs AND SURROGATE COMPOUNDS WITHIN CONTROL LIMITS	8802DOEB

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TABLE 3-9. DATA VALIDATION WORKSHEETS: SEMIVOLATILE ORGANIC COMPOUNDS (Continued)

SAIC Sample Number	Laboratory Identification Number	Significant Sample Results	Tentatively Identified Compounds
WATER			
SBLK01	WATER BLANK 8/29	None Detected	310 (2)
8802D0EB	8808S016-1	None Detected	0 (0)
8802D0EB MS	8808S016-1MS	Not Applicable	Not Analyzed
8802D0EB MSD	8808S016-1MSD	Not Applicable	Not Analyzed
SOIL			
SBLK02	BLANK SOIL 9/01	BZACID=74J/INP123=46J/DBAHA=45J µg/Kg	0 (0)
8801D49CRE	8807S099-02RE	BZACID=79BJ µg/Kg	0 (0)

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FOOTNOTES TO TABLES 3-8 AND 3-9

Note: There were no Field Blank samples taken for this project.
Note: Trip Blanks were not analyzed for SVOAs.

Control Limits for Water SVOA Surrogate Recovery
- Nitrobenzene-d5: 35-114
- 2-Fluorobiphenyl: 43-116
- Terphenyl: 33-141
- Phenol-d5: 10-94
- 2-Fluorophenol: 21-100
- 2,4,6-Tribromophenol: 10-123

Control Limits for Soil SVOA Surrogate Recovery
- Nitrobenzene-d5: 23-120
- 2-Fluorobiphenyl: 30-115
- Terphenyl: 18-137
- Phenol-d5: 24-113
- 2-Fluorophenol: 25-121
- 2,4,6-Tribromophenol: 19-122

Control Limits for Water SVOA MS/MSD Analyses
- Phenol: 12-86, %RPD= 42
- 2-Chlorophenol: 27-123, %RPD= 40
- 1,4-Dichlorobenzene: 36-97, %RPD= 28
- N-Nitroso-di-n-propylamine: 41-116, %RPD= 38
- 1,2,4-Trichlorobenzene: 39-98, %RPD= 28
- 4-Chloro-3-methylphenol: 23-97, %RPD= 42
- Acenaphthene: 46-118, %RPD= 31
- 4-Nitrophenol: 10-80, %RPD= 50
- 2,4-Dinitrotoluene: 24-96, %RPD= 38
- Pentachlorophenol: 9-103, %RPD= 50
- Pyrene: 26-127, %RPD= 31

Control Limits for Soil SVOA MS/MSD Analyses
- Phenol: 26-90, %RPD= 35
- 2-Chlorophenol: 25-102, %RPD= 50
- 1,4-Dichlorobenzene: 28-104, %RPD= 27
- N-Nitroso-di-n-propylamine: 41-126, %RPD= 38
- 1,2,4-Trichlorobenzene: 38-107, %RPD= 23
- 4-Chloro-3-methylphenol: 26-103, %RPD= 33
- Acenaphthene: 31-137, %RPD= 19
- 4-Nitrophenol: 11-114, %RPD= 50
- 2,4-Dinitrotoluene: 28-89, %RPD= 47
- Pentachlorophenol: 17-109, %RPD= 47
- Pyrene: 35-142, %RPD= 36

System Performance Check Compounds (SPCCs):
N-nitroso-di-n-propylamine (NNSPR), Hexachlorocyclopentadiene (HCCP), 2,4-Dinitrophenol (DNP24), and 4-Nitrophenol (NTPH4)

Calibration Check Compounds (CCCs):
Phenol (PHENOL), 1,4-Dichlorobenzene (DCBZ14), 2-Nitrophenol (NTPH2), 2,4-Dichlorophenol (DCP24), Hexachlorobutadiene (HCBU), 4-Chloro-3-methylphenol (C4M3PH), 2,4,6-Trichlorophenol (TCP246), Acenaphthene (ACNP), N-nitrosodiphenylamine(1) (NNSPH), Pentachlorophenol (PCP), Fluoranthene (FLA), Di-n-octylphthalate (DNOP), and Benzo(a)pyrene (BZAP)

Semivolatile Internal Standard Area Summary Compounds:
- 1,4-Dichlorobenzene-d4 (DCB)
- Naphthalene-d8 (NPT)
- Acenaphthene-d10 (ANT)
- Phenanthrene-d10 (PHN)
- Chrysene-d12 (CRY)
- Perylene-d12 (PRY)

NA - Not Applicable
*Not Avail. - Information was not available
Significant sample result data qualifiers:
- B - analyte found in associated laboratory blank as well as in environmental sample
- E - analyte's concentration exceeds the calibration range of the instrument for this specific analysis
- J - analyte present between the lower detection limit of the instrument and the lower quantitation limit

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SVOC analyses were described in the February 1988 SOW. Based on an evaluation of the initial calibrations conducted for SVOC analyses, all SPCC and CCC criteria requirements were met.

Continuing Calibration Results--A CCV standard was analyzed daily and every 12 hours. Following the standard analysis, SPCCs and CCCs were evaluated to verify that the current calibration remained acceptable. RRF and percent difference requirements used to evaluate the calibration acceptability are described in the February 1988 SOW. Based on an evaluation of the continuing calibrations conducted for SVOC analyses, all SPCC and CCC criteria requirements were met.

Internal Standard Summaries--Six internal standards (i.e., 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12}) were added to each sample immediately before analysis as indicators of instrumental operating variations. The concentration of SVOCs detected was calculated with reference to the RF of the IS for each sample. IS area requirements were described in the February 1988 SOW. The internal standard areas were within the acceptable ranges in all analyses. Based on an evaluation of all analyses, all internal standard areas were within acceptable limits, except perylene-d_{12} in 8801D22B, 8801D22B(MS), and 8801D22B(MSD) and naphthalene-d_8 in 8802D0EB(MS). Since target compounds that are quantified using perylene-d_{12} were not detected in 8801S22B in concentrations greater than the detection limit and all MS/MSD percent recoveries were within the control limits, the decreased area of this internal standard is not considered to have an adverse impact on the data quality. The low percent recovery of 1,2,4-trichlorobenzene in 8802D0EB(MS) should be considered qualified, since this target compound is quantified using naphthalene-d_8 and the increased area counts of this internal standard may have resulted in a decreased percent recovery of the spike compound.

Surrogate Recoveries--Six radio-labeled compounds (i.e., phenol-d_5, 2-fluorophenol, 2,4,6-tribromophenol, d_5-nitrobenzene, 2-fluorobiphenyl, and terphenyl) were added to each sample immediately before analysis. The control limits for surrogate recoveries in soil and water samples were described in the February 1988 SOW. All surrogate recoveries were within the control limits, except 2-fluorobiphenyl in SBLK01 and terphenyl and 2-fluorophenol in SBLK02. Tables 3-10 and 3-11 summarize the surrogate recovery results for water and soil samples, respectively.

Method Blank Results--One method blank analysis was conducted with each batch of environmental samples analyzed for SVOCs. Each method blank was evaluated for interferents that might potentially interfere with accurate quantitation of a target compound. According to CLP method blank criteria, a laboratory blank may not contain phthalate esters in concentrations 10 times greater than the CRQL or any other target compound in concentrations greater than the CRQL. Based on an evaluation of all method blanks analyzed for SVOCs using the February 1988 SOW, no interferents were detected.

Matrix Spike/Matrix Spike Duplicate Results--MS/MSD analyses were conducted to assess the accuracy and precision of the laboratory and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. Accuracy was expressed as the percent recovery of the spike compounds. Precision was expressed as the RPD of the concentrations of the

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TABLE 3-10. LABORATORY QUALITY CONTROL SUMMARY: SURROGATE RECOVERY-SEMIVOLATILE ORGANIC COMPOUNDS (WATER SAMPLES) AT IDAHO NATIONAL ENGINEERING LABORATORIES, IDAHO FALLS, IDAHO					
Parameter	Total Number Analyses	Percent Recovery Ranges	Percent Recovery Control Limits	No.Accept Analyses*	No.Unaccept Analyses*
SVOCs					
Nitrobenzene-d5	8	49-77	(35-114)	8	0
2-Fluorobiphenyl	8	30-73	(43-116)	7	1
Terphenyl	8	79-108	(33-141)	8	0
Phenol-d5	8	35-81	(10-94)	8	0
2-Fluorophenol	8	51-85	(21-100)	8	0
2,4,6-Tribromophenol	8	50-83	(10-123)	8	0

* - Acceptable and unacceptable are based on control limits only.

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TABLE 3-11. LABORATORY QUALITY CONTROL SUMMARY: SURROGATE RECOVERY-SEMIVOLATILE ORGANIC COMPOUNDS (SOIL SAMPLES) AT IDAHO NATIONAL ENGINEERING LABORATORIES, IDAHO FALLS, IDAHO

Parameter	Total Number Analyses	Percent Recovery Ranges	Percent Recovery Control Limits	No.Accept Analyses*	No.Unaccept Analyses*
SVOCs					
Nitrobenzene-d5	10	49-103	(23-120)	10	0
2-Fluorobiphenyl	10	57-110	(30-115)	10	0
Terphenyl	10	88-151	(18-137)	9	1
Phenol-d5	10	74-111	(24-113)	10	0
2-Fluorophenol	10	65-137	(25-121)	9	1
2,4,6-Tribromophenol	10	87-110	(19-122)	10	0

* - Acceptable and unacceptable are based on control limits only.

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spike compounds in the MS/MSD samples. The control limits for percent recoveries in soil samples were described in the February 1988 SOW. One MS/MSD analysis was required for each set of 20 samples of similar matrix, excluding dilutions and re-analyses conducted. Two MS/MSD analyses (of two soil samples received by the laboratory) were conducted on soil samples (i.e., 8801D22B and 8801D49C). All percent recoveries and RPDs were within the required control limits in 8801D22B. All percent recoveries and RPDs were within the required control limits in 8801D49C, except for phenol (129 and 167 percent), 2-chlorophenol (115 and 148 percent), n-nitroso-di-n-propylamine (128 percent), 4-chloro-3-methylphenol (115 and 130 percent), 4-nitrophenol (115 percent), 2,4-dinitrophenol (125 and 142 percent), pentachlorophenol (135 and 164 percent), and pyrene (176 percent). None of these compounds were detected in the soil samples; therefore, these MS/MSD results are not considered to have adversely impacted data quality. One MS/MSD analysis was conducted on one equipment blank (i.e., 8802D0EB) collected. All percent recoveries and RPDs were within the required control limits, except for n-nitroso-di-n-propylamine (40 percent), 1,2,4-trichlorobenzene (32 and 36 percent), and acenaphthene (42 and 42 percent). These percent recoveries are not considered to adversely impact the environmental sample results. Table 3-12 and 3-13 summarize the MS/MSD results for water and soil analyses, respectively.

3.1.3 Tetrachlorinated dibenzo-p-dioxins and Tetrachlorinated Dibenzofurans

Eight soil samples were collected and analyzed for TCDD/TCDF using EPA Method 8280 (*The Analysis of Polychlorinated dibenzo-p-dioxins And Polychlorinated dibenzofurans [PCDD/PCDFs]*). Data quality will be evaluated using the guidelines and control limits specified for holding times, system performance check analysis, continuing calibration verification, method blanks, surrogate recoveries, and MS/MSDs. Table 3-14 presents the TCDD/TCDF validation worksheets.

Holding Times--Holding times were defined as the maximum amount of time allowed to elapse between the date and time of sample collection and the date and time the sample was extracted. Holding times were further defined as the maximum amount of time allowed to elapse between the day and time of extraction and sample analysis. The Weston Laboratory was required to meet extraction holding times of 14 days for soil samples collected for TCDD/TCDF analysis. All analyses were required within 40 days of extraction. All samples were extracted at least 18 days after the sample were collected. Some samples (i.e., 8801D48C and 8801D49C) were extracted 65 days after collection. All extracts were analyzed within 40 days.

System Performance Check Analyses-- The first step in the calibration of the GC/MS system is the demonstration of satisfactory isotopic ratio criteria resulting from the analysis of a system performance check solution. This was accomplished, in addition to a retention time window check, a 2,3,7,8-TCDD and 1,2,3,4-TCDD resolution check, and a relative ion abundance check. This standard was analyzed every 12 hours to ensure that the GC/MS was tuned correctly. Tuning and mass calibration requirements used to evaluate the acceptable instrument operation are described in EPA Method 8280. Based on an evaluation of the system performance check criteria, all PCDD/PCDF criteria requirements were met.

TABLE 3-12. LABORATORY QUALTITY CONTROL SUMMARY: MS/MSD-SEMIVOLATILE ORGANIC COMPOUNDS (WATER SAMPLES) FOR IDAHO NATIONAL LABORATORIES, IDAHO FALLS, IDAHO

Parameter	ACCURACY					PRECISION				
	MS Total No. Analyses	Percent Recovery Ranges	%R Control Limits	%R No.Accept Analyses	%R No.Unaccept Analyses	MSD Total No. Analyses	Range RPD	RPD Limits	RPD No.Accept Analyses*	RPD No.Unaccept Analyses*
SVOCs										
Phenol	4	50-65	(12-86)	4	0	2	6-8	42	2	0
2-Chlorophenol	4	52-69	(27-123)	4	0	2	3-6	40	2	0
1,4-Dichlorobenzene	4	39-74	(36-97)	4	0	2	3-5	28	2	0
N-Nitroso-di-n-propylamine	4	40-73	(41-116)	3	1	2	7-28	38	2	0
1,2,4-Trichlorobenzene	4	32-70	(39-98)	2	2	2	3-12	28	2	0
4-Chloro-3-methylphenol	4	45-61	(23-97)	4	0	2	2-16	42	2	0
Acenaphthene	4	42-70	(46-118)	2	2	2	0-3	31	2	0
4-Nitrophenol	4	26-47	(10-80)	4	0	2	0-40	50	2	0
2,4-Dinitrotoluene	4	49-70	(24-96)	4	0	2	3-6	38	2	0
Pentachlorophenol	4	62-67	(9-103)	4	0	2	3-8	50	2	0
Pyrene	4	66-80	(26-127)	4	0	2	4-7	31	2	0

* - Acceptable and unacceptable based on control limits only.
Samples 881D00EBB and 8802D0EB were used for matrix effects evaluations.

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TABLE 3-13. LABORATORY QUALTITY CONTROL SUMMARY: MS/MSD-SEMIVOLATILE ORGANIC COMPOUNDS (SOIL SAMPLES) FOR IDAHO NATIONAL LABORATORIES, IDAHO FALLS, IDAHO

Parameter	ACCURACY					PRECISION				
	MS Total No. Analyses	Percent Recovery Ranges	%R Control Limits	%R No.Accept Analyses	%R No.Unaccept Analyses	MSD Total No. Analyses	Range RPD	RPD Limits	RPD No.Accept Analyses*	RPD No.Unaccept Analyses*
SVOCs										
Phenol	4	64-167	(26-90)	2	2	2	10-26	35	2	0
2-Chlorophenol	4	59-148	(25-102)	2	2	2	11-25	50	2	0
1,4-Dichlorobenzene	4	53-85	(28-104)	4	0	2	9-15	27	2	0
N-Nitroso-di-n-propylamine	4	53-128	(41-126)	3	1	2	11-23	38	2	0
1,2,4-Trichlorobenzene	4	61-83	(38-107)	4	0	2	5-11	23	2	0
4-Chloro-3-methylphenol	4	72-130	(26-103)	2	2	2	12-13	33	2	0
Acenaphthene	4	74-134	(31-137)	4	0	2	7-18	19	2	0
4-Nitrophenol	4	67-115	(11-114)	3	1	2	1-16	50	2	0
2,4-Dinitrotoluene	4	72-142	(28-89)	2	2	2	3-13	47	2	0
Pentachlorophenol	4	78-164	(17-109)	2	2	2	1-19	47	2	0
Pyrene	4	87-176	(35-142)	3	1	2	3-23	36	2	0

* - Acceptable and unacceptable based on control limits only.
Samples 8801D22B and 8801D49C RE were used for matrix effects evaluations.

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TABLE 3-14. DATA VALIDATION WORKSHEETS: EPA METHOD SW 8280--DIOXIN/FURAN ANALYSES

SAIC Sample Number	Laboratory Identification Number	Date Collected	Date Extracted	Date Analyzed	TCDD Surrogate Recovery	OCDD Surrogate Recovery	Dioxin/Furan MS/MSD Analyses	Dioxin/Furan BS/BSD Analyses	Dioxin System Performance Check Analysis
SOILS									
88065015-003	8807-006-001	6/07/88	7/15/88	7/28/88	102 PERCENT	138 PERCENT	ALL WITHIN LIMITS	ALL WITHIN LIMITS	ALL PCDD AND PCDF CRITERIA WITHIN CONTROL LIMITS
88065015-006	8807-006-002	6/07/88	7/15/88	7/28/88	81 PERCENT	97 PERCENT			
88065015-011	8807-006-003	6/07/88	7/15/88	7/28/88	108 PERCENT	145 PERCENT			
88065015-013	8807-006-004	6/07/88	7/15/88	7/28/88	106 PERCENT	136 PERCENT			
88065015-015	8807-006-005	6/07/88	7/15/88	7/28/88	107 PERCENT	151 PERCENT			
88065079-001X	8807-006-006	6/27/88	7/15/88	7/28/88	101 PERCENT	116 PERCENT			
LAB BLANK	BLANK (777)	NA	7/15/88	7/28/88	96 PERCENT	145 PERCENT			
88065015-015 MS	8807-006-005 MS	6/07/88	7/15/88	7/28/88	95 PERCENT	128 PERCENT			
88065015-015 MSD	8807-006-005 MSD	6/07/88	7/15/88	7/28/88	82 PERCENT	107 PERCENT			
SOILS									
8801D48C	8809-738-001	7/25/88	9/28/88	10/18/88	40 PERCENT	25 PERCENT	ALL WITHIN LIMITS (MSD WAS NOT ANALYZED)	ALL WITHIN LIMITS (BSD WAS NOT ANALYZED)	ALL PCDD AND PCDF CRITERIA WITHIN CONTROL LIMITS
8801D49C	8809-738-002	7/25/88	9/28/88	10/18/88	46 PERCENT	54 PERCENT			
LAB BLANK	BLANK (176)	NA	9/28/88	10/18/88	54 PERCENT	36 PERCENT			
BLANK SPIKE	BS (176)	NA	9/28/88	10/18/88	50 PERCENT	17 PERCENT			
8801D48C MS	8809-738-001 MS	7/25/88	9/28/88	10/18/88	42 PERCENT	65 PERCENT			
WATERS									
8802DOEB	8809-738-003	8/05/88	9/28/88	10/28/88	54 PERCENT	55 PERCENT		ALL WITHIN LIMITS	ALL PCDD AND PCDF CRITERIA WITHIN CONTROL LIMITS
LAB BLANK	BLANK (177)	NA	9/28/88	10/28/88	80 PERCENT	86 PERCENT			
BS	BS (177)	NA	9/28/88	10/28/88	83 PERCENT	89 PERCENT			
BSD	BSD (177)	NA	9/28/88	10/28/88	72 PERCENT	72 PERCENT			

TABLE 3-14. DATA VALIDATION WORKSHEETS: EPA METHOD SW 8280--DIOXIN/FURAN ANALYSES (Continued)

SAIC Sample Number	Laboratory Identification Number	Initial Calibration	Continuing Calibration	Equipment Blank Analysis
SOILS				
88065015-003	8807-006-001	7/28/88 DAILY TUNE IN CONTROL: ALL %RSD <= 10% ALL COMPOUNDS WITHIN CONTROL LIMITS		*Not Avail.
88065015-006	8807-006-002			*Not Avail.
88065015-011	8807-006-003			*Not Avail.
88065015-013	8807-006-004			*Not Avail.
88065015-015	8807-006-005			*Not Avail.
88065079-001X	8807-006-006			*Not Avail.
LAB BLANK	BLANK (777)			NA
88065015-015 MS	8807-006-005 MS			*Not Avail.
88065015-015 MSD	8807-006-005 MSD			*Not Avail.
SOILS				
8801D48C	8809-738-001	10/18/88 DAILY TUNE IN CONTROL: ALL %RSD <= 10% %RSD: TCDD > 10%; PeCDD > 10%; HxCDD > 10%; HpCDD > 10%; OCDD > 10%; TCDF > 10%; PeCDF > 10%; HxCDF > 10%; HpCDF > 10%; OCDF > 10% ALL REMAINING COMPOUNDS WITHIN CONTROL LIMITS	10/18/88 DAILY TUNE IN CONTROL: ALL %D <= 10% %D: HpCDF > 10%; ^{13}C-d12-OCDD > 10% ALL REMAINING COMPOUNDS WITHIN CONTROL LIMITS	8802D0EB
8801D49C	8809-738-002			8802D0EB
LAB BLANK	BLANK (176)			NA
BLANK SPIKE	BS (176)			NA
8801D48C MS	8809-738-001 MS			8802D0EB
WATERS				
8802D0EB	8809-738-003	10/24/88 DAILY TUNE IN CONTROL: ALL %RSD <= 10% ALL COMPOUNDS WITHIN CONTROL LIMITS	10/28/88 DAILY TUNE IN CONTROL: ALL %D <= 10% ALL COMPOUNDS WITHIN CONTROL LIMITS	NA
LAB BLANK	BLANK (177)			NA
BS	BS (177)			NA
BSD	BSD (177)			NA

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TABLE 3-14. DATA VALIDATION WORKSHEETS: EPA METHOD SW 8280--DIOXIN/FURAN ANALYSES (Continued)

SAIC Sample Number	Laboratory Identification Number	Significant Sample Results (TCDD)	Significant Sample Results (TCDF)	Confirm As OCDD	Confirm As HpCDD
SOILS					
88065015-003	8807-006-001	OCDD=0.43 ng/g	None Detected	Yes	NA
88065015-006	8807-006-002	HpCDD=0.17/OCDD=0.76 ng/g	None Detected	Yes	Yes
88065015-011	8807-006-003	OCDD=0.22 ng/g	None Detected	Yes	NA
88065015-013	8807-006-004	None Detected	None Detected	NA	NA
88065015-015	8807-006-005	None Detected	None Detected	NA	NA
88065079-001X	8807-006-006	None Detected	None Detected	NA	NA
LAB BLANK	BLANK (777)	None Detected	None Detected	NA	NA
88065015-015 MS	8807-006-005 MS	Not Applicable	Not Applicable	NA	NA
88065015-015 MSD	8807-006-005 MSD	Not Applicable	Not Applicable	NA	NA
SOILS					
8801D48C	8809-738-001	OCDD=1.6 ng/g	None Detected	NC	NA
8801D49C	8809-738-002	None Detected	None Detected	NA	NA
LAB BLANK	BLANK (176)	None Detected	None Detected	NA	NA
BLANK SPIKE	BS (176)	Not Applicable	Not Applicable	NA	NA
8801D48C MS	8809-738-001 MS	Not Applicable	Not Applicable	NA	NA
WATERS					
8802D0EB	8809-738-003	None Detected	None Detected	NA	NA
LAB BLANK	BLANK (177)	None Detected	None Detected	NA	NA
BS	BS (177)	Not Applicable	Not Applicable	NA	NA
BSD	BSD (177)	Not Applicable	Not Applicable	NA	NA

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FOOTNOTES TO TABLE 3-14

Note: There were no Field Blank samples taken for this project.
Note: Trip Blanks were not analyzed for Dioxins/Furans.

NA - Not Applicable
*Not Avail. - Information was not available
NC - this sample result was Not Confirmed
Control Limits for DIOXIN/FURAN MS/MSD Analyses
  2,3,7,8-Tetrachlorodibenzo-p-dioxin: 40-120, %RPD= 20
  Octachlorodibenzo-p-dioxin: 40-120, %RPD= 20
Control Limits for DIOXIN/FURAN BS/BSD Analyses
  2,3,7,8-Tetrachlorodibenzo-p-dioxin: 40-120, %RPD= 20
  Octachlorodibenzo-p-dioxin: 40-120, %RPD= 20
  Note: Control Limits obtained from STATEMENT OF WORK - DIOXIN ANALYSIS, 9/1/86, pages E-7 (%R) and E-9 (RPD). Although these limits are specifically for 2,3,7,8-TCDD MS/MSD values only, they were arbitrarily used for OCDD MS/MSD and all BS/BSD values also.
Control Limits for DIOXIN/FURAN Initial/Continuing Calibrations
  Initial Calibration: <= 10%
  Continuing Calibration: <= 10%
  Note: Control Limits obtained from STATEMENT OF WORK - DIOXIN ANALYSIS, 9/1/86, pages D-19 (Initial) and D-20 (Continuing).

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Initial Calibration Results--Calibration of the GC/MS was established and validated by injecting EPA-traceable standards at five concentrations (i.e., 200; 500; 1,000; 2,000; and 5,000 µg/L) spanning the expected sample concentration range. Following the initial calibration, RRFs, standard deviation, and percent RSD values were evaluated to verify the validity of the initial calibration. Calibration criteria requirements (i.e., less than 15 percent RSD) for TCDD/TCDF analyses were described in the EPA Method 8280. Based on an evaluation of the initial calibrations conducted for TCDD/TCDF analyses, all percent RSD criteria requirements were met, except HxCDD (20 percent), HpCDD (16 percent), OCDD (20 percent), and OCDF (25 percent) in the October 18, 1988 initial calibration. All other percent RSD values were less than 15 percent.

Continuing Calibration Results--A CCV standard was analyzed daily and every 12 hours. Following the standard analysis, the percent differences of the RRF values from the mean RRF values calculated during the intial calibration were were evaluated to verify that the current calibration remained acceptable (i.e., were less than 30 percent). Percent difference requirements used to evaluate the calibration acceptability are described in EPA Method 8280. Based on an evaluation of the continuing calibrations conducted for TCDD/TCDF analyses, all percent difference criteria requirements were met.

Surrogate Recoveries--Two radio-labeled compounds (i.e., C^{13}-TCDD and C^{13}-OCDD) were added to each sample immediately before analysis. No control limit criteria for surrogate recoveries in soil and water samples were specified in EPA Method 8280. All surrogate recoveries were less than 108 percent and greater than 40 percent for C^{13}-TCDD and less than 151 percent and greater than 17 percent for C^{13}-OCDD.

Method Blank Results--One method blank analysis was conducted with each batch of environmental samples analyzed for TCDD/TCDF. Each method blank was evaluated for interferents that might potentially interfere with accurate quantitation of a target compound. According to EPA Method 8280 method blank criteria, a laboratory blank may not contain any signal at mass 320, 322, or 259 that is greater than 2 percent of the mass 322 response within 5 scans of the mass 322 maximum. Based on an evaluation of all method blanks analyzed for TCDD/TCDF using EPA Method 8280, no interfering signals were detected.

Matrix Spike/Matrix Spike Duplicate Results--MS/MSD analyses were conducted to assess the accuracy and precision of the laboratory and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. Accuracy was expressed as the percent recovery of the spike compounds. Precision was expressed as the RPD of the concentrations of the spike compounds in the MS/MSD samples. The control limits for percent recoveries in soil samples were described in EPA Method 8280. One MS/MSD analysis was required for each set of 20 samples of similar matrix, excluding dilutions and re-analyses conducted. One MS/MSD analysis and one MS analysis (of 8 soil samples received by the laboratory) were conducted on soil samples (i.e., 88065015 and 8801D48C). All percent recoveries and RPDs were within the required control limits.

Blank Spike/Blank Spike Duplicate (BS/BSD) Analyses--One BS/BSD analysis and one BS analysis (of 8 soil samples received by the laboratory) were conducted. All percent recoveries and RPDs were within the required control limits.

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3.1.4 Pesticide/PCBs (SOW 2/88)

Three soil samples and two equipment blanks were collected and analyzed for pesticide/PCBs using the February 1988 CLP SOW. Data quality will be evaluated using the guidelines and control limits specified for holding times, system performance check analysis (i.e., 4,4'-DDT retention time, 4,4'-DDT/endrin degradation check, and dibutyl chlorendate retention time check), initial and continuing calibration verification, method blanks, surrogate recoveries, and MS/MSDs. Table 3-15 presents the pesticide/PCB validation worksheets.

Holding Times--Holding times were defined as the maximum amount of time allowed to elapse between the date and time of sample collection and the date and time the sample was extracted. Holding times were further defined as the maximum amount of time allowed to elapse between the day and time of extraction and sample analysis. The Weston Laboratory was required to meet extraction holding times of 7 days for water samples and 14 days for soil samples collected for pesticide/PCB analysis. All analyses were required within 40 days of extraction. Based on an evaluation of all environmental samples and field QC blanks analyzed for pesticide/PCBs using the CLP SOW 2/88, all holding time criteria were met, except for 8801D0EBB and the associated MS/MSD analyses that were conducted 44 days after these samples were extracted.

Surrogate Recoveries--One surrogate compound (i.e., dibutyl chlorendate) was added to each sample immediately before the sample was extracted. The control limits for surrogate recoveries in soil and water samples were described in the February 1988 SOW. All surrogate recoveries were within the control limits.

MS/MSD Analyses--MS/MSD analyses were conducted to assess the accuracy and precision of the laboratory and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. Accuracy was expressed as the percent recovery of the spike compounds. Precision was expressed as the RPD of the concentrations of the spike compounds in the MS/MSD samples. The control limits for percent recoveries in soil and water samples were described in the February 1988 SOW. One MS/MSD analysis was required for each set of 20 samples of similar matrix, excluding dilutions and re-analyses conducted. Three MS/MSD analyses (of 3 soil samples received by the laboratory) were conducted on soil samples (i.e., 8801D22A, 8801D48C, and 8801D49C). All percent recoveries and RPDs were within the required control limits, except lindane (31 and 38 percent) in 8801D22A. Two MS/MSD analyses were conducted on equipment blanks (i.e., 8801D0E and 8802D0EB). All percent recoveries and RPDs were within the required control limits, except aldrin (123 percent recovery and 24 percent RPD) in 8801D0E and heptachlor (28 percent RPD), aldrin (41 percent RPD), and 4,4'-DDT (36 percent recovery and 61 percent RPD) in 8802D0EB.

Method Blank Analyses--One method blank analysis was conducted with each batch of environmental samples analyzed for pesticides/PCBs. Each method blank was evaluated for interferents that might potentially interfere with accurate quantitation of a target compound. According to CLP method blank criteria, a laboratory blank may not contain any target compound in concentrations greater than the CRQL. Based on an evaluation of all method blanks analyzed for SVOCs using the February 1988 SOW, no interferents were detected.

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TABLE 3-15. IDAHO NATIONAL ENGINEERING LABORATORIES DATA VALIDATION WORKSHEETS FOR PESTICIDES

SAIC sample Number	Laboratory Identification Number	Date Collected	Date Extracted	Date Analyzed (1)	Date Analyzed (2)	Date Analyzed (3)	Pesticide/PCBs Surrogate Recovery	Pesticide/PCBs MS/MSD Analyses	Pesticide/PCBs Blank Analysis
881D00EBB	8806S009002	06/03/88	06/06/88	07/20/88	07/20/88	07/20/88	ALL SURROGATE RECOVERIES WERE WITHIN CONTROL LIMITS (24-154) FOR DIBUTYLCHLORENDATE	ALL WITHIN CONTROL LIMITS EXCEPT: ALDRIN MSD %R=123; ALDRIN RPD=24%	NONE DETECTED
PBLK	PBLK 880606	NA	06/06/88	07/20/88	07/20/88	07/20/88			
881D00EBB MS	8806S009002 MS	06/03/88	06/06/88	07/20/88	07/20/88	07/20/88			
881D00EBB MSD	8806S009002 MSD	06/03/88	06/06/88	07/20/88	07/20/88	07/20/88			
PBLK	PBLK 880702	NA	07/02/88	08/07/88	07/25/88	07/29/88	ALL SURROGATE RECOVERIES WITHIN CONTROL LIMITS (20-150) FOR DIBUTYLCHLORENDATE		NONE DETECTED
8801D22A	8806S079 001	06/27/88	07/02/88	08/08/88	07/25/88	07/29/88		ALL WITHIN CONTROL LIMITS EXCEPT: LINDANE MS %R=31; LINDANE MSD %R=38	
8801D22A MS	8806S079 001 MS	06/27/88	07/02/88	08/08/88	NT	07/29/88			
8801D22A MSD	8806S079 001 MSD	06/27/88	07/02/88	08/08/88	NT	08/08/88			
PBLK	PBLK 880729	NA	07/29/88	08/20/88	08/20/88	08/20/88	ALL SURROGATE RECOVERIES WITHIN CONTROL LIMITS (20-150) FOR DIBUTYLCHLORENDATE		NONE DETECTED
8801D48C	8807S099 001X	07/25/88	07/29/88	08/21/88	08/11/88	08/06/88			
8801D49C	8807S099 002X	07/25/88	07/29/88	08/21/88	08/11/88	08/06/88		ALL WITHIN % REC AND %RPD CONTROL LIMITS	
8801D48C MS	8807S099 001X MS	07/25/88	08/01/88	NA	08/11/88	NA			
8801D48C MSD	8807S099 001X MSD	07/25/88	08/01/88	NA	08/11/88	NA			
8801D49C MS	8807S099 002X MS	07/25/88	07/29/88	08/21/88	NA	08/06/88			
8801D49C MSD	8807S099 002X MSD	07/25/88	07/29/88	08/21/88	NA	08/06/88			
PBLK	PBLK 880808	NA	08/08/88	08/29/88	08/16/88	08/23/88	ALL SURROGATE RECOVERIES WERE WITHIN CONTROL LIMITS (24-154) FOR DIBUTYLCHLORENDATE		NONE DETECTED
8802D0EB	8808S016 001	08/05/88	08/08/88	08/29/88	08/16/88	08/23/88		HEPTACHLOR RPD=28%; ALDRIN RPD=41%; 4,4'-DDT MSD %R=36%, AND RPD=61%	
8802D0EB MS	8808S016 001 MS	08/05/88	08/08/88	08/29/88	08/16/88	08/23/88			
8802D0EB MSD	8808S016 001 MSD	08/05/88	08/08/88	08/29/88	08/16/88	08/23/88			

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TABLE 3-15. IDAHO NATIONAL ENGINEERING LABORATORIES DATA VALIDATION WORKSHEETS FOR PESTICIDES (Continued)

SAIC sample Number	Laboratory Identification Number	Equipment Blank Analysis	Significant Sample Results	Evaluation Check for Linearity	Evaluation Retention Time Shift For DBC
881D00EBB	8806S009002	NA	None Detected	ALDRIN (11.0%) AND 4,4'-DDT (24.6) WERE GREATER THAN 10.0% DIFFERENCE FOR LINEARITY CHECK; ENDRIN AND DBC WERE WITHIN CONTROL LIMITS	DBC RETENTION TIME PERCENT DIFFERENCES LESS THAN 2% FOR ENVIRONMENTAL SAMPLES
PBLK	PBLK 880606	NA	None Detected		
881D00EBB MS	8806S009002 MS	NA	Not Applicable		
881D00EBB MSD	8806S009002 MSD	NA	Not Applicable		
PBLK	PBLK 880702	NA	None Detected	ALL %RSD <10.0% FOR ALDRIN, ENDRIN, 4,4'-DDT, AND DBC	DBC RETENTION TIME PERCENT DIFFERENCES LESS THAN 2% FOR ENVIRONMENTAL SAMPLES
8801D22A	8806S079 001	*Not Avail.	None Detected		
8801D22A MS	8806S079 001 MS	*Not Avail.	Not Applicable		
8801D22A MSD	8806S079 001 MSD	*Not Avail.	Not Applicable		
PBLK	PBLK 880729	NA	None Detected	ALL %RSD <10.0% FOR ALDRIN, ENDRIN, 4,4'-DDT, AND DBC (FOR SAMPLES ANALYZED 8/20-8/21) ALDRIN (16.2%), ENDRIN (15.9%), AND 4,4'-DDT (11.9%) WERE GREATER THAN 10.0% DIFFERENCE FOR LINEARITY CHECK; DBC WAS WITHIN CONTROL LIMITS (<20% BREAKDOWN FOR COMBINED 4,4'-DDT AND ENDRIN 8/22-8/23)	DBC RETENTION TIME PERCENT DIFFERENCES LESS THAN 2% FOR ENVIRONMENTAL SAMPLES
8801D48C	8807S099 001X	8802D0EB	None Detected		
8801D49C	8807S099 002X	8802D0EB	None Detected		
8801D48C MS	8807S099 001X MS	8802D0EB	Not Applicable		
8801D48C MSD	8807S099 001X MSD	8802D0EB	Not Applicable		
8801D49C MS	8807S099 002X MS	8802D0EB	Not Applicable		
8801D49C MSD	8807S099 002X MSD	8802D0EB	Not Applicable		
PBLK	PBLK 880808	NA	None Detected	ALL %RSD <10.0% FOR ALDRIN, ENDRIN, 4,4'-DDT, AND DBC	DBC RETENTION TIME PERCENT DIFFERENCES LESS THAN 2% FOR ENVIRONMENTAL SAMPLES
8802D0EB	8808S016 001	NA	None Detected		
8802D0EB MS	8808S016 001 MS	NA	Not Applicable		
8802D0EB MSD	8808S016 001 MSD	NA	Not Applicable		

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TABLE 3-15. IDAHO NATIONAL ENGINEERING LABORATORIES DATA VALIDATION WORKSHEETS FOR PESTICIDES (Continued)

SAIC sample Number	Laboratory Identification Number	Pesticide/PCB Standards Summary's	Evaluation Check for 4,4DDT/Endrin Combined Breakdown
881D00EBB PBLK 881D00EBB MS 881D00EBB MSD	8806S009002 PBLK 880606 8806S009002 MS 8806S009002 MSD	THE PERCENT DIFFERENCE FOR 4,4'-DDT (19.7%) WAS GREATER THAN THE 15.0% DIFFERENCE CONTROL LIMIT FOR QUANTITATION; ALL OTHERS WERE IN CONTROL LIMITS FOR BOTH QUANTITATION AND CONFIRMATION	ALL PERCENT BREAKDOWNS FOR 4,4'-DDT AND ENDRIN WERE LESS THAN 20.0%
PBLK 8801D22A 8801D22A MS 8801D22A MSD	PBLK 880702 8806S079 001 8806S079 001 MS 8806S079 001 MSD	SEVERAL PERCENT DIFFERENCES WERE GREATER THAN 15.0% FOR QUANTITATION AND 20.0% FOR CONFIRMATION, BUT NO PESTICIDES WERE DETECTED IN THESE SAMPLES SO NO CORRECTIVE ACTIONS WERE NECESSARY, NOR WERE ANY TAKEN	NOTE THAT EVAL MIX B (08/08/88 -9:18) WAS ABOVE THE CONTROL LIMIT OF 20.0% AT 20.3% BREAKDOWN FOR ENDRIN AND 4,4'-DDT; SINCE THIS IS A QUANTITATION CHECK AND NO PESTICIDES WERE DETECTED, NO CORRECTIVE ACTIONS WERE NECESSARY
PBLK 8801D48C 8801D49C 8801D48C MS 8801D48C MSD 8801D49C MS 8801D49C MSD	PBLK 880729 8807S099 001X 8807S099 002X 8807S099 001X MS 8807S099 001X MSD 8807S099 002X MS 8807S099 002X MSD	SEVERAL PERCENT DIFFERENCES WERE GREATER THAN 15.0% FOR QUANTITATION AND 20.0% FOR CONFIRMATION, BUT NO PESTICIDES WERE DETECTED IN THESE SAMPLES SO NO CORRECTIVE ACTIONS WERE NECESSARY, NOR WERE ANY TAKEN	ALL PERCENT BREAKDOWNS FOR 4,4'-DDT AND ENDRIN WERE LESS THAN 20.0%
PBLK 8802D0EB 8802D0EB MS 8802D0EB MSD	PBLK 880808 8808S016 001 8808S016 001 MS 8808S016 001 MSD	ALL PERCENT DIFFERENCES WERE LESS THAN 15.0% FOR QUANTITATION AND 20.0% FOR CONFIRMATION	ALL PERCENT BREAKDOWNS FOR 4,4'-DDT AND ENDRIN WERE LESS THAN 20.0%

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FOOTNOTES TO TABLE 3-15

Control limits for Soil Pesticide/PCB Surrogate Recovery
  Dibutylchlorendate: 20-150
  Isodrin: 20-127
  (advisory limits)
Control limits for Water Pesticide/PCB Surrogate Recovery
  Dibutylchlorendate: 24-154
  Isodrin: 20-127
  (advisory limits)
Control limits for Soil Pesticide/PCB MS/MSD Analysis
  Lindane: 46-127, %RPD=50
  Heptachlor: 35-130, %RPD=31
  Aldrin: 34-132, %RPD=43
  Dieldrin: 31-134, %RPD=38
  Endrin: 42-139, %RPD=45
  4,4'DDT: 23-134, %RPD=50
Control limits for Water Pesticide/PCB MS/MSD Analysis
  Lindane: 56-123, %RPD=15
  Heptachlor: 40-131, %RPD=20
  Aldrin: 40-120, %RPD=22
  Dieldrin: 52-126, %RPD=18
  Endrin: 56-121, %RPD=21
  4,4'DDT: 38-127, %RPD=27
NA - Not Applicable
NT - Not Tested
*Not Avail. - Information was not available
Control limits for organophosphorous pesticides:
  Disulfton: 55-109%
  Methyl Parathion: 81-111%
Control limits have not been established for dimethoate, delnav, ethyl parathion, and DEF.

Note concerning the analyses: all samples were analyzed for Pesticides/ PCBs (reported on the standard form I) and additionally, organophosphorous pesticides, and chlorinated phenoxy acid herbicides were analyzed for and reported on seperate forms. Samples "...A" and "...B" were the same sample analyzed for different parameters and both samples were used for MS/MSDs.

Note: There were no Field Blank samples taken for this project. Trip Blank samples were not analyzed for Pesticides/PCBs.
Note: The MS/MSD analysis for sample 8801D48C was performed for Chlorinated Phenoxy Acid Herbicides only.
The MS/MSD analysis for sample 8801D49C was performed for CLP Pesticides/PCBs and Organophosphorous Pesticides only.

(1) Samples were analyzed for CLP pesticides/PCBs.
(2) Samples were analyzed for chlorinated phenoxy acid herbicides.
(3) Samples were analyzed for organophosphorous pesticides.

Linearity Check--Calibration mixtures containing aldrin, endrin, 4,4'-DDT, and dibutyl chlorendate at 3 concentration levels must be analyzed at the beginning of each 72-hour analytical period. The percent RSD must be less than or equal to 10 percent. All linearity criteria were met, except aldrin (11 percent) and 4,4'-DDT associated with 8801D0EB, analyzed July 20, 1988, and aldrin (16.2 percent), endrin (15.9 percent), and 4,4'-DDT associated with 8801D48C and 8801D49C, analyzed on August 29, 1988. Since the surrogate recoveries and MS/MSD recoveries and differences were within the QC criteria, these linearity results are not considered to have adversely affected data quality.

Retention Time Evaluation--*Since all pesticides and PCBs are quantified using the external standard technique, the retention time of all target compounds and surrogates must be determined. The dibutyl chlorendate* retention time shift between initial and all subsequent calibration mixtures must not be greater than 2 percent. All retention time shift criteria (i.e., less than 2 percent) were met.

Standards Summary--Two calibration standards (i.e., Individual Standard Mixtures A and B) were analyzed at the intervals specified in SOW 2/88. The calibration factor calculated for each single component pesticide (e.g, lindane, endrin, aldrin) must not exceed 15 percent for the GC column used for quantitation nor exceed 20 percent for the confirmation analysis. Several percent differences calculated from the July 20, August 7, 8, 20, and 21 analyses were greater than 15 percent; however, pesticides/PCBs were not detected in the associated samples. The percent differences calculated from the August 29, 1988 analysis were less than 15 percent.

4,4'-DDT/Endrin Breakdown Evaluation--All percent breakdown criteria (i.e., 20.0 percent) were met, except for that calculated for the August 8, 1988 analysis (20.3 percent). Since pesticides/PCBs were not detected in the associated samples, corrective action was not taken based on this QC analysis. These results are not considered to adversely impact data quality.

3.2 INORGANIC ANALYSES

Three soil samples were submitted to the Weston Laboratory for Inorganic Compound analysis using the July 1988 CLP SOW. A data quality assessment is presented in the following subsection.

3.2.1 Trace Metals and Cyanide (SOW 7/88)

Three soil samples and three QC blanks (i.e., two equipment blanks and one spike blank) were collected and analyzed using the July 1988 SOW. Data quality will be evaluated using the guidelines and control limits specified for holding times, initial and continuing calibration verification, method blanks, interference check sample analysis, spiked sample analysis, duplicate sample analysis, laboratory check sample analysis, and contract required detection limits (CRDL) verification. Table 3-16 presents the trace metals and cyanide validation worksheets.

Holding Times--Holding times were defined as the maximum amount of time allowed to elapse between the date and time of sample collection and the date and

TABLE 3-16. IDAHO NATIONAL ENGINEERING LABORATORY INORGANICS DATA VALIDATION WORKSHEETS

SAIC Sample Number	Laboratory ID Number	Date Received	Mercury Analysis Date (1)	Cyanide Analysis Date (1)	CALIBRATION Initial Calibration (a)	Continuing Calibration (a)	BLANKS Initial Blank (b)	Continuing Blank (b)	Procedural Blank (b)
SOIL 8801D48B	8807S099-001M	07/27/88	08/11/88 (15 DAYS)	08/05/88 (9 DAYS)	ALL INITIAL AND CONTINUING CALIBRATIONS WITHIN %R CONTROL LIMITS FOR ALL METALS		NO CONTAMINANTS WERE DETECTED IN ANY OF THE INITIAL BLANKS	NO CONTAMINANTS WERE DETECTED IN ANY OF THE CONTINUING BLANKS	NO CONTAMINANTS WERE DETECTED IN ANY OF THE PROCEDURAL BLANKS
8801D49B	8807S099-002M	07/27/88	08/11/88 (15 DAYS)	08/05/88 (9 DAYS)					
SOIL 8801D22B	8806S079-001	06/28/88	07/19/88 (21 DAYS)	07/06/88 (8 DAYS)	ALL INITIAL AND CONTINUING CALIBRATIONS WITHIN %R CONTROL LIMITS FOR ALL METALS		NO CONTAMINANTS WERE DETECTED IN ANY OF THE INITIAL BLANKS	NO CONTAMINANTS WERE DETECTED IN ANY OF THE CONTINUING BLANKS	NO CONTAMINANTS WERE DETECTED IN ANY OF THE PROCEDURAL BLANKS
WATER 8802D0EB	8808S016-001	08/06/88	08/15/88 (9 DAYS)	08/10/88 (4 DAYS)	ALL INITIAL AND CONTINUING CALIBRATIONS WITHIN %R CONTROL LIMITS FOR ALL METALS		NO CONTAMINANTS WERE DETECTED IN ANY OF THE INITIAL BLANKS	NO CONTAMINANTS WERE DETECTED IN ANY OF THE CONTINUING BLANKS	NO CONTAMINANTS WERE DETECTED IN ANY OF THE PROCEDURAL BLANKS
8802D0SB	8808S016-003	08/06/88	08/15/88 (9 DAYS)						
WATER 881D00EBC	8806-009-003	06/04/88	Not Avail.	Not Avail.	ALL INITIAL AND CONTINUING CALIBRATIONS WITHIN %R CONTROL LIMITS FOR ALL METALS (2)		CONTAMINANTS WERE DETECTED IN THE INITIAL BLANKS BELOW THE CRDL (2)	CONTAMINANTS WERE DETECTED IN THE CONTINUING BLANKS BELOW THE CRDL (2)	CONTAMINANTS WERE DETECTED IN THE PROCEDURAL BLANKS BELOW THE CRDL (2)

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TABLE 3-16. IDAHO NATIONAL ENGINEERING LABORATORY INORGANICS DATA VALIDATION WORKSHEETS (Continued)

SAIC Sample Number	Laboratory ID Number	ICP/ICS Initial (c)	ICP/ICS Final (c)	ACCURACY Spike Sample (d)	PRECISION Duplicate Sample (e)	LCS Laboratory Control Sample (f)	CRDL Verification AA (g)
SOIL 8801D48B 8801D49B	8807S099-001M 8807S099-002M	ALL INITIAL ICP/ICS %R WITHIN CONTROL LIMITS	ALL FINAL ICP/ ICS %R WITHIN CONTROL LIMITS	PERCENT RECOVERY FOR AG=3.3%/ ALL OTHER %Rs WITHIN SPIKE SAMPLE CONTROL (2)	ALL DUPLICATE SAMPLE RPDs WERE LESS THAN 35%.	AS %R=122% RESULTS REMAINED UNCORRECTED; TL %R=57% RESULTS REMAIN UNCORRECTED; ALL OTHER PERCENT RECOVERIES WITHIN CONTROL LIMITS	ALL CRDL %R FOR AA WERE GREATER THAN ZERO
SOIL 8801D22B	8806S079-001	ALL INITIAL ICP/ICS %R WITHIN CONTROL LIMITS	ALL FINAL ICP/ ICS %R WITHIN CONTROL LIMITS	PERCENT RECOVERY FOR AG=3.3%/ ALL OTHER %Rs WITHIN SPIKE SAMPLE CONTROL (2)	ALL DUPLICATE SAMPLE RPDs WERE LESS THAN 35%.	AS %R=122% RESULTS REMAINED UNCORRECTED; TL %R=57% RESULTS REMAIN UNCORRECTED; ALL OTHER PERCENT RECOVERIES WITHIN CONTROL LIMITS	ALL CRDL %R FOR AA WERE GREATER THAN ZERO
WATER 8802D0EB 8802D0SB	8808S016-001 8808S016-003	ALL INITIAL ICP/ICS %R WITHIN CONTROL LIMITS	ALL FINAL ICP/ ICS %R WITHIN CONTROL LIMITS	PERCENT RECOVERY FOR AG=0%/ ALL OTHER %Rs WITHIN SPIKE SAMPLE CONTROL LIMITS	WATER SAMPLES ARE NOT ANALYZED FOR PERCENT DIFFERENCES	ALL PERCENT RECOVERIES WITHIN %R CONTROL LIMITS (80-120%)	ALL CRDL %R FOR AA WERE GREATER THAN ZERO
WATER 881D00EBC	8806-009-003	ALL INITIAL ICP/ICS %R WITHIN CONTROL LIMITS	ALL FINAL ICP/ ICS %R WITHIN CONTROL LIMITS	PERCENT RECOVERY FOR SE=72.0%/ ALL OTHER %Rs WITHIN SPIKE SAMPLE CONTROL LIMITS	WATER SAMPLES ARE NOT ANALYZED FOR PERCENT DIFFERENCES	PERCENT RECOVERIES FOR AS=214, PB=52.3, TL=48.1; ALL OTHER %Rs WITHIN CONTROL LIMITS	ALL CRDL %R FOR AA WERE GREATER THAN ZERO

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TABLE 3-16. IDAHO NATIONAL ENGINEERING LABORATORY INORGANICS DATA VALIDATION WORKSHEETS (Continued)

SAIC Sample Number	Laboratory ID Number	CRDL Verification Initial ICP (g)	CRDL Verification Final ICP (g)	Standard Addition Results	Equipment Blank Results	Significant Sample Results
SOIL 8801D48B	8807S099-001M	ALL %R FOR INITIAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO	ALL %R FOR FINAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO	PEARSON'S r=0.9743 FOR LEAD; ALL OTHER STANDARD ADDITION RESULTS GREATER THAN 0.995	8802D0EB	SB=14.4UFN\AS=6.4FNS\BA=392P\BE=1.4P\ CD=8.4P*\CR=40.0P\CO=14.4P\CU=26.9P\ PB=16.1F\HG=0.12UCVN*\NI=34.4P\V=52.7P\ ZN=81.6PE mg/Kg
8801D49B	8807S099-002M				8802D0EB	AS=14.3FN\BA=348P\BE=1.4P\CD=7.8P*\ CR=33.4P\CO=13.4P\CU=30.3P\PB=14.6F\ HG=0.12UCVN*\NI=27.9P\V=49.5P\ZN=67.4P mg/Kg
SOIL 8801D22B	8806S079-001	ALL %R FOR INITIAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO	ALL %R FOR FINAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO	PEARSON'S r=0.9743 FOR LEAD; ALL OTHER STANDARD ADDITION RESULTS GREATER THAN 0.995	Not Avail.	AS=4.0FN\BA=273P\CD=4.8P*\CR=25.2P\CO=13.3P\ CU=28.4P\PB=7.2F\HG=0.6CVN*\NI=27.5P\ V=53.3P\ZN=48.9P mg/Kg
WATER 8802D0EB	8808S016-001	ALL %R FOR INITIAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO	ALL %R FOR FINAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO		NA	PB=29.8F µg/L
8802D0SB	8808S016-003				8802D0EB	Not Applicable
WATER 881D00EBC	8806-009-003	ALL %R FOR INITIAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO	ALL %R FOR FINAL ICP CRDL VERIFICATIONS WERE GREATER THAN ZERO		NA	BE=1.0BP\PB=10.6F\HG=0.40\AG=7.7UN\ZN=156P µg/L

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FOOTNOTES TO TABLE 3-16

(a) Calibration percent recovery control limits for mercury = 80-120 %R, for other metals = 90-110 %R, and for cyanide = 85-115 %R.
(b) Instrument detection limits and methods for all metals analyzed (µg/L):
Sb = 60 F
As = 10F
Ba = 200 P
Be = 5 P
Cd = 5 P
Cr = 10 P
Co = 50 P
Cu = 25 P
Pb = 3 F
Hg = 0.2 CV
Ni = 40 P
Se = 5 P
Ag = 10 P
Tl = 10 P
Sn = 5000 P
V = 50 P
Zn = 20 P
(c) Control limits for ICP interfernce check sample (ICS) are 80-120 %R for initial and final.
(d) Control limits for spike sample % recoveries (%R) are 75-125%.
(e) Duplicate sample control limits are ± 20 percent RPD for those samples greater than 5X the CRDL.
(f) Laboratory control sample (LCS) control limits are 80–120 percent for all elements.
(g) Control limits for CRDL Verification have not been established, any recovery greater than zero is deemed acceptable.
(1) Holding time for mercury is 28 days for soil and water samples; holding time for cyanide samples is 14 days for soil and water samples.
(2) Note about all the data: these samples were analyzed in batches that were validated previously; some data may be skewed by the results from non-applicable samples.
NA - Not Applicable
Not Avail. - Information was not available
* - Duplicate analysis not within control limits.
CV - Analyzed by cold vapor (mercury only).
F - Analyzed by graphite furnace atomic absorption (GFAA).
N - Spiked sample recovery not within control limits.
P - Analyzed by inductively coupled argon plasma (ICAP).
U - Indicates compound was analyzed for but not detected.

Note: There were no Field Blank samples taken for this project.

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time the sample was extracted. The Weston Laboratory was required to meet analysis holding times (for both soil and water samples) of 14 days for cyanide, 28 days for mercury, and 6 months for all other inorganics. Based on an evaluation of all environmental samples and QC blanks analyzed for Inorganics using the July 1988 SOW, all holding time criteria were met.

Initial Calibration Verification--Calibration of the inductively coupled argon plasma (ICP) spectrometer was established and validated by injecting a blank and at least one standard to establish an analytical curve. Calibration of the graphite furnace atomic absorption spectrometer (GFAA) was established and validated by injecting a blank and at least three standards (one of which must be at the CRDL) to establish the analytical curve. Mercury analysis requires the use of a blank and at least four standards to establish the curve and cyanide analysis requires the use of a blank and at least three standards in establishing the curve with a distilled midrange standard. Following the initial calibration, percent recovery values were evaluated to verify the validity of the calibration. Calibration criteria requirements (i.e., mercury, 80 to 120 percent; cyanide, 85 to 115 percent; and all others, 90 to 110 percent recovery) were described in the July 1988 SOW. Based on an evaluation of the initial calibrations conducted for metals and cyanide analyses, all percent recovery values were within control limits.

Continuing Calibration Verification--A CCV standard was analyzed daily and every 12 hours. Following the standard analysis, percent recovery values were calculated to verify that the current calibration remained acceptable. After this, at least one of the ICV and CCV percent recovery values per analysis type (e.g., ICP, GFAA) was recalculated to confirm that the original calculation agreed with the recalculation (i.e. within one percent). Percent recovery requirements used to evaluate the calibration acceptability are described in the July 1988 SOW. Based on an evaluation of the continuing calibrations conducted for metals and cyanide analyses, all percent recovery values were within control limits.

Method Blanks--One method blank analysis was conducted with each batch of environmental samples analyzed for metals and cyanide. Each method blank was evaluated for interferents that might potentially interfere with accurate quantitation of a target compound. According to CLP criteria, a laboratory blank may not contain any contaminants. Based on an evaluation of all method blanks (i.e., initial, continuing, and procedural) analyzed for metals and cyanide using the July 1988 SOW, no interferents were detected, except in 881D00EBC, where some contaminants were detected, but were all below the CRDL.

Interference Check Sample (ICS) Analysis--An ICS was run at the beginning and end of each sample analysis run, or twice per 8-hour work shift, whichever was more frequent. The results for the ICS solution analysis must fall within the control limits (i.e., within 20 percent of the true value), or have an absolute value greater than the instrument detection limit for those analytes not present in the ICS solution. One or more of the percent recoveries were then recalculated from the raw data (ICP printout) to verify that the original value and the recalculated value agreed. ICS criteria requirements are described in the July 1988 SOW. Based on an evaluation of the interference check sample analyses conducted for metals and cyanide, all percent recovery criteria were within control limits.

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Spiked Sample Analysis--Spiked sample analyses were conducted to assess the accuracy of the laboratory and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. The control limits for percent recovery values were between 75 and 125 percent, and were described in the July 1988 SOW. One or more of the recoveries was then recalculated from the raw data to verify that the original value and the recalculated value agreed. All percent recoveries were within the required control limits for all spiked samples, except for 8801D48B (silver = 3.3 percent), 8801D22B (silver = 3.3 percent), 8802DOEB (silver = 0 percent), and 881DOOEBC (selenium = 72.0 percent). None of these elements were detected in the soil samples, however, so these spiked samples were not considered to have adversely impacted the data quality. Tables 3-17 and 3-18 present the spiked and duplicate sample results for water and soil samples, respectively.

Duplicate Sample Analyses--Duplicate sample analyses were conducted to assess the precision of the laboratory based on each sample matrix. Precision was expressed as the RPD. The control limits for the RPD were within 20 percent (35 percent for soils) for sample values greater than 5 times the CRDL or two times the CRDL for sample values less than 5 times the CRDL. These limits were described in the July 1988 SOW. One or more of the RPD values was then recalculated to verify that the results were reported correctly. Based on an evaluation of the duplicate sample analyses conducted for Metals and Cyanides, all soil samples were within control limits. Since all of the water samples were field QC blanks, duplicate analyses were not performed for water samples.

Laboratory Control Sample (LCS) Analyses--Laboratory control sample analyses serve as monitors of the overall performance of all analysis steps. Since LCS control limits (percent recovery) for soils were not reported, the limits for soils were assumed to be the same as those used for water samples (i.e. 80-120 percent). These control limits were described in the July 1988 SOW. The raw data were then checked and one or more of the recovery values was recalculated to verify the results. All percent recoveries results for metals and cyanide were within control limits, except for 8801D48B (arsenic = 122 percent, thallium = 57 percent), 8801D22B (arsenic = 122 percent, thallium = 57 percent), and 881DOOEBC (arsenic = 214, lead = 52.3, thallium = 48.1 percent). The significant sample results for arsenic for samples 8801D48B and 8801D22B should be regarded as estimates because the LCS recoveries were greater than 120% and the sample results were above the instrument detection limit (i.e., 10 μg/L). For samples 8801D48B and 8801D22B, the sample results for thallium should be regarded as estimates because the results were below the instrument detection limit (i.e. 10 μg/L) and the LCS recoveries were within the range of 50 to 79 percent. In sample 881DOOEBC, the result for arsenic is regarded as acceptable because the results are below the instrument detection limit and the LCS recovery is greater than 120 percent. Additionally, the result for lead in this sample is regarded as an estimate because the LCS recovery is within 50 to 79 percent and the sample result is above the instrument detection limit (i.e., 3 μg/L); the result for thallium, however, is unusable because the LCS recovery is less than 50 percent.

CRDL Verification--A CRDL verification analysis is required for both GFAA and the ICP (initial and final) to verify the contract required detection limits.

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TABLE 3-17. TRACE METALS SPIKED SAMPLE AND DUPLICATE SAMPLE RESULTS: WATER SAMPLES AT IDAHO NATIONAL LABORATORIES, IDAHO FALLS, IDAHO

	ACCURACY					PRECISION				
Parameter	MS Total No. Analyses	Percent Recovery Ranges	%R Control Limits	%R No.Accept Analyses	%R No.Unaccept Analyses	MSD Total No. Analyses	Range RPD	RPD Limits	RPD No.Accept Analyses*	RPD No.Unaccept Analyses*
TRACE METALS										
Antimony	1	(103)	(75-125)	1	0	0	NA	60	NA	NA
Arsenic	1	(83.0)	(75-125)	1	0	0	NA	10	NA	NA
Barium	1	(98.6)	(75-125)	1	0	0	NA	200	NA	NA
Beryllium	1	(102)	(75-125)	1	0	1	(200)	5	0	1
Cadmium	1	(101)	(75-125)	1	0	0	NA	5	NA	NA
Chromium	1	(101)	(75-125)	1	0	0	NA	10	NA	NA
Cobalt	1	(99.1)	(75-125)	1	0	0	NA	50	NA	NA
Copper	1	(109)	(75-125)	1	0	0	NA	25	NA	NA
Lead	1	(97.0)	(75-125)	1	0	1	(0.00)	5	1	0
Nickel	1	(96.0)	(75-125)	1	0	0	NA	40	NA	NA
Selenium	1	(72.0)	(75-125)	0	1	0	NA	5	NA	NA
Silver	1	(0.00)	(75-125)	0	1	0	NA	10	NA	NA
Thallium	1	(95.6)	(75-125)	1	0	0	NA	10	NA	NA
Vanadium	1	(92.6)	(75-125)	1	0	0	NA	50	NA	NA
Zinc	1	(96.0)	(75-125)	1	0	1	(109)	20	0	1

* - Acceptable and unacceptable based on control limits only.
NA - Not analyzed.
Samples 8801EBCD and 8802D0EB were used for matrix effects evaluations.

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TABLE 3-18. TRACE METALS SPIKED SAMPLE AND DUPLICATE SAMPLE RESULTS: SOIL SAMPLES AT IDAHO NATIONAL LABORATORIES, IDAHO FALLS, IDAHO

	ACCURACY					PRECISION				
Parameter	MS Total No. Analyses	Percent Recovery Ranges	%R Control Limits	%R No.Accept Analyses	%R No.Unaccept Analyses	MSD Total No. Analyses	Range RPD	RPD Limits	RPD No.Accept Analyses*	RPD No.Unaccept Analyses*
TRACE METALS										
Barium	1	(99.0)	(75-125)	1	0	1	0.040	20	1	0
Beryllium	1	(97.0)	(75-125)	1	0	0	NA	20	0	0
Cadmium	1	(102)	(75-125)	1	0	1	14	20	1	0
Chromium	1	(98.0)	(75-125)	1	0	1	0.80	20	1	0
Cobalt	1	(105)	(75-125)	1	0	1	14	20	1	0
Copper	1	(107)	(75-125)	1	0	1	7.7	20	1	0
Nickel	1	(103)	(75-125)	1	0	1	8.6	20	1	0
Silver	1	(3.30)	(75-125)	0	1	0	NA	20	0	0
Tin	1	(99.0)	(75-125)	1	0	0	NA	20	0	0
Vanadium	1	(89.0)	(75-125)	1	0	1	4.7	20	1	0
Zinc	1	(85.0)	(75-125)	1	0	1	2.0	20	1	0

* - Acceptable and unacceptable based on control limits only.
NA - Not analyzed.
Sample 8801D22A was used for matrix effects evaluations.

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The EPA has not established any control limits for this QC check analysis, but any positive percent recovery is considered to be acceptable. Based on an evaluation of the CRDL verification analyses conducted for Metals and Cyanide, all samples were greater than zero.

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Appendix 5–7

APPENDIX 5-7

GAS SAMPLING RESULTS

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Table 5-22. Quality control table summary for formation gas samples[a]

Borehole Number	Sample Number	Sample Volume	Chain of Custody	Holding Time	Surrogate Recovery	Tuning and Mass Cal	Initial Cal	Continuing Cal	Internal Standard	Method Blank
8801D	05/03/89									
	E8019X8901	OK	OK	OK	OK	OK	Two compounds exceeds % diff	4 compounds exceeds % diff	OK	Acetone 2-butanone
	E8018X8901	OK	OK	OK	OK	OK			OK	
	E8017X8901	OK	OK	OK	OK	OK			OK	
	E8016X8901	OK	OK	OK	OK	OK			OK	
	E8015X8901	Sample not collected								
	E801528901	OK	OK	OK	NO*	OK			OK	
	E801538901	OK	OK	OK	NO*	OK			OK	
	E8010S8901	OK	OK	OK	OK	OK			OK	
8801D	05/10/89									
	E801548901	5mL	OK	OK	OK	OK			OK	
	E8014X8901	5mL	OK	OK	OK	OK		3 compounds exceeds % diff	OK	4 compounds found in lab blank
	E8013X8901	5mL	OK	OK	NO*	OK			OK	
	E801328901	5mL	OK	OK	NO*	OK			NO*	
	E801338901	Sample not collected								
	E8012X8901	5mL	OK	OK	OK	OK			OK	
	E8011X8901	5mL	OK	OK	OK	OK			OK	
	E8010X8901	5mL	OK	OK	OK	OK			OK	
78-4	05/18/89									
	E7845X8901	OK	OK	OK	OK	OK			OK	
	E784528901	OK	OK	OK	OK	OK		6 compounds exceeds % diff	OK	2-butanone methylene chlo 1,1,1-trichlor
	E7844X8901	OK	OK	OK	OK	OK			OK	
	E784428901	OK	OK	OK	OK	OK			OK	
	E7843X8901	23 mL	OK	OK	NO*	OK			OK	
	E7842X8901	OK	OK	OK	NO*	OK			OK	
	E7840E8901	OK	OK	OK	NO*	OK			OK	
WWW-1	05/31/89									
	EWW17X8901	OK	OK	OK	OK	OK			OK	
	EWW16X8901	OK	OK	OK	OK	OK		8 compounds exceeds % diff	OK	4 compounds found in blank
	EWW1628901	Sample not collected								
	EWW1638901	OK	OK	OK	OK	OK			OK	
	EWW15X8901	OK	OK	OK	OK	OK			OK	
	EWW14X8901	OK	OK	OK	OK	OK			OK	
	EWW1428901	OK	OK	OK	OK	OK			OK	
	EWW10S8901	OK	OK	OK	OK	OK			OK	
WWW-1	06/06/89									
	EWW13X8901	OK	OK	OK	OK	OK			OK	
	EWW1328901	OK	OK	OK	OK	OK		7 compounds exceeds % diff	OK	2 blanks run
	EWW12X8901	OK	OK	OK	OK	OK			OK	
	EWW11X8901	OK	OK	OK	NO*	OK			OK	
	EWW1128901	OK	OK	OK	NO*	OK			OK	3 compounds reported
	EWW10X8901	OK	OK	OK	NO*	OK			OK	

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Table 5-22. (continued)

Borehole Number	Sample Number	Sample Volume	Chain of Custody	Holding Time	Surrogate Recovery	Tuning and Mass Cal	Initial Cal	Continuing Cal	Internal Standard	Method Blank
77-1	06/08/89							8 Compounds exceeds % diff		2-butanone 1,1,1-tri-chloroethane
	E7716X8901	OK	OK	>48 H	OK	OK			OK	
	E7715X8901	OK	OK	>48 H	NO*	OK			OK	
	E771528901	OK	OK	>48 H	OK	OK			OK	
	E7714X8901	OK	OK	>48 H	OK	OK			OK	
	E7713X8901	OK	OK	>48 H	OK	OK			OK	
	E7712X8901	OK	OK	>48 H	NO*	OK			OK	
	E7710T8901	OK	OK	>48 H	NO*	OK			OK	

a. Communication between L. D. Goodrich, EG&G Idaho, Inc., Idaho Falls, Idaho, and L. N. Peterson/C. J. Bonzon, EG&G Idaho, Inc., Idaho Falls, Idaho, December 26, 1989.

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Appendix 6–1

APPENDIX 6-1

1983 SOILS STUDY

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EG&G Idaho, Inc.

Report No. PG-WM-83-032

Date: October 1983

INTERNAL TECHNICAL REPORT

SCREENING FOR HAZARDOUS MATERIALS IN RWMC ERODIBLE SOILS

Physical and Biological Sciences Division
Earth and Life Sciences Branch

Alan B. Crockett

Checked By: Alan B. Crockett

Approved By:

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PG-WM-83-032
October 1983

SCREENING FOR HAZARDOUS MATERIALS IN RWMC ERODIBLE SOILS

Physical and Biological Sciences Division
Earth and Life Sciences Branch

Alan B. Crockett

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SCREENING FOR HAZARDOUS MATERIALS IN RWMC ERODIBLE SOILS

INTRODUCTION

The Radioactive Waste Management Complex (RWMC) in the Idaho National Engineering Laboratory is currently a shallow land burial site for low-level waste and, prior to 1970, for transuranic waste. Since it was opened in 1952, about 115,000 m^3 (4,060,000 ft^3) of low-level waste and low-level waste commingled with transuranic waste have been buried at the RWMC. The practice of burying transuranic waste was discontinued in 1970.

The buried waste consists of a variety of materials contaminated with radioactivity including: construction and demolition material, laboratory equipment, protective clothing, maintenance equipment, decontamination materials, waste processing products, etc.[1] Some of the buried waste, if not radioactive, would be considered hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 260-265. By this definition, the hazardous wastes known to be buried at the RWMC include acetone, antimony, benzene, cadmium, hydrofluoric acid, mercury and thallium. Other buried hazardous materials include asbestos, beryllium, gasoline, lead, nitrates, oil, palladium, polychlorinated biphenyls, zirconium, etc.[1] Accurate data do not exist on the types and quantities of contaminated, hazardous materials buried at the RWMC, but quantities of most are thought to be small.

Increased concern for hazardous waste has been stimulated by the RCRA regulations promulgated by the EPA, and DOE's concern for hazardous waste and radioactive mixed waste (radioactive waste containing hazardous waste constituents). Under DOE Order 5480.2,[2] low-level radioactive mixed waste will be managed "to assure a degree of protection of the environment and the safety of the public equivalent to that afforded under 40 CFR 260-265." While the Order does not apply retroactively, it has stimulated concern about radioactive mixed waste previously buried at the RWMC.

To ensure that buried radioactive waste is not migrating from the RWMC, routine environmental monitoring is conducted.[3,4] Samples of

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groundwater, surface water, subsurface rock and soil, surface soil, air, and biota are analyzed for radionuclides. The only nonradioactive constituents routinely sought are nitrates in a few soil and surface water samples and chlorides in groundwater. Results of the monitoring programs are reported annually.

One special study was conducted in 1980 by the U.S. Geological Survey;[5] RWMC groundwater and perched water samples were analyzed for dissolved organic carbon (DOC), since elevated levels generally indicate contamination by organic chemicals. Water samples from four deep wells--numbers 87, 88, 89, and 90--were collected by pumping. These samples contained 1.6-8.7 mg/L of DOC compared to background levels of 7.1 mg/L. The perched water sample was collected from Well 92 and it showed a value of 8.7 mg/L DOC compared to a background level of 9.3 mg/L. According to these data, there is no evidence of organic contamination of groundwater.

Other than the United States Geological Survey (USGS) study of groundwater, no studies have been conducted to determine if nonradioactive hazardous materials are migrating from the RWMC. Since only limited migration of radioactive waste has occurred, hazardous waste movement has also been assumed to be minimal. Thus, this screening study was conducted to determine if trace elements and organics from buried waste are migrating from the RWMC as evidenced by their presence in surface soils.

OBJECTIVES

The purpose of this screening study was to determine if hazardous materials buried at the RWMC are migrating from the burial site as particulate matter suspended in air or water. To maximize the probability of detecting metals and organics and to minimize costs, sampling efforts focused on collecting surface soils consisting of fine particulates. Fine-grained soils have a relatively higher probability of resuspension and a greater sorption capacity for metals and organics than do coarse materials.[6] The results of this study will serve as a basis for determining if more comprehensive studies are needed.

The specific objectives of the study were as follows:

- To quantify the concentrations of hazardous metals and organics in surface soil at the RWMC

- To determine whether the contaminant levels represent a significant hazard that would require routine monitoring.

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SAMPLING DESIGN

Initially, waste records were examined to determine if specific areas of the RWMC could be associated with radioactive mixed waste disposal. The records were not helpful and were not used as a basis for the sampling design.

As previously noted, metals and organic chemicals usually concentrate in fine particles, and such fines are more susceptible to erosion. Therefore, waterborne and deposited soil found in drainage ditches and depressions was selected for sampling. Nine soil samples potentially containing hazardous materials (R) and three control samples (C) were collected from the following areas (Figures 1 and 2):

R-1	Spreading area downstream from the RWMC to which runoff is channeled
R-2	Ditch just outside the burial ground into which all runoff water from the burial grounds is pumped
R-3	Depression to the right of the entrance gate and within the burial grounds
R-4	Culvert which receives runoff from Pad A
R-5	Depression west of pit 2 (closed in 1963)
R-6	Sedimentation area north of trench 2 before culvert
R-7	Depression southeast and downgradient from an abandoned acid disposal pit
R-8	Bottom of active pit 16/17

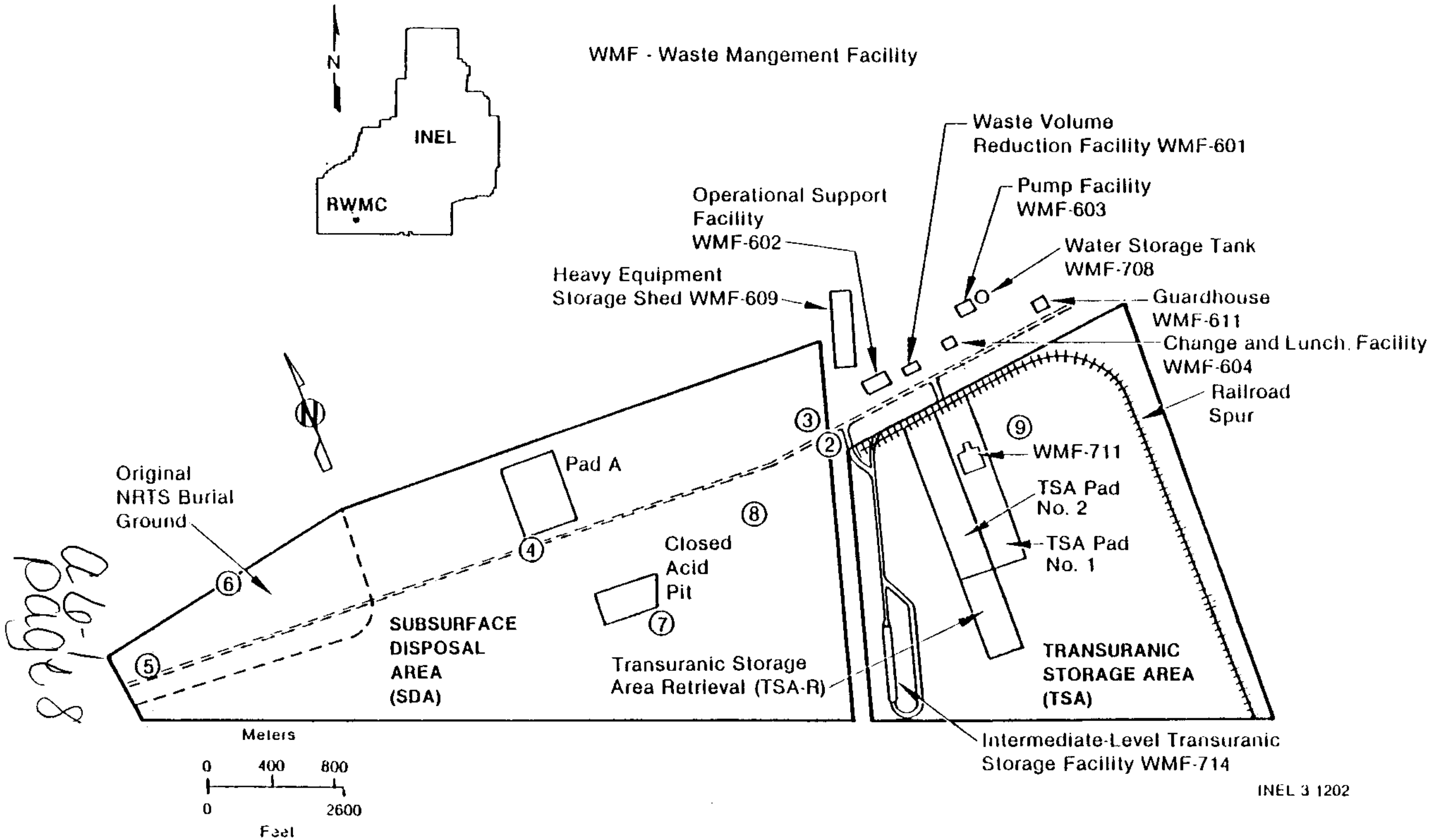

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Figure 1. Location of RWMC soil sampling Sites R-2 through R-9.

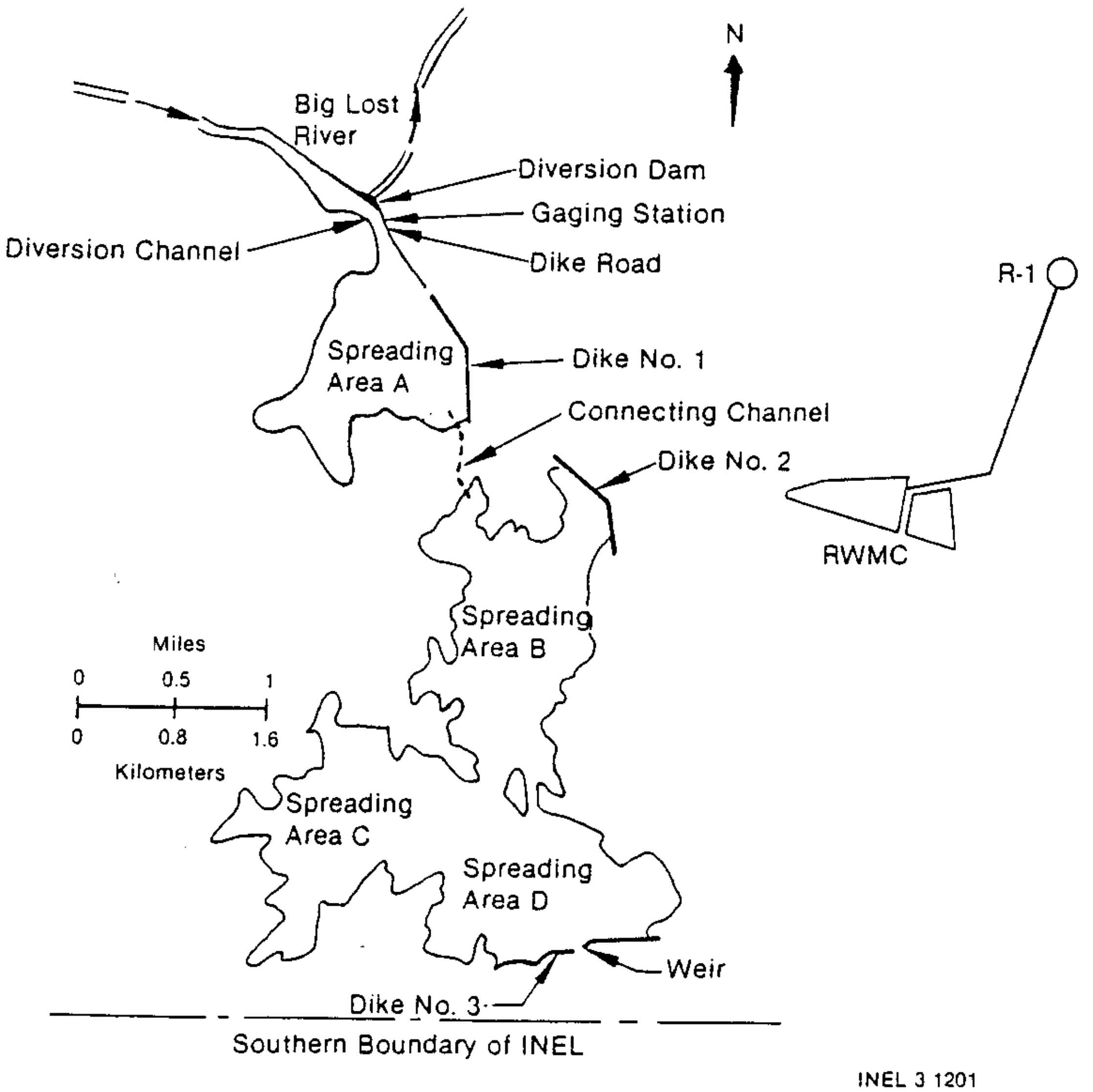

Figure 2. Location of soil sampling Location R-1 and spreading Area B where control samples were collected.

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R-9 Area where snow scraped from the burial grounds is deposited

C-1 Control taken from undisturbed sagebrush area

C-2, C-3 Controls collected from diversion area B which is used as a source of clean soil for capping pits and trenches

Each sample was a composite of five surface soil subsamples. The subsamples were scooped with a trowel from inside a steel ring (5 cm deep x 10-cm diameter) which was pounded into the ground and the soil was then placed in specially cleaned 1-qt (~1-L) glass jars with teflon-lined lids. In control areas, subsamples were collected from a large area, but samples collected from ditches and ponding areas were composited from much smaller areas. The trowel and steel ring used for sampling was cleaned with chlorothane Nu (solvent for radioactive decontamination) between samples. The samples were collected on September 13, 1982, and shipped chilled to the analytical laboratory where they were received September 15, 1982.

ANALYTICAL PROCEDURES

All samples were analyzed by California Analytical Laboratories, Inc., for the organic compounds, metals, and inorganic nonmetallic constituents shown in Table 1. The lower limits of detection in soil are also listed in Table 1. Raw data on these metals, inorganic nonmetals, and a few other elements are presented in Appendix A. All results are based upon wet weights of samples.

Organic Compounds

The analytical procedures used for organic priority pollutants in sediments were specified by the EPA in their contract with the laboratory. The procedures are modified versions of methods 608, 613, 624, and 625 as published in the Federal Register, December 3, 1979. Any significant peak detected on the gas chromatograph runs, even though not a priority organic, was to be identified.

For extractable compounds, 40 g of sediment (wet weight) were extracted in a Soxhelet apparatus with 1:1 acetone/hexane (v:v) (spiked with the internal standards) for 16 h. One half of the extract was concentrated to 10 mL using a Kuderna-Danish evaporator, and the second half was rinsed with water, concentrated, and analyzed for pesticides. The first extract was added to 50 mL of hexane, and the mixture was extracted three times with a NaOH solution. The organic phase was then concentrated and analyzed by gas chromatography/mass spectrometry for base/neutral compounds. The aqueous extract was acidified, extracted three times with methylene chloride, concentrated, and analyzed for acid extractable compounds.

Volatile organics in soils were determined by placing 1 to 5 g of soil into a volatile organic analysis vial and adding 5 mL of water containing internal standards. The vial was then purged, and the vapors trapped and analyzed according to EPA method 624 referenced above.

TABLE 1. LIST AND DETECTION LIMITS OF ORGANIC CHEMICALS, METALS AND NONMETALLIC INORGANIC CONSTITUENTS ANALYZED IN RWMC AND CONTROL SOILS (mg/kg)

Volatiles	Detection Limit	Base/Neutral Compounds	Detection Limit
acrolein	0.05	acenaphthene	0.5
acrylonitrile	0.05	benzidine	0.5
benzene	0.05	1,2,4-trichlorobenzene	0.5
carbon tetrachloride	0.05	hexachlorobenzene	0.5
chlorobenzene	0.05	hexachloroethane	0.5
1,2-dichloroethane	0.05	bis(2-chloroethyl)ether	0.5
1,1,1-trichloroethane	0.05	2-chloronaphthalene	0.5
1,1-dichloroethane	0.05	1,2-dichlorobenzene	0.5
1,1,2-trichloroethane	0.05	1,3-dichlorobenzene	0.5
1,1,2,2-tetrachloroethane	0.05	1,4-dichlorobenzene	0.5
chloroethane	0.05	3,3'-dichlorobenzidine	0.5
2-chloroethylvinyl ether	0.05	2,4-dinitrotoluene	0.5
chloroform	0.05	2,6-dinitrotoluene	0.5
1,1-dichloroethene	0.05	1,2-diphenylhydrazine	0.5
trans-1,2-dichloroethene	0.05	fluoranthene	0.5
1,2-dichloropropane	0.05	4-chlorophenyl phenyl ether	0.5
trans-1,3-dichloropropene	0.05	4-bromophenyl phenyl ether	0.5
cis-1,3-dichloropropene	0.05	bis (2-chloroisopropyl) ether	0.5
ethylbenzene	0.05	bis (2-chloroethoxy) methane	0.5
methylene chloride	0.05	hexachlorobutadiene	0.5
chloromethane	0.05	hexachlorocyclopentadiene	0.5
bromomethane	0.05	isophorone	0.5
bromoform	0.05	naphthalene	0.5
bromodichloromethane	0.05	nitrobenzene	0.5
fluorotrichloromethane	0.05	N-nitrosodiphenylamine	0.5
dichlorodifluoromethane	0.05	N-nitrosodipropylamine	0.5
chlorodibromomethane	0.05	bis (2-ethylhexyl) phthalate phthalate	0.5
tetrachloroethene	0.05	benzyl butyl phthalate	0.5
toluene	0.05	di-n-butyl phthalate	0.5
trichloroethene	0.05	di-n-octyl phthalate	0.5
vinyl chloride	0.05	diethyl phthalate	0.5
		dimethyl phthalate	0.5
Acid Compounds		benzo(a)pyrene	0.5
		benzo(b)fluoranthene	0.5
2, 4, 6-trichlorophenol	0.5	benzo(k)fluoranthene	0.5
p-chlor-m-cresol	0.5	chrysene	0.5
2-chlorophenol	0.5	acenaphthylene	0.5
2,4-dichylorophenol	0.5	anthracene	0.5
2,4-dimethylphenol	0.5	benzo(ghi)perylene	0.5
2-nitrophenol	0.5	fluorene	0.5
4-nitrophenol	2.	phenanthrene	0.5
2,4-dinitrophenol	1.	dibenzo(a,h)anthracene	0.5
4,6-dinitro-2-methylphenol	0.5	indeno(1,2,3-cd)pyrene	0.5
pentachlorophenol	0.5	pyrene	0.5
phenol	0.5		

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TABLE 1. (continued)

Pesticides	Detection Limit	Metals	Detection Limit
aldrin	0.01	antimony	1.0
dieldrin	0.01	arsenic	1.0
chlordane	0.1	beryllium	0.01
4,4'-DDT	0.01	boron	1.0
4,4'-DDE	0.01	cadmium	0.2
		chromium	0.2
4,4'-DDD	0.1	copper	0.4
α-endosulfan	0.01	lead	0.3
β-endosulfan	0.01	mercury	0.03
endosulfan sulfate	0.1	nickel	0.3
endrin	0.01	selenium	1.0
endrin aldehyde	0.1	silver	1.0
heptachlor	0.01	thallium	0.6
heptachlor epoxide	0.01	zinc	0.2
α-BHC	0.01		
β-BHC	0.01		
		Inorganic Nonmetals	
δ-BHC	0.01	chloride	NA[a]
γ-BHC (lindane)	0.01	nitrate	NA
PCB-1242	0.1		
PCB1254	0.1		
PCB-1221	0.1		
PCB-1232	0.1		
PCB-1248	0.1		
PCB-1260	0.1		
PCB-1016	0.1		
toxaphene	0.2		
Dioxins			
2,3,7,8, -tetrachloro-dibenzo-p-dioxin	0.1		

a. NA = Not Available.

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Metals

For all elements except boron and mercury, 10 g of soil (wet weight) were digested with 10 mL of 1:1 HNO_3 for 2-6 h and evaporated to near dryness on a hot plate. Eight mL of HNO_3 were added to the sample and it was again evaporated to near dryness. Twenty mL of 1:1 HNO_3 and 6 mL of 30% H_2O_2 were added, and the sample was heated until effervescence ceased (approximately 10 min). After cooling, 2 mL of 1:1 HNO_3 and 25 mL of distilled water were added to the mixture, which was then filtered. The filtrate was made up to volume and analyzed by atomic absorption or inductively coupled plasma emission spectroscopy (Federal Register, December 3, 1979, Part III). Boron analyses were conducted on an aqueous extract of the soils. Mercury was determined by the cold vapor technique.

Inorganic Nonmetalic Compounds

The American Public Health Association[7] procedures were used for the determination of chloride (method 407C), and nitrate (418C) on aqueous extracts of the soil samples.

Quality Assurance

A quality assurance (QA) program was included in this study. This involved submitting duplicate, spiked, and standard samples from another study to the analytical laboratory; however, only the samples collected simultaneously with the RWMC samples are presented. The metal and inorganic compound results (Table 2) indicate reasonable precision for a screening study. Since only one organic was detected, precision cannot be determined.

In addition, the analytical laboratory runs an internal quality assurance program as specified in EPA procedures for organic compounds and elements (Federal Register, December 3, 1979).

TABLE 2. RESULTS OF TWO QUALITY ASSURANCE SAMPLES (FIELD DUPLICATES) SUBMITTED TO THE LABORATORY (mg/kg)

	Sample[a]			
Analysis[b]	A_1	A_2	B_1	B_2
Boron	42	49	--	--
Cadmium	0.58	0.58	0.29	0.36
Chromium	120	150	1.9	1.3
Copper	10	11	3.6	2.5
Lead	11	8.0	15	12
Nickel	8.2	7.4	1.2	0.6
Zinc	83	175	25	20
Chloride	240	210	160	130
Nitrate-N	0.21	0.23	0.60	0.62
PCB 1260	--	--	300	400

a. A and B are separate samples. 1 and 2 represent field duplicates.

b. No other metals or organic compounds were detected. QA results are from sediment samples collected for a different study but submitted to the laboratory at same time.

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RESULTS

The 12 soil samples were analyzed for organic priority pollutants specified by the EPA (Table 1). Sample R-1 showed chloroform at 0.055 mg/kg but no other organic compound was detected in the samples. The source of the chloroform was probably the chlorothane Nu cleaning solution which contained chloroform. The results for volatile compounds should be viewed with caution since such compounds are not likely to persist in surface soils.

Table 3 presents estimated geometric means and 95% confidence intervals for analytical data on inorganics in RWMC exposed soils, controls, and preoperational samples collected from around the Waste Experimental Reduction Facility (WERF). The WERF is a facility on the INEL at which a set of preoperational soil samples was collected and analysed. The results are included as additional background data. Samples R-8 and C-3 were rejected as statistical outliers. The only reasonable explanation for the outliers is an error in the extraction procedure.

T-tests for comparisons of means indicated no statistically significant difference in concentration between inorganics in RWMC soils and controls at the 95% confidence level. Considering only two control samples were used, this is not suprising. However, the data do not even suggest contamination. Generally, control soils contain somewhat higher levels of inorganics than RWMC exposed soils. RWMC soils also do not have elevated levels of elements compared to granitic or basaltic crustal abundance levels (Table 3).[9] The soils at the RWMC are derived mainly from granitic rock but also contain some basaltic materials. In a comparison of concentrations, it should be noted that all concentration data are based upon wet weights. Concentrations could have increased by about 50% if the samples had been analyzed on a dry weight basis.

A comparison of the 95% confidence intervals for RWMC and WERF soils indicates that copper, lead, and zinc levels are lower at the WERF than at the RWMC (95% confidence intervals do not overlap). However, these elements at the RWMC are below average crustal abundance values for granite.

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TABLE 3. CONCENTRATION OF METALS AND INORGANIC NONMETALLIC COMPOUNDS IN SURFACE SOILS AT RWMC AND WERF

	Concentrations mg/kg						
	RWMC Surface Soil			WERF Surface Soil			
Constituent[a]	Exposed Mean[b]	95% Conf. Int.	Control Mean[b,c]	Mean[b] n=12	95% Conf. Int.	Granite Average[d]	Basalt Average[d]
Boron	19	16 - 22	25	67	61 - 74	15	5
Cadmium	0.50	0.42 - 0.60	0.62	0.5	0.4 - 0.6	0.2	0.2
Chromium	3.5	2.7 - 4.6	3.3	4.4	3.7 - 5.3	4	200
Copper	6.9	5.6 - 8.4	6.8	ND	--	10	100
Lead	8.8	7.8 - 9.9	9.9	1.7	1.0 - 2.9	20	5
Nickel	7.0	5.8 - 8.6	5.8	5.7	4.8 - 6.8	0.5	150
Zinc	37	27 - 51	27	19	16 - 23	40	100
Chloride	150	80 - 310	160				
Nitrate-N	0.28	0.15 - 0.52	0.53				

a. The following elements were not detected in RWMC surface soils or controls: antimony, arsenic, beryllium, mercury, selenium, silver, and thallium.

b. Estimated geometric mean.

c. One RWMC soil sample extract was rejected as an outlier for elemental analysis; n equals 8 and 2 for exposed and control soils. For the other inorganic constituents n equals 9 and 3 for exposed and control soils.

d. Reference 9.

CONCLUSIONS

The screening study for hazardous waste at the RWMC shows no evidence of surface contamination by organic chemicals, metals, or nonmetallic inorganic constituents. It can be concluded that no significant elevated levels of the constituents listed in Table 1 are being transported off the RWMC by surface runoff or atmospheric transport of particulates. The results should not, however, be used to draw any conclusions concerning the transport of highly volatile organic chemicals. The results of this screening study do not provide any evidence that a routine monitoring program for elements and organics in surface soil at the RWMC needs to be established.

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3. U.S. Department of Energy, 1981 Environmental Monitoring Program Report for Idaho National Engineering Laboratory Site, IDO-12082 (81), 1982.

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7. American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 15th edition, Washington, D.C. 1981, 1134 p.

8. W. J. Dixon and F. J. Massey, Jr, Introduction to Statistical Analysis, New York: McGraw-Hill Book Company, Inc., 1969, 639 p.

9. S. R. Taylor, "Abundance of Chemical Elements in the Continental Crust: A New Table," Geochimica et Cosmochimica Acta, 28, pp. 1273-1285.

APPENDIX A

RAW DATA FOR METALS AND NONMETALLIC INORGANIC CONSTITUENTS IN RWMC SOILS

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TABLE A-1. RAW DATA FOR METALS AND NONMETALLIC INORGANIC CONSTITUENTS IN RWMC SOILS (mg/kg)

Constituent[a]	Detection Limit	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	C-1	C-2	C-3
Barium	1.0	83	210	180	83	92	180	83	--	130	250	92	--
Boron	1.0	17	18	12	21	22	18	22	--	22	25	25	--
Chromium	0.2	5.1	3.5	2.7	4.7	5.1	2.5	3.3	--	2.4	5.8	7.9	--
Cadmium	0.2	.65	.45	.45	.62	.55	.34	.50	--	.52	1.1	.36	--
Cobalt	0.4	3.5	2.2	2.2	2.5	3.1	2.7	2.1	--	2.3	4.8	2.0	--
Copper	0.4	9.2	8.3	5.5	8.1	8.0	4.5	6.6	--	6.2	11	4.3	--
Lead	0.3	10	8.2	8.2	11	9.2	8.3	9.2	--	6.8	12	7.8	--
Manganese	0.1	200	160	150	150	190	120	120	--	140	230	160	--
Nickel	0.3	12	6.7	5.9	6.9	8.0	5.7	5.9	--	7.1	8.3	4.0	--
Zinc	0.2	52	31	32	78	39	26	28	--	33	38	20	--
Chloride	--	400	160	240	400	160	80	64	64	160	130	130	240
Nitrate-N	--	0.53	0.22	0.57	0.17	0.14	0.26	0.20	0.18	0.74	0.57	1.0	0.27

a. Antimony, arsenic, beryllium, mercury, selenium, silver, thallium, and vanadium were not detected. Metal results for samples R-8 and C-3 rejected due to extraction errors.

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APPENDIX 11-1

EDF-PRELIMINARY ANALYSIS OF TWO-WEEK TEST

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EG&G Idaho, Inc.
FORM EG&G-2631 (Rev.12-88)

Project File Number 50
EDF Serial Number ERP-VVED-
Functional File Number

ENGINEERING DESIGN FILE

Project/Task VVED
Subtask DATA ANALYSIS

EDF Page 1 of 15

Subject: Preliminary Analysis of the 2week VVED Test

Abstract: (See below)

Distribution (complete package) P.B. BLACKER, K.H. KINKAID, R.R. PISCITELLA, J.B. SISSON, R.G. BACA, N.W. SOANG, J.F. GINSBERG, D.L. FRENCH, T.B. AARINGTON, F.A. DAVIES

Distribution (cover sheet only): Project EDF file log, EDF serial no. log

Author	Dept.	Reviewed	Date	Approved	Date
James B. Sisson	F83b	RG Baca	5/28/90	[signature]	5-30-90

The objective of this report is to present a preliminary evaluation of the data from the 2-week Vapor Vacuum Extraction Demonstration (VVED) applicable to modeling. This report focuses on evaluation of the soil gas pressure and organic vapor concentration data. The VVE process proceeded at a soil gas pumping rate of 514 cfm producing an average mass extractoin rate for carbon tetrachloride (CCL4) of 14 lbs/day. Problems with the Data Acquisition System (DAS) were encountered that prevented the pressure data from the 2 week test from being fully useful. However, problems with the system have been corrected and now has yielded data for more then 1 month continuously at a sampling interval of 2 minutes. Downhole pressures are being corrected for barometric effects. The corrected pressures will be used to obtain estimates of the large scale hydraulic conductivities needed to model a large clean up system. The gas concentration data appears to have sources of error that are probably mechanical but are as yet to be identified. Further studies are needed to better isolate and correct these errors. The concentration of carbon tetrachloride (CCl4) in the extraction stream is anomalously low and a tracer test is being devised to identify conduit flow near the extraction well.

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PRELIMINARY ANALYSIS OF THE 2 WEEK VVED TEST
by
J. B. Sisson

The 2-Week VVED test was conducted primarily to establish levels of radionuclides that might be transported by Vapor Vacuum Extraction (VVE) process (See ERP-VVED-042 for a report on the radionuclides). Secondary objectives of the 2-Week Test were to obtain data for modeling activities and data required to scale up the extraction system to the final cleanup configuration.

This report presents a preliminary evaluation of the data collected during the 2 week VVED test. This information will be used to model the contaminant migration beneath the SDA.

Data collected during the operation of the VVED 2 week test are soil gas concentrations, soil gas pressures, concentration of the extraction stream, pressure at the well head during extraction, and skid operating parameters.

Skid Operating Parameters and DAS Operation:

The skid operating parameters tell us how things are going with the pumping phase of the extraction process. From an extraction viewpoint the two most important parameters are flow rate and bore hole pressure. Figure 1 shows the relationship between Flow rate and borehole pressure. These small vacuum pressures indicate that the underlying basalts are highly permeable and can be pumped at a high rate. Based on these results doubling the pumping rate to 1000 cubic feet per minute (CFM) or 28 cubic meters per minute (MM) would result in a bore hole vacuum pressure of 1 psi (6.5 kPa).

Other operating parameters monitored manually at the skid include relative humidity (following the in line heater), well

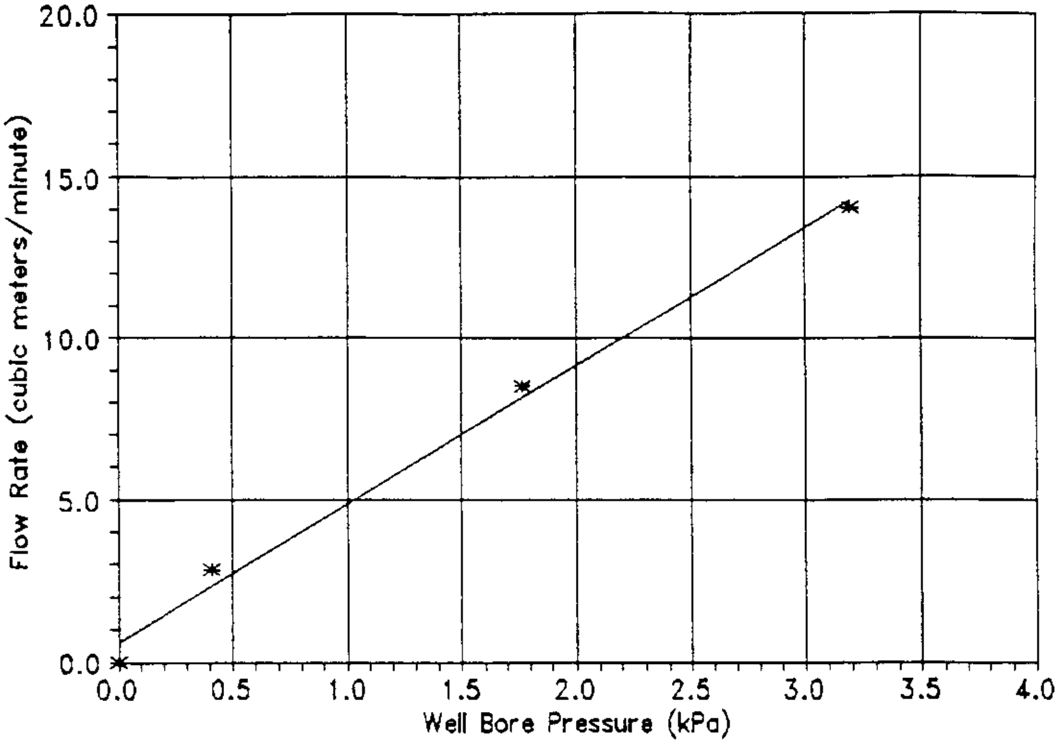

Figure 1. Pumping rate at the extraction well vs the extraction well vacuum. Soild line from regression (Flow = 0.6+4.3×Vacuum).

psi

.135 200

.387 490

.541 680

$\frac{\Delta \text{Flow}}{\Delta \text{Vac}} = 905.7 \frac{\text{scfm}}{\text{psi}}$

$900 \times \frac{1 m^3}{28 ft^3} \times \frac{14.7 psi}{100 kPa}$

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vacuum, heater temperature, HNu reading, electrical power frequency applied to the pump motor, vacuum at the pump, gas discharge temperature, pressure drops across filters, position of the extraction well valve, and rotameter flow reading for the flat filters. The following Table summarizes the pumping activities during the 2-Week Test.

Table 1. Pumping Activities During 2 Week Test.

Date	Time	Activity
~~Sept.~~ 31 Oct.	15:36	Start of Staged Pump Test. Flow set at 0, 100, 300, and 500 CFM.
	16:22	Pump set to permitted limit of 514 ±11 CFM
Nov. 1	11:19	Pump off. Condensation in CAM Alarm System, Rotameter, and HNu suction line.
Nov. 3	08:49	Pump restarted and set to limit.
Nov. 14	15:30	Pump off. End of the 2-week test.

Relative humidity readings ranged between 30 and 40% throughout the test while the air stream temperature ranged from 70 to 80 F. Vacuum in the well ranged from 0.38 to 0.46 pounds per square inch vacuum (psiv) or 2.58 to 3.21 kPa. An additional data column added to the log indicates that the pumping rate varied from 497 to 523 cubic feet per minute (CFM) during the 2-Week test.

Downhole and Barometric Pressures:

Downhole pressures are known to vary with pumping rates and

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the barometer. A data set showing only barometric effects is presented on Figure 2. Figure 2 shows that the downhole pressures are similar to the barometric pressure except they appear smoother and lag behind the barometer. The shallower depths lag about 20 minutes and the deepest depths lag nearly 10 hours! These results indicate that if the downhole pressures are to be corrected for the barometer long periods (> 2 weeks) of uninterrupted data sequences are needed. Figure 2 also shows the need to remove barometric effects from the data in order to precisely estimate pumping effects. Once the pumping effects are precisely known, reliable estimates of the hydraulic properties of the underlying basalts will be obtained. These data are essential to produce more accurate computer simulations of the gas extraction process. During the 2 week test the barometer ranged 11 kPa (between 79 and 90 kPa) while there was only a 3 kPa vacuum in the extraction well. These results indicate that if pumping effects are to be seen in the closest monitoring well 8801D, 22 meters away, the downhole effects due to the barometer must be reduced to less then 0.01 kPa. Currently digital filters are being designed to carry out this task.

Soil gas pressures from 33, 50, 78, 93, 103, 131, 167, 193, and 230 feet below land surface were recorded at time intervals varying from 30 seconds to hourly at monitoring Well 8801D. At monitoring Well DO2, the downhole pressures were sampled hourly for the entire test period from 28, 60, 69,100, 130, 166, 193, and 233 feet below land surface. The pressure sensors at 8801D were differential sensors with the reference port open to atmospheric

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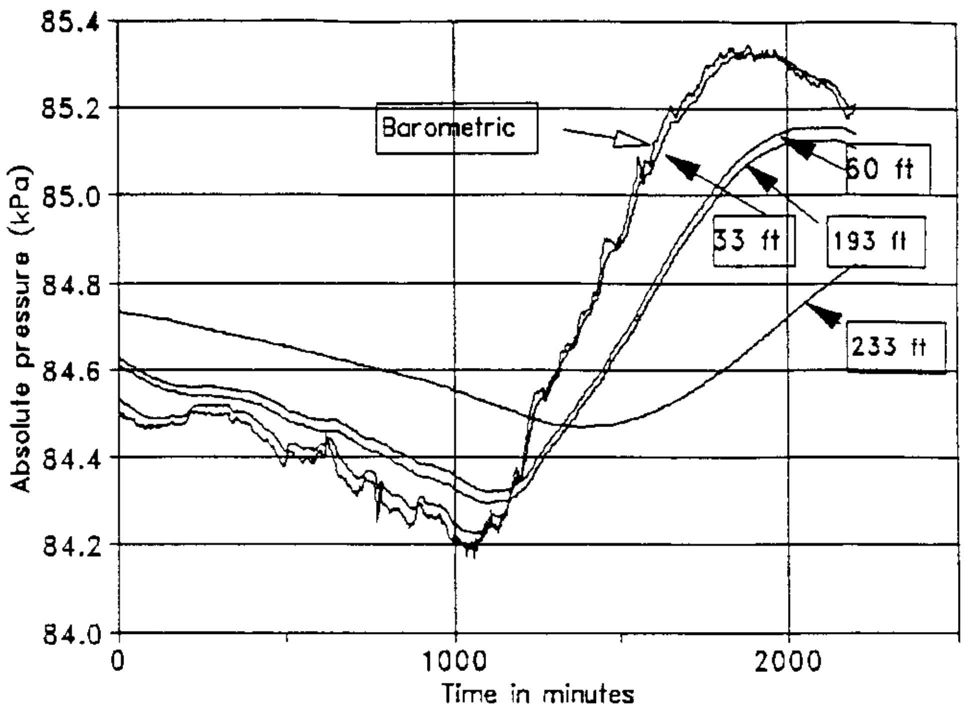

Figure 2. Downhole pressure flutuations due to barometric effects at monitoring Well DO2.

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pressure. Differential sensors were found to be unsatisfactory for this application and following the 2 week test were returned to the vendor for absolute pressure sensors designed specifically for atmospheric pressure monitoring. Well DO2 was originally equipped with absolute sensors of the barometric type. Following the 2 week test a barometric sensor was added to the existing system of sensors for the explicit purpose of monitoring barometric pressure at DO2. This provides measurement redundancy for the barometric pressure.

During the 2 week test the Data Acquisition System (DAS) experienced several failures producing gaps in the data from the skid and well 8801D. One source of DAS failure was attempting to provide too wide a range of options for operating the DAS. The complex menus that resulted were difficult to read on the portable computer under field conditions thus, causing errors. It was not until several months following the 2 week test that a firmware error in the DAS was discovered. This error caused the DAS to drop out for 24 hour periods. Currently all sensors, data loggers and computers appear to be fully operational and one month of data has been obtained without interruption.

A preliminary estimate of the horizontal hydraulic permeability was computed. The computation assumed all flow to the extraction well to be horizontal and an undetectable pressure drop in the closest observation well. The computed value of 40 Darcies compared favorably with the USGS estimates made at the Birch Creek Playa.

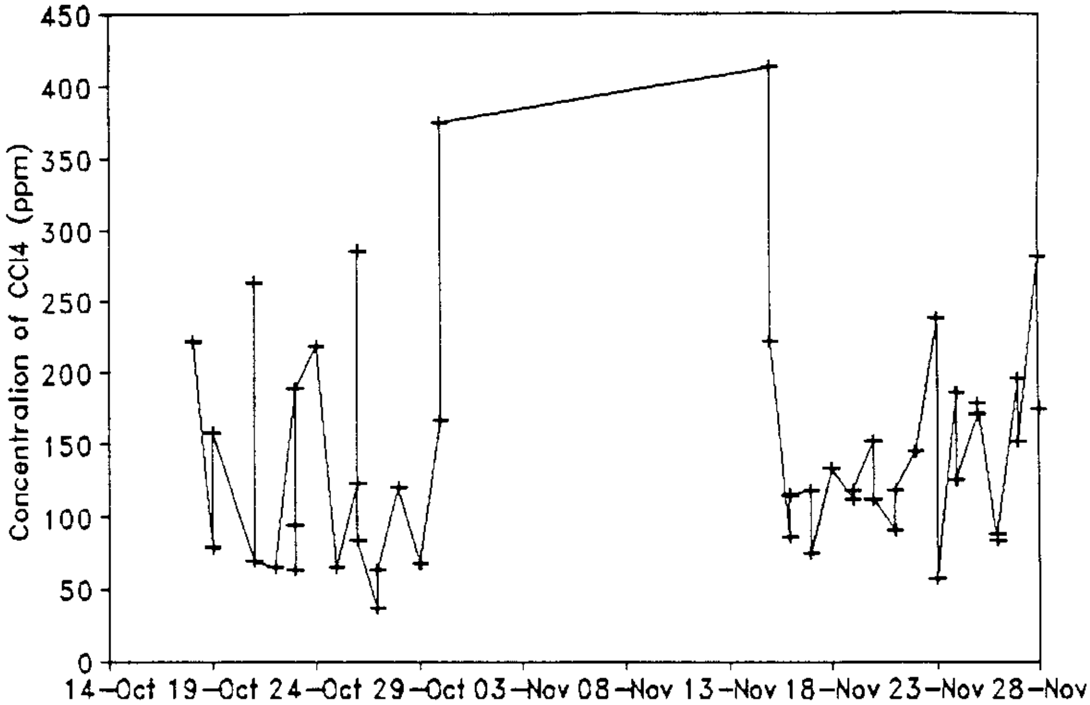

Figure 3. Concentration of the standard gas estimated with field GC.

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Gas Sampling Activities:

Soil gas samples were obtained from the 4 monitoring wells 8801D, DO2, WWW-1, and 78-4. Samples were taken using a small portable pump in Tedlar bags and transported to the skid for analytical analysis. Gas concentrations was estimated using a gas chromatograph (GC). In addition to the monitoring wells samples of a standard gas mixture were analyzed. Results of the standard gas analysis is shown on Figure 3. Figure 3 indicates that the GC data had a large variance; in this particular case the average concentration of the standard gas was 140 ppm with a standard error of 80 ppm. Since the 2 week test the GC has been moved from the skid to a more temperature stable office in the SWEPP building to partially control the wide variance in these data.

During the 2 week test samples were taken from the extraction stream and are shown on Figure 4. Using the pumping rate of 514 CFM an extraction rate for CCl_4 was computed and integrated over the duration of test shown on Figure 5. After integration a smooth extraction curve resulted that is near linear over the duration of the test. Figure 5 indicates that approximately 165 lbs (76 kg) of CCl_4 was extracted over the 12 days of pumping for an average extraction rate of 14 lbs per day (6 kg/day). The ability of the system to sustain this rate of extraction will depend on maintaining at least 200 ppm CCl_4 in the extraction stream.

The concentration of contaminants in the extraction stream is controlled in part by the horizontal hydraulic conductivity and by the ratio of the horizontal to vertical hydraulic conductivities

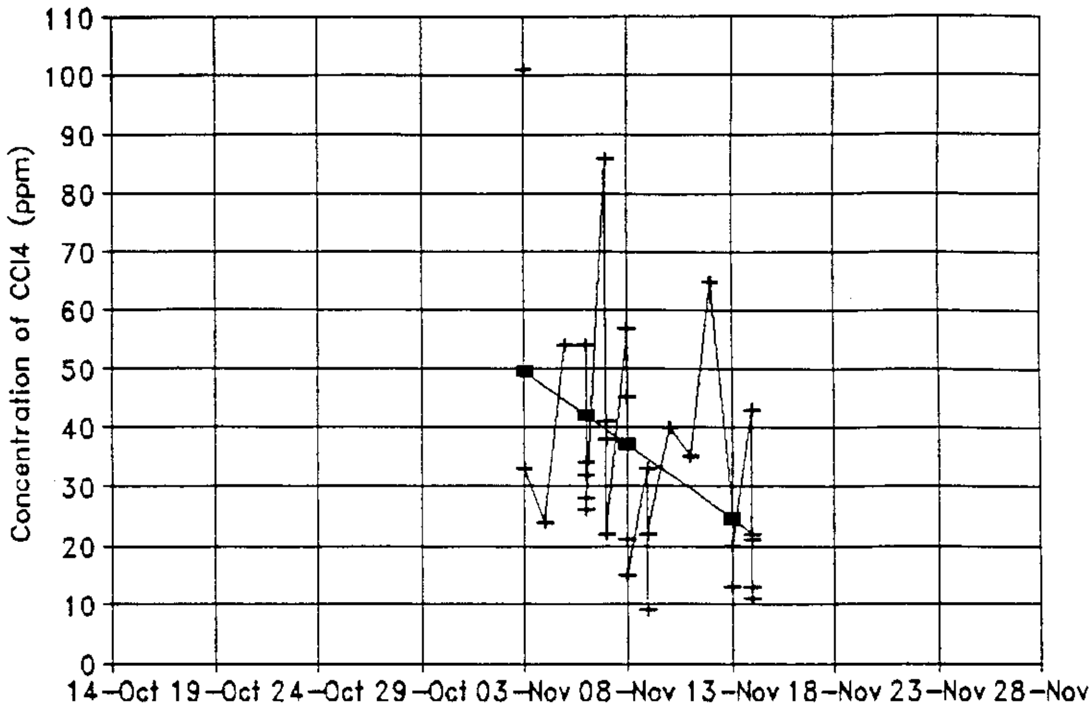

Figure 4. Concentration of CCl4 in the extraction stream. Solid line fitted using linear regression (r-square = 0.12).

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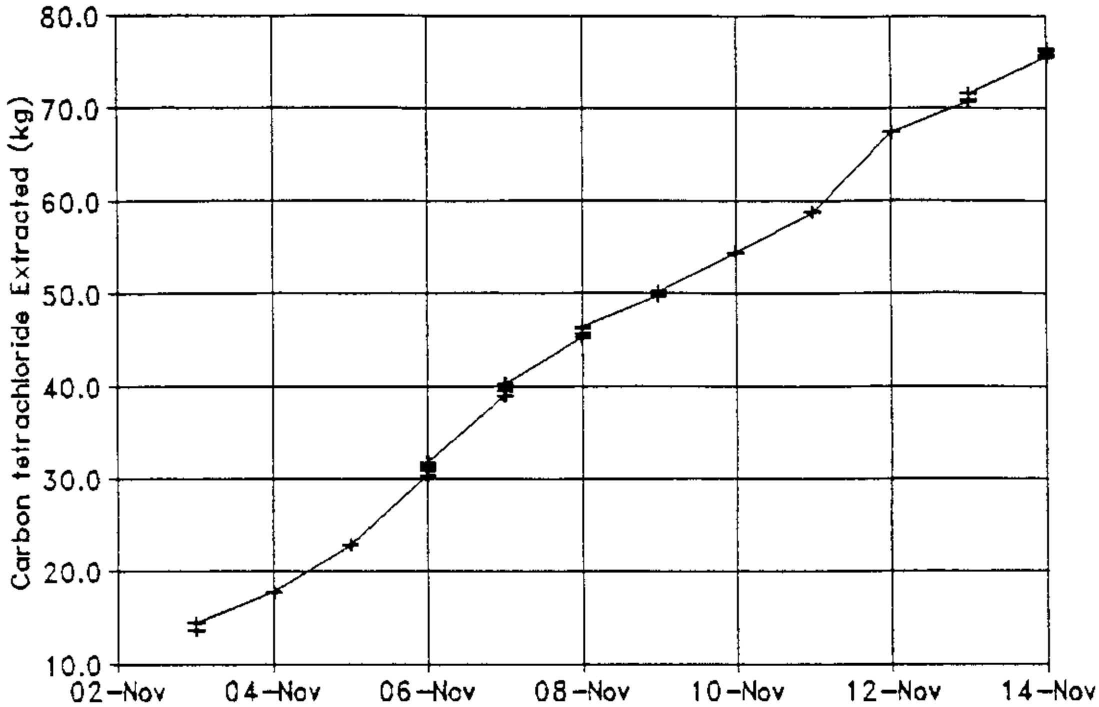

Figure 5. Cummulative CCl4 extraction during the 2 week test.

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(i.e. anisotropy ratio). These conductivities will be estimated from downhole barometric effects, individual pumping tests at each port, and from the VVED itself. Another factor controlling the concentration of contaminants in the extraction stream is the distribution of contaminants surrounding the extraction well.

Gas Concentrations in the monitoring wells:

The gas concentrations in the monitoring wells (8801D and D02, and more recently 8902D) near the extraction well are indicators of the concentration levels to be expected in the extraction stream. Figure 6 shows the concentration of CCl_4 at the 50 ft depth in well 8801D located 22 m from the extraction well. The trend in Figure 6 is nearly level except for the 3 peaks above 2000 ppm in concentration. The high values could have resulted from samples being mixed-up or simply instrument error. In contrast to the nearly level trend in Figure 6, the results shown in Figure 7 from the 93 ft depth in 8801D show a pattern of wide and erratic swings ranging from 0 to more then 7000 ppm CCl_4. It would appear that this wide of a range in data values taken from the same port could only result from mechanical sampling problems, yet to be identified. The two deepest ports at 8801D show less variation then those at the intermediate depths, but they also are lower in concentration. For example at the 90 foot depth concentrations are on the order of 2000 ppm where at the 193 and 230 ft depths concentrations are approximately 20 ppm. During and after the 2 week test some progress has been made in tracking down sources of error and include loose fittings on the sampling ports, and

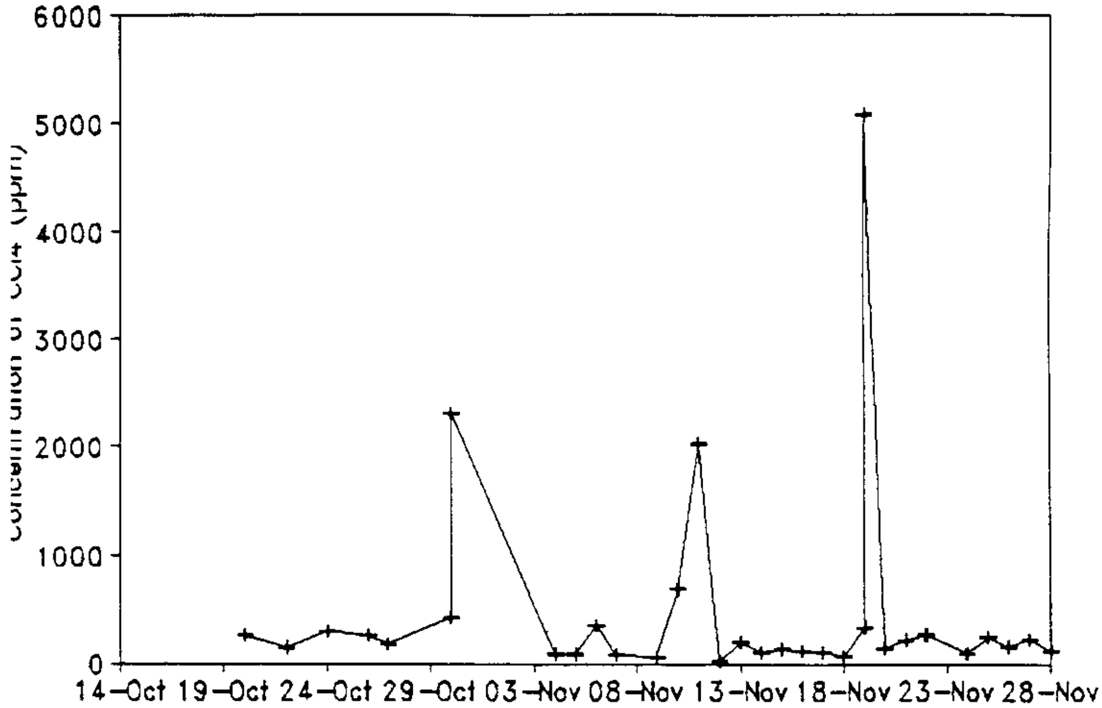

Figure 6. Concentration of CCl4 from the 50 foot depth in monitoring well 8801D during the 2 week test.

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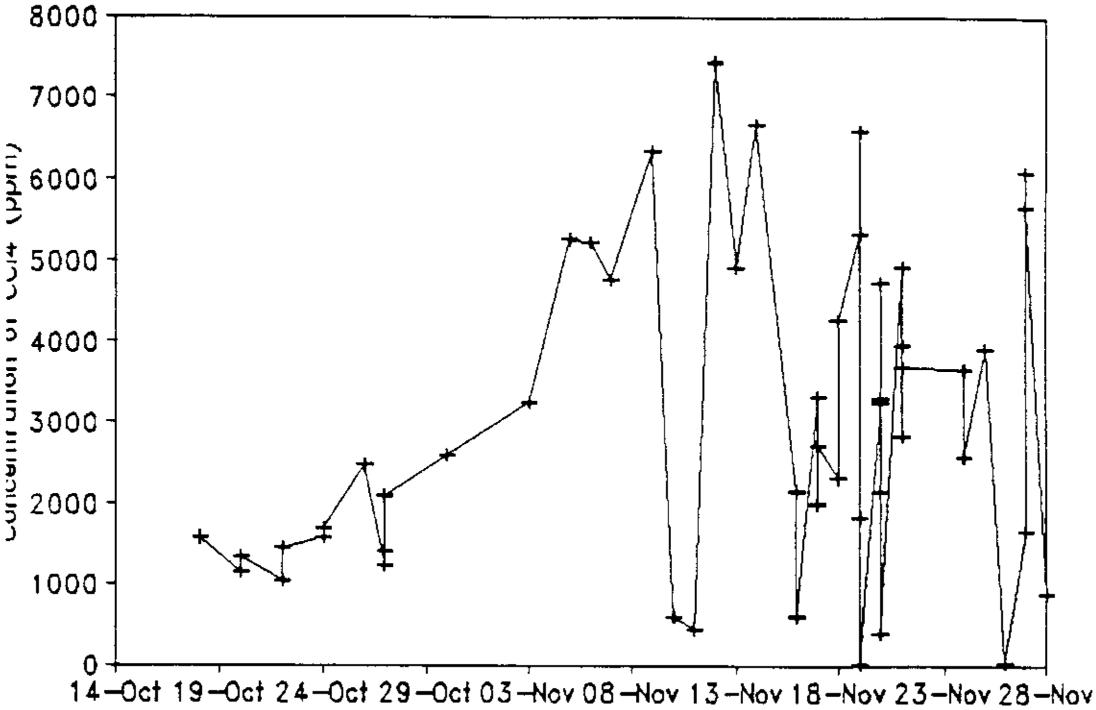

Figure ~~6~~ 7. Concentration of CCl4 from the ~~50~~ 93 foot depth in monitoring well 8801D during the 2 week test.

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concentrations outside the GC calibration range. Fittings have been tightened and a diluter has been tested to correct these problems. Even though field and lab procedures are followed to the letter obtaining quality data requires constant vigilance and scrutiny of the equipment.

Although the measured concentrations during the 2 week VVED test show considerable variance they have been used in identifying possible sources of sampling problems. The 20 ppm concentration seen in the extraction well is relatively low for the concentrations found on well 8801D. The only depths with similar concentrations are at 30, 193 and 230 ft. all other depths are at least 10 time higher in concentration. There are a number of possible reasons for the low concentrations observed in the extraction well. For Example, 1) nearly all of the extracted gases are coming from the deeper depths in the system and 2) the extraction well was not grouted satisfactorily and a direct conduit to the atmosphere exists. Currently the construction of the extraction well is being reviewed by hydrologists. In addition , a helium tracer scoping study is being designed to establish the presence of any direct connection to the soil surface. If deeper depths are contributing most of the gas being extracted then the downhole pressure distribution should indicate that.

Conclusions:

The objective of this report is to present a preliminary evaluation of the data from the 2-week Vapor Vacuum Extraction Demonstration (VVED) applicable to modeling. This report focuses on evaluation of the soil gas pressure and organic vapor concentration data. The VVE process proceeded at a soil gas pumping rate of 514 cfm producing an average mass extraction rate for carbon tetrachloride (CCL4) of 14 lbs/day. Problems with the Data Acquisition System (DAS) were encountered that prevented the pressure data from the 2 week test from being fully useful. However, problems with the system have been corrected and now has yielded data for more then 1 month continuously at a sampling interval of 2 minutes. Downhole pressures are being corrected for barometric effects. The corrected pressures will be used to obtain estimates of the large scale hydraulic conductivities needed to model a large clean up system. The gas concentration data appears to have sources of error that are probably mechanical but are as yet to be identified. Further studies are needed to better isolate and correct these errors. The concentration of carbon tetrachloride (CCl4) in the extraction stream is anomalously low and a tracer test is being devised to identify conduit flow near the extraction well.

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APPENDIX 13-1

DETAILED OPERATING PROCEDURES

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Completed DOP Review

______ Date ______ (OM) Initial

08/03/89
Issue Date

RWMC/SWEPP PROGRAMS

RWMC OPERATIONS

DETAILED OPERATING PROCEDURE

5.0 Retrieval

5.2 Buried Waste Programs Operations

5.2.2 — Pad A Initial Penetration Pre-operational Site Preparation

DOP RO Number — Subject

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RWMC/SWEPP Operations Manager

T. L. Clements, Jr.
RWMC/SWEPP Technical Programs Mgr.

Original Signatures appear on DRR-WM-3487

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Subject: DOP-RO-5.2.2 -- Pad A Initial Penetration Pre-operational Site Preparation

REFERENCES

1. RWMC Operational Safety Requirements (OSR) including Appendix A

2. RWMC Emergency Action Plan

3. EG&G Safety Manual

4. EG&G Radiological Controls Manual

5. PAD A Initial Penetration Soil Sample Collection Procedure

6. PAD A Initial Penetration Health and Safety Plan

7. PAD A Initial Penetration Quality Assurance Project Plan

8. DOE Hoisting & Rigging Manual

9. DOE/ID-10112 INEL Low-Level Radioactive Waste Acceptance Criteria

10. DOE/ID-10074 INEL Transuranic Waste Acceptance Criteria

11. SWR's:
    - 11.1 RS224X Fabricate Ventilation Skid
    - 11.2 RS225X Install Ventilation System
    - 11.3 RS226X Fabricate and Install Electrical System
    - 11.4 RS227X Erect Pad A Building
    - 11.5 RS228X Relocate Pad A Building
    - 11.6 RS356X Breathing Air System S.O.Test
    - 11.7 POWER 1012 Install Pole, Line and Transformer-RWMC

12. JHM Sketch 4 - Pad A Portable Breathing Air Compressor Temperature Control System

13. Project Directives:
    - 13.1 PD-RS-1.8 Transfer, Storage, Handling and Tracking of Waste
    - 13.2 PD-RS-1.13 Use of DOPs and SOPs
    - 13.3 PD-RS-2.1 RWMC Receipt, Inspection, and Documentation of Waste
    - 13.4 PD-RS-2.2 RWMC Operations in the Subsurface Disposal Area
    - 13.5 PD-RS-2.4 Operations in the TSA
    - 13.6 PD-RS-3.6 RWMC / SWEPP Document Preparation and Control
    - 13.7 PD-RS-6.1 Radiation and Contamination Control
    - 13.8 PD-RS-6.2 Industrial and Fire Safety
    - 13.9 PD-RS-6.3 Criticality Control
    - 13.10 PD-RS-6.5 Control of Radiological Spills
    - 13.11 PD-RS-6.8 RWMC Access Control

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REFERENCES (Cont'd)

14. Detailed Operating Procedures:
    14.1 DOP-RO-5.2.1 Pad A Initial Penetration & Retrieval Project

GENERAL

This procedure provides instructions for the following:

1. Pad A preparation for sprung structure:

   Pad A preparation includes flattening an area approximately 2500 square feet to accommodate the 40 ft. diameter sprung structure. Prior to pad preparation, the soil overburden will be sampled for chemical and radiological contamination. Sampling will be performed per the Sample Collection Procedure (Ref.5)

2. Movement of the sprung structure building:

   The primary purpose of the retrieval containment building is to provide protection from the elements. The building is a 40 ft. diameter sprung structure, with an 18.5 ft. peak. The building was erected on the asphalt pad on the West side of Pad A per SWR RS227X and will be moved using a crane and appropriate slings per SWR RS228X.

3. Retrieval equipment setup:

   The equipment setup includes the excavation boundaries, backhoe, ventilation, filters, CAMs etc. as they will be used for drum retrieval in DOP-RO-5.2.1. There will be two cargo containers for Rocky Flats drums and one for Non-Rocky Flats drums.

4. Decontamination

   Decontamination procedures will be initiated if surface levels of the building and/or equipment exceed radiological clean limits as stated in the EG&G Radiological Control Manual.(See Precautions and Limitations Item 13)

The DOE Hoisting and Rigging Manual has been interpreted to classify all lifts within this procedure as "Ordinary Lifts".

This procedure is in compliance with the criteria of the EG&G Safety Manual, EG&G Radiological Controls Manual and DOE Hoisting and Rigging Manual, and shall be completed per requirements of PD-RS-1.13. The sequence of steps may be altered or worked in parallel with the permission of the RWMC/SWEPP Shift Manager, or designated alternate, and all alterations shall be so noted in the body of the procedure. Compliance and execution are verbatim.

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GENERAL (Cont'd)

If RWMC Operating Limits cannot be satisfied or any abnormal condition arises that may compromise this operation, this operation shall stop and the limit and/or condition brought to the attention of the RWMC/SWEPP Operations Manager or designated alternate. The identified condition shall be resolved before proceeding with operations (RWMC OSR 3. Operating Limits, Numbers 2, 3 and 4). Abnormal conditions that may be associated with this task will be covered in the Training Checklist and crew briefing prior to the execution of this procedure.

Acronyms and abbreviations used in this procedure include:

A/R	As Required
BWP	Buried Waste Program
CAM	Constant Air Monitor
CGI	Combustible Gas Indicator
CIH	Certified Industrial Hygienist
DOE	Department of Energy
DOP	Detailed Operating Procedure
DOT	Department of Transportation
DRD	Direct Reading Dosimeter
DRR	Document Revision Request
EO	Equipment Operator
GC	Gas Chromatograph
GVW	Gross Vehicle Weight
HAZMAT	Hazardous Material
HEO	Heavy Equipment Operator
HEPA	High Efficiency Particulate Air
HNU	A "Trade Name" for a type of organic vapor detector
HP	Health Physics Technician
HSO	Health and Safety Officer
IH	Industrial Hygienist
ILTSF	Intermediate Level Transuranic Storage Facility
JS	Pad A Job Supervisor or Alternate (an Operations Specialist who has been trained specifically for this job)
NA	Not Applicable
ND	No alpha contamination detected with a large area wipe
OMP	Occupational Medical Program
OS	Operations Specialist
OSR	Operational Safety Requirements
OVA	Organic Vapor Analyzer
PD	Project Directive
QA	Quality Assurance Inspector
QAPP	Quality Assurance Project Plan
QFO	Quality Field Officer
RWMC	Radioactive Waste Management Complex
SOP	Standard Operating Procedure
SM	Shift Manager
SWEPP	Stored Waste Examination Pilot Plant
SWL	Safe Working Load

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Acronyms and abbreviations (Cont'd)

SWP	Safe Work Permit
SWR	Site Work Release
TC	Training Coordinator
TLD	Thermal Luminescent Dosimeter
TSA	Transuranic Storage Area
TYVEK	A "Trade Name" for a type of material used in personnel protection clothing
WCC	Warning Communication Center
WE	Waste Engineer
WMF	Waste Management Facility

MATERIALS and EQUIPMENT

Materials

1. Duct tape - A/R
2. Yellow 20 mil. nylon reinforced polyethylene sheeting - A/R
3. Yellow poly bags, large - A/R
4. Soil stabilizer (to be determined)
5. Visquine, as required

Equipment for Health Physics and Industrial Safety Requirements

1. Five (5) ea. ABC fire extinguishers, 30 lb. capacity * (RWMC SAR Add. A, 3.5)
2. Five (5) ea. MET-L-X fire extinguishers, 30 lb. capacity ** (RWMC SAR Add. A, 3.5)
3 1000 lb. Soda Ash available at RWMC for fire suppression (RWMC SAR Add. A, 3.5)
4. Beta/gamma constant air monitor (CAM) to monitor filter discharge, (RWMC OSR Add. A, 3.5.3.1)
5. Beta/gamma constant air monitor (CAM) with sniffer hose for excavation area monitoring (RWMC OSR Add. A, 3.5.3.1)
6. Alpha CAM, 5A or equivalent to monitor filter discharge, (RWMC OSR Add. A, 3.5.3.1)
7. Alpha CAM, 5A or equivalent with sniffer hose for excavation area monitoring (RWMC OSR Add. A, 3.5.3.1)
8. Alpha survey meters, portable (2 ea), (RWMC OSR Add. A, 3.5.3.1)
9. Beta/Gamma Survey Meters, portable (2 ea), (RWMC OSR Add. A, 3.5.3.1)
10. Low Range Radiation Meters (2 ea), (RWMC OSR Add. A, 3.5.3.1)
11. High Range Radiation Meter (1 ea), (RWMC OSR Add. A, 3.5.3.1)
12. Portable Air Sampler (1 ea), (RWMC OSR App.A, 3.5.3.1)
13. Contamination survey smears
14. Kimwipes, teritowels, etc.
15. Hard hats
16. Safety shoes
17. Organic Vapor Analyzer (OVA or HNU) (1 ea), (RWMC OSR Add. A, 3.5.3.1)
18. Combustible Gas Indicator (CGI), (1 ea), (RWMC OSR Add. A, 3.5.3.1)

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Equipment for Health Physics and Industrial Safety Requirements (Cont'd)

19. Scott Air Pacs (2 ea)
20. Health Physics Emergency Response Trailer (Available at RWMC)
21. Anti-C clothing (coveralls, shoe covers, nitrile gloves with surgical liners) A/R
22. Full face respirators A/R (Five of these to be located in evacuation vehicle)
23. Air hoods or airline respirators A/R
24. TYVEK suits A/R
25. Breathing air compressor (capable of supplying six [6] people) including hoses and portable power supply (One ea.) (RWMC SAR Add. A, 3.4)
26. Area TLD's (2 ea)
27. Self contained air horn
28. Permanent felt tip markers for marking drums (AR)
29. Materials and Equipment as required per Section 5 of the Pad A Initial Penetration Soil Sampling Collection Procedures (Ref. 5)
30. Personal Air Samplers (AR), (RWMC OSR Add. A, 3.5.3.1)
31. Passive Organic Monitors (RWMC OSR Add. A, 3.5.3.1)
32. First Aid Kit-Industrial first aid kit with sufficient supplies for five people.
33. Eye Wash-Eye wash meeting the minimum requirements of ANSI-Z358-1. (Location directed by the IH)

* Other sizes may be used as long as total weight is 150 lb. min.
** Other sizes may be used as long as total weight is 150 lb. min.

Equipment for Operations

1. Excavator (backhoe-75641 or 75643, etc. *)
2. Backhoe-75641 for drum retrieval
3. Drum handling device (vertical)
4. Drum handling device (horizontal)
5. Drum uprighting device
6. Shovels or hand augers for manual soil removal A/R
7. Power supply for electrical equipment
8. Sprung structure containment building with ventilation blowers and HEPA filters
9. Radio "6" Net (1 ea)
10. Radio Head Sets, Channel "C" (6 ea min.)
11. Crane for building movement (Manitowoc)-75610
12. International 10 wheel flat bed truck-71621 *
13. Low Rider LOED material handler-75189 *
14. Front end loader-75632 * or tracked earth mover-75702 *
15. Fork lift-75224 *, with hydraulic clamp handler available at TSA as required for placing drums in cargo containers

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Equipment for Operations (Cont'd)

16. Flexible hose for vehicle exhaust from building
17. 83 gal. vented drum overpacks with bar codes (48 each)
18. Cargo Containers, three each, located at TSA (Two for the Rocky Flats drums and one for the Non-Rocky Flats drums).
19. Waste containers for change areas for storing used clothing, respirators etc.
20. A change area for donning and doffing protective clothing

NOTE: Not all the equipment listed will be used in this preparation activity, however all equipment will be set up and operational for the retrieval operation which will follow.

* Or Equivalent - Equipment numbers shown are examples for reference only

SPECIFIC PRECAUTIONS AND LIMITATIONS

1. The Pad A Job Supervisor will be responsible to ensure that all personnel entering the retrieval area (workers and observers) have completed the OSHA HAZMAT, respirator and radiation worker training.

2. Building movement shall be initiated and conducted only in fair weather as judged by the Pad A Job Supervisor and the RWMC/SWEPP Shift Manager or designated alternates.

3. The dig area will be an Exclusion Zone and shall be so posted after equipment set up. Air hoods or airline respirators, TYVEK suits, safety shoes, chemical resistant booties, and Nitrile outer gloves with surgical inner gloves and hard hats will be worn inside this area. (These requirements do not apply during equipment set up.)

4. The area outside the Exclusion Zone but inside the building will be a Contamination Reduction Zone and shall be so posted after equipment set up. Full face respirators, TYVEK suits, safety shoes, chemical resistant booties, and Nitrile outer gloves with surgical inner gloves will be worn inside this area. The airline hood may be worn when transiting out from the exclusion zone (these requirements do not apply during equipment set-up).

5. Non-working observers inside either the Exclusion Zone or the Contamination Reduction Zone will wear the same protective clothing as required for workers in the corresponding area. In accordance with the ALARA philosophy, the number of non-working observers in the exclusion zone will be minimized.

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SPECIFIC PRECAUTIONS AND LIMITATIONS (Cont'd)

6. All personnel will wear protective equipment as required by conditions as determined by the IH on HP:

7. If uncontained contamination exceeds limits of Precaution 13, all activities shall be stopped. The affected area shall be stabilized with soil stabilizer if required, and covered with nylon reinforced plastic. All personnel shall then leave the immediate area and shall proceed to a pre-designated staging area for personnel survey. The RWMC/SWEPP Shift Manager shall be notified. An evaluation of the situation shall be made by the Pad A Job Supervisor and/or Project Engineer, RWMC/SWEPP Shift Manager, BWP Project Manager, Technical Programs and Safety personnel. Specific corrective action shall then be determined and supporting documentation completed as required. All corrective actions shall be completed before resuming operations.

8. In the event of an abnormal occurrence (fire, radiation or explosion), all personnel shall evacuate upwind or as directed by the Health Physics technician or Job Supervisor. Work area evacuations shall be by verbal communication. Emergency communications between Pad A work site and the RWMC work control office in WMF-601 shall be via "6" net radio and activation of the RWMC evacuation siren will be determined by the Emergency Action Director. The RWMC/SWEPP Shift Manager or his designated alternate shall direct further action in accordance with procedures established in the RWMC Emergency Action Plan.

9. All applicable requirements of the DOE Hoisting and Rigging Manual shall be observed during lifting procedures.

10. Limits for overburden soil shall be 100 counts/minute above background Beta/Gamma and ND Alpha as determined through monitoring by Health and Safety personnel. If above limits are exceeded, samples will be collected for full radionuclide analysis.

11. To prevent crushing drums with vehicles, the minimum dirt thickness over drums has been established at <u>26</u> inches (Ref. RWMC OSR Add. A, 3.3.3).

12. If the fire department is needed, call RWMC personnel on "6" net radio at WMF-601 and have phone call placed to 6-2211.

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SPECIFIC PRECAUTIONS AND LIMITATIONS (Cont'd)

13. When conducting wipe surveys, if less than 100 c/m beta-gamma above background and NO alpha, proceed. If greater than the above limits, perform a legal smear survey. If the results exceed 200 d/m/100 cm^2 beta-gamma and/or 20 d/m/100 cm^2 alpha, stop the operation and contact the JS for resolution. An evaluation of the situation will be made by the Pad A Job Supervisor and/or Project Engineer, RWMC/SWEPP Shift Manager, BWP Project Manager, Technical Programs and Safety personnel. Specific corrective actions will then be determined and completed before resuming operations.

14. All operations involving radioactive materials or the potential of encountering radioactive materials shall be conducted with continuous HP coverage. (RWMC OSR 4.6.3.2.)

15. An Industrial Hygienist (IH) will be at the dig site during all operations involving hazardous materials. (RWMC OSR Add. A, 4.2.3.2)

16. The Pad A containment exhaust radiological effluent activity downstream of the HEPA filtration system shall not exceed 2 x 10^{-12} uCi/ml alpha activity and/or 1 x 10^{-10} uCi/ml beta-gamma activity (RWMC OSR Add. A, 3.2.3.1).

17. If organic levels are detected at greater than 200 ppm for a period of 15 minutes, operations will be suspended and the containment building evacuated. (RWMC OSR Add. A, 3.2.3.4).

18. If the combustible gas indicator readings within the containment exceed 10% of the Lower Explosive Limit (LEL). Retrieval activities will be suspended. (RWMC OSR Add. A, 3.2.3.4) (Combustible gas samples are not required during equipment set up.)

19. When wind speeds exceed 75 mph (120 Km/h), operations at Pad A shall cease and all personnel shall exit the Pad A containment structure. Only in the event of an emergency shall personnel reenter the Pad A containment structure until wind speeds decrease to less than 75 mph. (RWMC OSR Add. A, 3.1.3.1)

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SPECIFIC PRECAUTIONS AND LIMITATIONS (Cont'd)

20. A portal monitor, large-area detector, or portable survey station shall be operating in the guard house (WMF-611) for use by personnel entering and exiting the RWMC/SWEPP. (RWMC/SWEPP OSR Section 3.3.3.)

NOTE:
1. A new copy of this DOP will be used for each shift.
2. The Pad A Job Supervisor shall maintain a daily operations log.
3. The H.P. will maintain a specific Pad A HP log.
4. The IH will maintain a daily log book of monitoring activities.
5. All operations shall be documented with photographs as required by the Pad A Job Supervisor.

PREREQUISITES

General

_____ 1. (JS) The following designated crew members (min) have been qualified in their basic positions. (All RWMC personnel trained and qualified per RWMC Training program (RWMC OSR 4.1.3). (Operations involving radioactive material shall have as a minimum an HP and a crew size designated by RWMC OS. The RWMC/SWEPP Operations Specialist or designated alternate must be present at the facility during waste handling operations. (RWMC OSR Add. A, 4.2.3.2).

One Pad A Job Supervisor (JS)	Name: ____________
One Industrial Hygienist (IH)	Name: ____________
One heavy equipment operator (HEO)	Name: ____________
One equipment operator (EO)	Name: ____________
One HP technician (HP)	Name: ____________
One Laborer	Name: ____________
	Name: ____________
One Photographer	Name: ____________

_____ 2. (JS) Verify that wind speed as read at WMF-601 or WMF-613 does not exceed 75 mph. (RWMC OSR Add. A, 3.1.3.1)).

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PREREQUISITES (Cont'd)

_____ 3. (JS) Complete a shift briefing which will cover the anticipated operations coming up this shift as well as a summary of status to date, as applicable. The potential chemical, radiological and industrial hazards will be made explicitly clear. (In addition, a briefing will be held prior to starting a new phase of the operation if not covered in the pre-shift briefing.)

_____ 4. (JS) A portal monitor, large-area detector, or portable survey station is operating in the guard house (WMF-611) for use by personnel entering and exiting the RWMC/SWEPP.

_____ 5. (JS) Upon completion of the roadway on top of Pad A to either excavation site, as appropriate, and prior to commencement of daily activities on Pad A place the engineer's transit over the designated benchmark and short roadway level to assure that the roadway is still at least 30 in. above the waste.

Area Soil Preparation

_____ 6. (JS) Soil field sampling and analysis using portable Gas Chromatograph (GC) has been completed.

_____ 7. (JS) Front-end loader or tracked earth mover and operator are available.

Building Placement/Movement

_____ 8. (JS) Weather forecasts shall indicate fair weather (no precipitation) for an 8-hour period of time prior to initiation of building placement/movement. Weather evaluation will be made by the Pad A Job Supervisor or Project Engineer and RWMC/SWEPP Shift Manager.

_____ 9. (JS) Maximum wind conditions shall be 15 mph during building movement.

_____ 10. (JS) Crane and operator are available.

_____ 11. (JS) Other personnel as listed in SWR RS-228X are available.

Breathing Air System Installation

_____ 12. (JS) Prior to Installing the breathing air system per step 2.4 of this DOP, the breathing air system will be operationally tested per SWR-RS-356X (Ref.4.6).

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WASTE MANAGEMENT DEPARTMENT

RWMC/SWEPP PROGRAMS

PERSONNEL BRIEFING LOG

Personnel Briefing Log (your signature and initials indicate your briefing attendance, understanding, and commitment to procedure compliance)

DATE	NAME (PRINT)	SIGNATURE	INITIALS	CLASSIFICATION	BRIEFED BY

Subject: DOP-RO-5.2.2 -- Pad A Initial Penetration Pre-Operational Site Preparation

WASTE MANAGEMENT DEPARTMENT

RWMC/SWEPP PROGRAMS

PERSONNEL BRIEFING LOG (Continued)

Personnel Briefing Log (your signature and initials indicate your briefing attendance, understanding, and commitment to procedure compliance).

DATE	NAME (PRINT)	SIGNATURE	INITIALS	CLASSIFICATION	BRIEFED BY

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OPERATION

Procedure Opened: ______________ Time _______ Date _______
(JS)

1. AREA SOIL PREPARATION

NOTE: After Step 1.8 has been completed, building may be transported and placed on first site per Section 2., Enclosure/Ventilation/ Radiation Monitoring Equipment Installation, while second site is prepared per Step 1.9, if desired.

____ 1. (JS) Verify that General prerequisites and the prerequisites for Area Soil Preparation have been completed.

____ 2. (JS) The HP will periodically survey the overburden soil for contamination using Alpha and Beta/Gamma instruments.

NOTE: STOP operations and notify RWMC/SWEPP Shift Manager if the following readings are obtained:

1. >100 cpm Beta/Gamma above background
2. Any Alpha detection

____ 3. (JS) The IH will periodically survey the area for organic vapors and document findings in the IH log.

NOTE: STOP operations and notify RWMC/SWEPP Shift Manager if HNU photoionization readings above 200 ppm above background for 15 minutes are obtained:

Restart operations only after notification from Shift Manager.

____ 4. (JS) During earth moving operations, the HP will periodically take "Grab Samples" downwind of the operation area. These samples will be evaluated for Alpha and gross Beta/gamma activity.

____ 5. (JS) Establish the excavation boundaries for penetration sites as shown in Figure 1. The "Point A" stake will be the center of the North penetration site and the "Point B" stake will be the center of the South penetration site.

____ 6. (JS) Remove dirt from east side of each penetration site for crane positioning as shown in Figure 1. These crane location areas will be at the approximate height of the area to the East of Pad A and will be connected by a roadway so that crane may be moved as required.

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OPERATIONS (Cont'd)

____ 7. (JS) Prepare equipment access roadway to the top of Pad A per Job Supervisor direction. This road will be used by the backhoe, the ten wheel truck, the Low Rider LOED etc. and may involve hauling dirt in to the area from elsewhere at the RWMC.

____ 8. (JS) Remove overburden from South penetration area as necessary to flatten area sufficiently to install the 40 foot diameter building over the South penetration area as shown in Figures 1 and 2 per Pad A Job Supervisor direction. Prior to excavating dirt with power equipment, dig test holes with hand shovels or hand augers to ensure that a minimum of 26-in. of dirt remains above the drums at all times. Repeat testing prior to moving each layer of dirt. (RWMC OSR Add. A, 3.3.3).

____ 9. (JS) Prepare a roadbed per Pad A Job Supervisor's direction, on top of Pad from the equipment access roadway in Step 1.7 to the site where the 40 ft diameter building will be located maintaining a minimum of 30 in. of fill above the waste. Subsidence holes on depressions will be filled as required and reported to the RWMC/SWEPP Shift Manager as they are encountered.

____ 10. (JS) Clearly define with markers the roadway on top of Pad A per Pad A Job Supervisor's direction. All heavy equipment used on Pad A will follow the designated road.

____ 11. (JS) Perform frequent inspection daily on the top of the Pad for further subsidences and report findings to the RWMC/SWEPP Program and Shift Managers.

____ 12. (JS) Remove overburden from North penetration area as in 1.8 above to flatten area in preparation for building installation.

2. ENCLOSURE/VENTILATION/RADIATION MONITORING EQUIPMENT INSTALLATION

NOTE: Steps may be worked in parallel per Job Supervisor's direction.

____ 1. (JS) Verify that the General prerequisites and the prerequisites for Building Movement have been completed.

____ 2. (JS) Install the Sprung Structure building over the South penetration location as shown in Figure 1 and 2 per SWR-RS228X.

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____ 3. (JS) Install power distribution equipment per SWRs-RS226X (Ref 11.3) and POWER 1012 (Ref 11.7).

____ 4. (JS) Verify that the prerequisite for Breathing Air System Installation has been completed.

____ 5. (JS) Install ventilation equipment and verify operability including smoke test per SWR RS225X (Ref 11.2).

____ 6. (JS) Install the Breathing Air System per JHM Sketch 4 (Ref 12) and locate components as directed by the Pad A Job Supervisor.

____ 7. (HP) Install the various radiation monitoring equipment as follows:

One Alpha CAM and one Beta/Gamma CAM will monitor the Exclusion area.
One Alpha CAM and one Beta/Gamma CAM will monitor the HEPA filter outlet flow.
Other equipment located as desired.

Verify operability. Log results in Pad A Health Physics Log.

____ 8. (HP) Record HP/IH instruments assigned to this operation.

INSTRUMENT TYPE	Serial No.	Calib.Date
Alpha Contamination		
____	____	____
____	____	____
____	____	____
Beta/Gamma Contamination		
____	____	____
____	____	____
____	____	____
Direct Radiation		
____	____	____
____	____	____
____	____	____
____	____	____
____	____	____

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OPERATIONS (Cont'd)

Miscellaneous

_____ 9. (JS) Position the following equipment as it will be during the retrieval operation:

1. Ten wheel flatbed truck
2. Backhoe (No. 75641)
3. Low Rider LOED
4. Change area
5. Exclusion Zone boundaries
6. Contamination Reduction Zone boundaries

3. CARGO CONTAINER PLACEMENT AT TSA

_____ 1. (JS) Place three (3) cargo containers at the ILTSF at TSA as directed by the PAD A Job Supervisor.

2. (JS) Identify two of the cargo containers as "Rocky Flats" and the other one as "Non-Rocky Flats".

4. EQUIPMENT SHUTDOWN

_____ 1. (JS) Shut down all equipment except for one ventilation blower which will be left running to minimize humidity buildup in the containment building.

Procedure Completed:

Signature _________________ Time _______ Date _______
(JS)

Shift Manager___________________________ Date________

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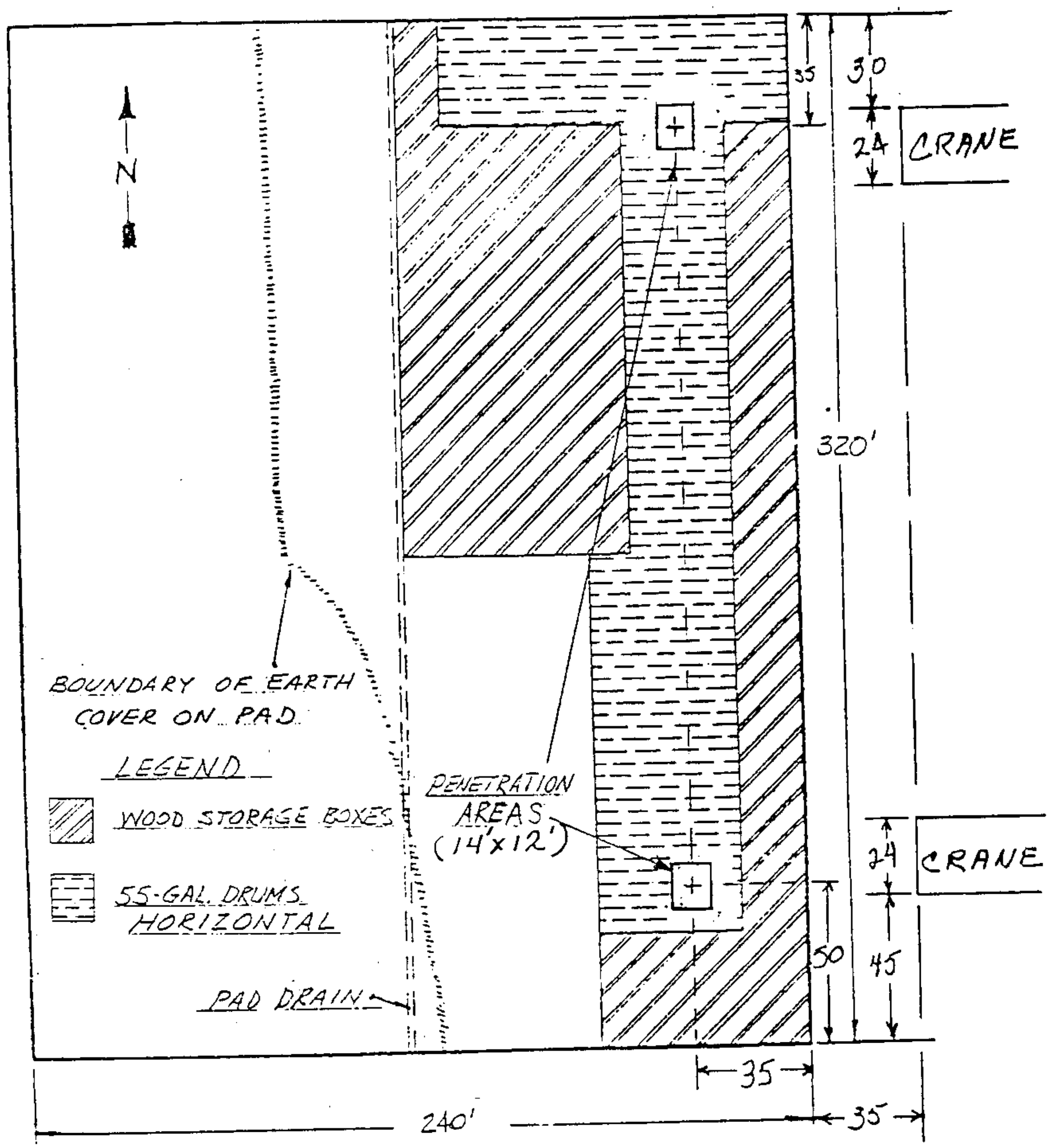

Figure 1. Plan View of Pad A and Penetration Area.

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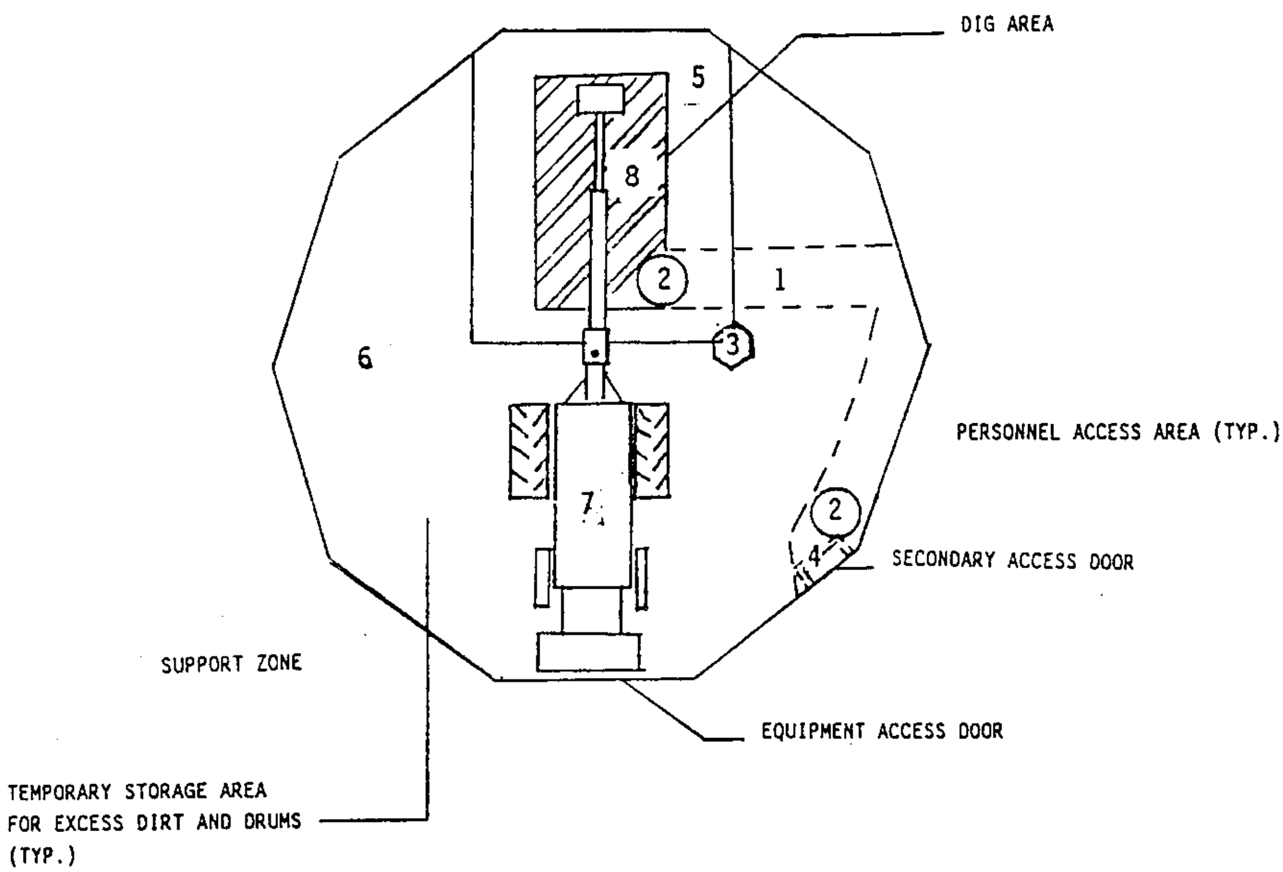

1. Contamination Reduction Corridor
2. Access Control Points
3. Decontamination Station A
4. Decontamination Station B
5. Exclusion Zone
6. Contamination Reduction Zone
7. Backhoe
8. Retrieval Area

Figure 2. Pad A Building/Penetration Layout.

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ATTACHMENT 1

ABNORMAL/EMERGENCY PROCEDURES

General

1. If prompt, lifesaving first aid and/or medical treatment is required, decontamination procedures can be omitted. Onsite personnel should accompany contaminated victims to the medical facility to provide medical personnel information regarding contamination specifics.

2. Lifesaving care will be instituted immediately without considering decontamination. Outer garments can be removed if they do not cause delay or interfere with treatment or aggravate medical problems. Respiratory equipment must always be removed. Chemical-resistant clothing can be cut away. If the outer contaminated garments cannot be removed, the victim should be wrapped in cloth to help prevent contamination of transporting vehicles or medical personnel. Outer garments can then be removed at the medical facility. Medical radiation and chemical decontamination facilities are located at CFA. The transport vehicle and medical facility may have to be decontaminated.

3. In cases of life-threatening emergencies such as fire or explosion, personnel should leave the vicinity using the shortest possible route without regard for decontamination at that time. When the situation has stabilized, personnel will take necessary steps to decontaminate themselves, equipment, and other affected areas.

4. Emergency phone numbers:

   o Warning Communication Center (WCC) 777
   o Occupational Medical Program (OMP) 6-2356

5. Other phone numbers:

   o Work Package Manager: Buck Horton
     Work - 526-2116
     Home - 529-2368
   o Cost Account Manager: Steve Fogdall
     Work - 526-6265
     Home - 529-3220
   o Health and Safety Officer: Jeff Ginsburg
     Work - 526-9698
     Home - 523-2945

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Transportation of an injured person and follow up action

1. If an injured worker is transported to the medical facility, he/she will be accompanied by at least one other dig site worker to inform medical personnel of the level of decontamination performed prior to leaving the dig site and to provide specific details as to the nature of the injury. If radiological contamination is suspected, the HP will accompany the victim; likewise, if hazardous chemical exposure is suspected, the IH will accompany the victim.

2. In the event of contaminant exposure, the same procedures will be followed and affected personnel monitoring devices will be immediately transported to the analytical lab to aid in the appropriate testing and treatment of the injured worker.

Subject: DOP-RO-5.2.2 -- Pad A Initial Penetration Pre-operational Site Preparation

COMMENT SHEET

Init	Date	Page Number	Step Number	Comments/Notes/Observations

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Subject: DOP-RO-5.2.2 -- Pad A Initial Penetration Pre-operational Site Preparation

COMMENT SHEET (Continued)

Init	Date	Page Number	Step Number	Comments/Notes/Observations

ADD CONTINUATION SHEETS AS REQUIRED

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Subject: DOP-RO-5.2.2 -- Pad A Initial Penetration Pre-operational Site Preparation

COMMENT SHEET (Continued)

Init	Date	Page Number	Step Number	Comments/Notes/Observations

ADD CONTINUATION SHEETS AS REQUIRED

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RWMC/SWEPP PROGRAMS
TRAINING CHECKLIST FOR
Pad A Initial Penetration Pre-operational Site Preparation

Name________________________ S Number________________________

Date________________ Classification____________________

Each item listed below is to be completed by each individual who is to work this task. The personnel responsible for signing each item is as noted.

		Signature
1.0	Attend a Briefing and self study on the following: PD-RS-6.6 Control of Radiological Spills RWMC Emergency Action Plan VI.A.2 - Radiological Emergencies VI.A.3 - Operational Emergencies Pad A Initial Penetration Health and Safety Plan Pad A Sections of the RWMC OSR/SAR	________________ Individual
2.0	Attend a Briefing and self study on the following Detailed Operating Procedure: DOP RO Number 5.2.2 Pad A Initial Penetration Pre-operational Site Preparation	________________ Individual
3.0	Complete an Oral Checkout on the items listed in 1 and 2 above:	
	HPs	________________ HP Work Leader
	All other team members	________________ Operations Specialist
4.0	Qualification Completed	________________ RWMC/SWEPP Oper. Mgr.
5.0	Checklist Included in Individual's Training Record	________________ Training Coordinator

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RWMC/SWEPP PROGRAMS
TRAINING CHECKLIST FOR
Pad A Initial Penetration Pre-operational Site Preparation

Name________________ S Number________________

Date________________ Classification Job Supervisor

Each item listed below is to be completed by each individual who is to work this task. The personnel responsible for signing each item is as noted.

	Signature	
1.0 Review the RWMC/SWEPP Document Tree with J. B. Sahr or designated alternate	J. B. Sahr	Date
2.0 Review the following with D. L. French or designated alternate:	D. L. French	Date

Project Directives:

- PD-RS-1.5 -- Work Control
- PD-RS-1.13-- Use of DOPs and SOPs
- PD-RS-2.2 -- RWMC Operations in the Subsurface Disposal Area
- PD-RS-3.6 -- RWMC/SWEPP Document Preparation and Control
- PD-RS-6.1 -- Radiation and Contamination Control
- PD-RS-6.2 -- Industrial and Fire Safety
- PD-RS-6.6 -- Control of Radiological Spills
- PD-RS-6.8 -- RWMC Access Control

RWMC Emergency Action Plan

- V1.A.2 - Radiological Emergencies
- V1.A.3 - Operational Emergencies

DOP RO 5.2.2- Pad A Initial Penetration Pre-operational Site Preparation

DOE Hoisting and Rigging Manual

3.0 Review the RWMC Operations Safety Requirements Document, Appendix A to OSR and Safety Analysis Report with R. L. Devries or designated alternate.	R. L. Devries	Date
4.0 Complete an oral checkout on the items in 1, 2, and 3 above with J. N. Davis or designated alternate	J. N. Davis	Date
5.0 Qualification Completed	RWMC/SWEPP Oper. Mgr.	
6.0 Checklist Included in Individual's Training Record	Training Coordinator	

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Completed DOP Review

______ Date	______ (OM) Initial	11/28/89 Issue Date

RWMC/SWEPP PROGRAMS

RWMC OPERATIONS

DETAILED OPERATING PROCEDURE

5.0 Retrieval

5.2 Buried Waste Programs Operations

5.2.1 BWP Pad A Initial Penetration & Retrieval Project

DOP RO Number Subject

Approved:

J. N. Davis
RWMC/SWEPP Programs Manager

Reviewed:

C. W. Bloom
RWMC/SWEPP Radiological Engineer

R. O. Sanders
RWMC/SWEPP Rigging Engineer

R. C. Caummisar
RWMC/SWEPP Safety Engineer

W. J. Isle
RWMC/SWEPP Quality Engineer

L. D. Croft
RWMC/SWEPP Engineering Manager

M. M. Garcia
RWMC/SWEPP Industrial Hygiene

K. McNeel
RWMC/SWEPP Environmental Engineer

D. L. French
RWMC/SWEPP Operations Manager

Original signatures appear on DRR-WM-3594

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RWMC Operations

Subject: DOP-RO-5.2.1 -- BWP Pad A Initial Penetration and Retrieval Project

REFERENCES

RWMC Operational Safety Requirements (OSR) including Appendix A

RWMC Emergency Action Plan

EG&G Safety Manual

EG&G Radiological Controls Manual

PAD A Initial Penetration Soil Sample Collection Procedure

PAD A Initial Penetration Health and Safety Plan

PAD A Initial Penetration Quality Assurance Project Plan

DOE Hoisting & Rigging Manual

DOE/ID-10112 INEL Low-Level Radioactive Waste Acceptance Criteria

DOE/ID-10074 INEL Transuranic Waste Acceptance Criteria

SWR's:

RS228X	Relocate Pad A Building

JHM Sketch 4 - Pad A Portable Breathing Air Compressor Temperature Control System

Project Directives:

PD-RS-1.8	Transfer, Storage, Handling and Tracking of Waste
PD-RS-1.13	Use of DOPs and SOPs
PD-RS-2.1	RWMC Receipt, Inspection, and Documentation of Waste
PD-RS-2.2	RWMC Operations in the Subsurface Disposal Area
PD-RS-2.4	Operations in the TSA
PD-RS-3.6	RWMC/SWEPP Document Preparation and Control
PD-RS-6.1	Radiation and Contamination Control
PD-RS-6.2	Industrial and Fire Safety
PD-RS-6.3	Criticality Control
PD-RS-6.6	Control of Radiological Spills
PD-RS-6.8	RWMC Access Control

Detailed Operating Procedures:

DOP-RO-5.2.2	Pad A Initial Penetration Pre-operational Site Preparation

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GENERAL

This procedure provides instructions for the following:

1. Final overburden removal to expose drums.

   Pad A penetration will be accomplished using a backhoe. The vehicle will enter and exit the sprung structure from a large equipment access door. Dirt which is removed from the penetration will be placed adjacent to the penetration for later use as backfill.

2. In-situ drum inspection and removal.

   Once the drums are exposed, their radiation levels will be measured, then they will be visually inspected and checked with large area wipes to determine loose surface contamination. Where possible, in-situ ultrasonic testing will determine drum wall thickness. Drums will then be retrieved using the backhoe and appropriate rigging and drum handling fixtures.

3. Above ground drum inspection, overpacking and interim storage (until characterization studies start).

   Once retrieved, drums will be inspected for corrosion and integrity as well as tags and labels which may provide information regarding waste content, dates, etc. Additional ultrasonic measurements, radiation readings and radiological large area legal wipes and smears will be taken as required. Upon completion of inspection, the drums will be placed in 83-gal drum overpacks, the drum information transferred to overpacks, and the overpacked drums stored in cargo containers at the ILTSF at TSA. There will be two cargo containers for Rocky Flats drums.

4. Movement of the sprung structure building.

   Following completion of drum retrieval at the South penetration, the building and equipment will then be moved to the North penetration site. The building was placed on the South penetration site per DOP-RO-5.2.2 (Ref. 14) and will be moved to the North penetration site using the crane and appropriate slings per SWR RS228X.

5. Repeating instructions 1, 2 and 3 at the North penetration site.

6. Building relocation.

   Following drum retrieval at the North penetration, the building will be removed and stored at the RWMC for future use per SWR-RS228X.

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GENERAL (Cont'd.)

7. Contouring and reseeding the Pad A berm

The Pad A surface will be recontoured to provide slope as required to provide water runoff then reseeded to prevent erosion.

The DOE Hoisting and Rigging Manual has been interpreted to classify all lifts within this procedure as "Ordinary Lifts".

This procedure is in compliance with the criteria of the EG&G Safety Manual, DOE Hoisting and Rigging Manual, and EG&G Radiological Controls Manual and shall be completed per requirements of PD-RS-1.13. The sequence of steps may be altered or worked in parallel with the permission of the RWMC/SWEPP Shift Manager, and that alteration shall be so noted and initialed by the Shift Manager in the body of the procedure. Non-applicable Sections/Steps must be designated n/a and initialed by the Shift Manager or RWMC Operations Manager. Compliance and execution are verbatim.

If RWMC Operating Limits cannot be satisfied or any abnormal condition arises that may compromise this operation, this operation shall stop and the limit and/or condition brought to the attention of the RWMC/SWEPP Shift Manager. The identified condition shall be resolved before proceeding with operations (RWMC OSR 3. Operating Limits, Numbers 2, 3 and 4). Abnormal conditions which may be associated with this task will be covered in the Training Checklist and crew briefing prior to the execution of this procedure.

Decontamination procedures will be initiated if surface contamination of the building and/or equipment exceed radiological clean limits as stated in the EG&G Radiological Control Manual (see Precautions and Limitations item 13).

If a drum is unable to support its weight and collapses during removal, retrieval operations will immediately cease, the area will be stabilized and personnel will evacuate the building. Further work will be evaluated. Prior to further operations, an approved DRR to this DOP must be issued showing continuation procedures.

NOTE

1. A new copy of this DOP will be used for each shift.
2. The Pad A Job Supervisor shall maintain a daily operations log.
3. The HP will maintain a specific Pad A HP log.
4. The IH will maintain a daily log book of monitoring activities.
5. All operations shall be documented with photographs as [illegible]

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ACRONYMS AND ABBREVIATIONS USED IN THIS PROCEDURE INCLUDE:

A/R	As Required
BWP	Buried Waste Program
CAM	Constant Air Monitor
CGI	Combustible Gas Indicator
cpm	Counts per minute
CIH	Certified Industrial Hygienist
dpm	Disintegrations per minute
DOE	Department of Energy
DOP	Detailed Operating Procedure
DOT	Department of Transportation
DRD	Direct Reading Dosimeter
DRR	Document Revision Request
EO	Equipment Operator
GC	Gas Chromatograph
GVW	Gross Vehicle Weight
HAZMAT	Hazardous Material
HEO	Heavy Equipment Operator
HEPA	High Efficiency Particulate Air
HNu	A "Trade Name" for a type of organic vapor detector
HP	Health Physics Technician
HSO	Health and Safety Officer
IH	Industrial Hygienist
ILTSF	Intermediate Level Transuranic Storage Facility
JS	Pad A Job Supervisor or Alternate (an Operations Specialist who has been trained specifically for this job)
NA	Not Applicable
ND	No alpha contamination detected with a large area wipe
OM	Operations Manager
OMP	Occupational Medical Program
OS	Operations Specialist
OSR	Operational Safety Requirements
OVA	Organic Vapor Analyzer
PD	Project Directive
QA	Quality Assurance Inspector
QFO	Quality Field Officer
RE	Radiological Engineer
RWMC	Radioactive Waste Management Complex
SE	Safety Engineer
SOP	Standard Operating Procedure
SM	Shift Manager
SWEPP	Stored Waste Examination Pilot Plant
SWL	Safe Working Load
SWP	Safe Work Permit
SWR	Site Work Release
TC	Training Coordinator
TLD	Thermoluminescent Dosimeter
TSA	Transuranic Storage Area
TYVEK	A "Trade Name" for a type of material used in personnel protection clothing
WCC	Warning Communication Center
WE	Waste Engineer
WMF	Waste Management Facility
WPM	Work Package Manager

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RWMC Operations

Subject: DOP-RO-5.2.1 -- BWP Pad A Initial Penetration and Retrieval Project

MATERIALS and EQUIPMENT

Materials

1. Duct tape - A/R
2. Yellow 20 mil. nylon reinforced polyethylene sheeting - A/R
3. Yellow poly bags, large - A/R
4. Soil stabilizer (to be determined)
5. 83 gal. vented drum overpacks with bar codes (48 each)
6. Cargo Containers, three each, located at TSA (Two for the Rocky Flats drums and one for the Non-Rocky Flats drums).
7. Waste containers for change areas for storing used clothing, respirators etc.
8. Visquine - A/R or
9. Tarps (20 ft.x 20 ft. Min) - 6 each
10. Twelve inch adjustable wrench (crescent)
11. Permanent marker pens-A/R

Equipment for Health Physics and Industrial Safety Requirements

1. Five (5) ea. ABC fire extinguishers, 30 lb. capacity * (RWMC SAR Add. A, 3.5)
2. Five (5) ea. MET-L-X fire extinguishers, 30 lb. capacity ** (RWMC SAR Add. A, 3.5)
3. 1000 lb. Soda Ash available at RWMC for fire suppression (RWMC SAR Add. A, 3.5)
4. Beta/gamma constant air monitor (CAM) to monitor filter discharge, (RWMC OSR Add. A, 3.5.3.1)
5. Beta/gamma constant air monitor (CAM) with sniffer hose for excavation area monitoring (RWMC OSR Add. A, 3.5.3.1)
6. Alpha CAM, 5A or equivalent to monitor filter discharge, (RWMC OSR Add. A, 3.5.3.1)
7. Alpha CAM, 5A or equivalent with sniffer hose for excavation area monitoring (RWMC OSR Add. A, 3.5.3.1)
8. Alpha survey meters, portable, PAC 4's or equivalent, (2 ea), (RWMC OSR Add. A, 3.5.3.1)
9. Beta/Gamma Survey Meters, portable (2 ea), (RWMC OSR Add. A, 3.5.3.1)
10. Low Range Radiation Meters (2 ea), (RWMC OSR Add. A, 3.5.3.1)
11. High Range Radiation Meter (1 ea), (RWMC OSR Add. A, 3.5.3.1)
12. Portable Air Sampler (1 ea), (RWMC OSR Add. A, 3.5.3.1)
13. Contamination survey smears
14. Kimwipes, teritowels, etc.
15. Hard hats
16. Safety shoes
17. Organic Vapor Analyzer (OVA or HNU) (1 ea), (RWMC OSR Add. A, 3.5.3.1)
18. Combustible Gas Indicator (CGI), (1 ea), (RWMC OSR Add. A, 3.5.3.1)
19. Hand held ultrasonic thickness gage with step wedge (with current calibration)
20. Scott Air Pacs (2 ea)
21. Health Physics Emergency Response Trailer (Available at RWMC)
22. Anti-C clothing (coveralls, shoe covers, nitrile gloves with surgical liners and leather gloves) A/R
23. Full face respirators (Five extras to be located in evacuation vehicle)

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Equipment for Health Physics and Industrial Safety Requirements (Cont'd.)

24. Air hoods or airline respirators A/R
25. TYVEK suits A/R
26. Breathing air compressor (capable of supplying six [6] people) including hoses and portable power supply (One ea.),(RWMC SAR Add. A, 3.4)
27. Area TLD's (2 each)
28. Self contained air horn
29. Materials and Equipment as required per Section 5 of the Pad A Initial Penetration Soil Sampling Collection Procedures (Ref. 5)
30. Personal Air Samplers (AR), (RWMC OSR Add. A, 3.5.3.1)
31. Passive Organic Monitors (RWMC OSR Add. A, 3.5.3.1)
32. First Aid Kit-Industrial first aid kit with sufficient supplies for five people
33. Eye Wash - Eye wash meeting the minimum requirements of ANSI-Z358-1. (Location directed by the IH)
34. "Exclusion Zone" signs
35. "Contamination Reduction Zone" signs
36. Ridge pole timber for covering penetration holes (about 18 ft long) -2 ea
37. 16 sheets plywood (1/2 in. min.)

    * Other sizes may be used as long as total weight is 150 lb min.
    ** Other sizes may be used as long as total weight is 150 lb min.

Equipment for Operations

1. Excavator (backhoe-75641 or 75643, etc. *)
2. Backhoe-75641 for drum retrieval
3. Drum handling device (vertical) with sling
4. Drum handling device (horizontal)
5. Drum uprighting device
6. Shovels or hand augers for manual soil removal A/R
7. Power supply for electrical equipment
8. Sprung structure containment building with ventilation blowers and HEPA filters
9. Radio "6" Net (1 ea)
10. Radio Head Sets, Channel "C" (6 ea min.)
11. Crane for building movement (Manitowoc)-75610
12. International 10 wheel flat bed truck-71621 *
13. Low Rider LOED material handler-75189 *
14. Front end loader-75632 * or tracked earth mover-75702 *
15. Fork lift-75224 *, with hydraulic clamp handler available at TSA as required for placing drums in cargo containers
16. Flexible hose for vehicle exhaust from building
17. A change area for donning and doffing protective clothing
18. Waste box for plywood and plastic sheeting

* Or Equivalent - Equipment numbers shown are examples for reference only

SPECIFIC PRECAUTIONS AND LIMITATIONS

1. The Pad A Job Supervisor must be present during all Pad A operations. (RWMC OSR, Add. A, 4.2.3.1)

2. All operations shall be conducted with continuous HP coverage. The crew size will be approved by the RWMC/SWEPP Operations Manager or designated alternate. (RWMC OSR, Add. A, 4.2.3.2. and 3.2.4.3)

3. An Industrial Hygienist (IH) will be at the dig site during all operations, (QAPP Sect.3.2.4), and will monitor with volatile organic detection instrumentation (OVA and HNu) to comply with the Pad A Health and Safety plan. (RWMC OSR, Add. A, 4.2.3.2)

4. The RWMC Pad A Job Supervisor or alternate will be responsible to ensure that all personnel entering the retrieval area (workers and observers) have completed the OSHA HAZMAT, respirator and radiation worker training. In addition, all personnel entering the area must have the permission of the Pad A Job Supervisor or his designated alternate.

5. All applicable requirements of the DOE Hoisting and Rigging Manual shall be observed during lifting procedures. (RWMC OSR 3.4.3.1. and 3.4.3.2)

6. All personnel working in the containment building on the Pad A drum retrieval operation will take complete showers at the end of each work shift. (Pad A Health and Safety Plan, Sect.5.5)

7. The dig area will be an Exclusion Zone and shall be so posted. Modified Level B suits (air hoods or airline respirators, TYVEK suits, safety shoes, chemical resistant booties, outer gloves with surgical inner gloves as required by HP and IH) and hard hats (if required by HSO and IH) will be worn inside this area.

8. The area outside the Exclusion Zone but inside the building will be a Contamination Reduction Zone and shall be so posted. Level C suits (full face respirators with combination organic filter, TYVEK suits, safety shoes, chemical resistant booties, and outer gloves with surgical inner gloves, as required by HP and IH). The airline hood may be worn when transiting out from the exclusion zone.

9. Nonworking observers inside either the Exclusion Zone or the Contamination Reduction Zone will wear the same protective clothing as required for workers in the corresponding area. In accordance with the ALARA philosophy, the number of nonworking observers in the exclusion zone will be minimized.

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SPECIFIC PRECAUTIONS AND LIMITATIONS (Cont'd.)

10. Pad A operations inside the containment building will be monitored for HAZMAT with the instrumentation listed in the Equipment section (RWMC OSR, Add. A, 3.2.4.4).

11. A vehicle capable of carrying five persons shall be available at the retrieval site at all times for emergency evacuation. Five extra full-face respirators shall be kept in the vehicle.

12. Personnel within the exclusion zone will be continuously monitored in the breathing zone (chest or face level). Negative readings on the HNu should never be interpreted as a complete absence of airborne toxic substances. If the readings on the HNu rise to 200 ppm above background, work at the site must be halted and personnel evacuated from the area. (RWMC OSR Add. A, 3.2.3.4) At this point, an evacuated canister sample will be taken to determine the constituents present in the air. From the analysis results, the IH will advise on an appropriate plan of action. Personnel will not re-enter the site except for sampling until the WPM has been assured of its safety.

13. When conducting wipe surveys, if less than 100 cpm beta-gamma above background and NO alpha, proceed. If greater than the above limits, stop operation to assess by performing a legal smear survey. If the results exceed 200 dpm/100 cm^2 alpha, stop the operation and contact the JS for resolution. An evaluation of the situation will be made by the Pad A Job Supervisor and/or Project Engineer, RWMC/SWEPP Shift Manager, BWP Project Manager, Technical Programs and Safety personnel. Actions will then be determined and completed before resuming operations.

14. If uncontained contamination exceeds limits of Precaution 13 or if a waste container is found to be breached or ruptured, all activities shall be stopped. The affected area shall be stabilized with soil stabilizer if required, and/or covered with nylon reinforced plastic or poly sheeting. All personnel shall then leave the immediate area and shall proceed to a pre-designated staging area for personnel survey. The RWMC/SWEPP Shift Manager shall be notified. An evaluation of the situation shall be made by the Pad A Job Supervisor and/or Project Engineer, RWMC/SWEPP Shift Manager, BWP Project Manager, Technical Programs and Safety personnel. An assessment of the additional information will be made and additional precautions will be instituted if necessary as determined by the Pad A Job Supervisor and Safety representative.

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SPECIFIC PRECAUTIONS AND LIMITATIONS (Cont'd.)

15. Beta/gamma limits for overburden soil shall be 100 cpm above background as determined through monitoring by Health and Safety personnel per Soil Sampling Collection Procedure. If above limit is exceeded, samples will be collected for full radionuclide analysis.

16. The Pad A confinement exhaust radiological effluent activity downstream of the HEPA filtration system shall not exceed 2 x 10^{-12} uCi/ml alpha activity and/or 1 x 10^{-10} uCi/ml beta-gamma activity. (RWMC OSR Add. A, 3.2.3.1)

17. If the combustible gas indicator readings within the containment exceed 10% of the Lower Explosive Limit (LEL) for one minute, retrieval activities will be suspended. (RWMC OSR Add. A, 3.2.3.4)

18. Building movement shall be initiated and conducted only in fair weather as determined by the Pad A Job Supervisor and the RWMC/SWEPP Shift Manager.

19. A portal monitor, large-area detector, or portable survey station shall be operating in the guard house (WMF-611) for use by personnel entering and exiting the RWMC/SWEPP. (RWMC OSR Section 3.3.3)

20. The tops of the waste containers in Pad A are at irregular elevations and may not be covered with plywood.

21. To prevent crushing drums with vehicles, the minimum dirt thickness over drums has been established at 26 in. (RWMC OSR Add. A, 3.3.3)

22. If the fire department is needed, call RWMC personnel on "6" net radio at WMF-601 and have phone call placed to 6-2211.

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SPECIFIC PRECAUTIONS AND LIMITATIONS (Cont'd.)

23. When wind speeds exceed 75 mph (120 Km/h), operations at Pad A shall cease and all personnel shall exit the Pad A containment structure. Only in the event of an emergency shall personnel reenter the Pad A containment structure until wind speeds decrease to less than 75 mph. (RWMC OSR Add. A, 3.1.3.1)

24. Due to the age of the waste which will be retrieved, breached waste containers, and consequently uncontained contamination, will be considered an anticipated or normal event. If uncontained contamination exceeds limits of Precaution 13, or if a waste container is found to be breached, ruptured, and/or corroded such that handling would be unsafe, all retrieval activities shall be stopped. The affected area and/or container shall be stabilized with soil stabilizer if required, and covered with nylon reinforced plastic. All personnel shall then leave the immediate area and shall proceed to a pre-designated staging area for personnel survey. The RWMC/SWEPP Shift Manager shall be notified. An evaluation of the situation shall be made by the RWMC/SWEPP Shift Manager, the Pad A Job Supervisor and/or Project Engineer, BWP Project Manager with Health and Safety personnel. Specific corrective action shall then be determined. All corrective actions shall be completed before resuming operations.

25. In the event of an abnormal occurrence (fire, high air particulate activity or explosion) all personnel shall evacuate upwind or as directed by the Health Physics technician or Job Supervisor. Work area evacuations shall be by verbal communication. Emergency communications between Pad A work site and the RWMC work control office in WMF-601 shall be via "6" net radio and activation of the RWMC evacuation siren will be determined by the Emergency Action Director. The RWMC/SWEPP Shift Manager shall direct further action in accordance with procedures established in the RWMC Emergency Action Plan.

26. The minimum temperature for operations requiring organic vapor monitoring is 15° F.

27. When not in use, air lines inside the building will have ends taped over to prevent personnel contamination.

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PREREQUISITES

1. GENERAL

_____ 1.1 (JS) DOP-RO-5.2.2 (Pad A Initial Penetration Pre-operational Site Preparation) has been completed for the South penetration site (Section 2) and cargo containers are ready (Section 3).

_____ 1.2 (JS) A Startup Checklist has been completed prior to the start of operations each day.

_____ 1.3 (JS) The following designated crew members (minimum) have been qualified in their basic positions. (All RWMC personnel trained and qualified per RWMC Training program (RWMC OSR 4.1.3). Operations involving radioactive and/or hazardous materials shall have as a minimum an HP, an IH, a fire watch and a crew size designated by RWMC SM or designated alternate (RWMC OSR Add. A, 4.2.3.2). The Pad A Job Supervisor must be present during all Pad A operations (RWMC OSR Add. A, 4.2.3.1). N/A all positions which are not required for daily activities.

One Pad A Job Supervisor (JS)	Name: _____________
One Health and Safety Officer (HSO)	Name: _____________
One Quality Field Officer (QFO) (for soil samples)	Name: _____________
One Industrial Hygienist (IH) for soil samples	Name: _____________
One Sampling Team Leader (for soil samples)	Name: _____________
One Sampling Technician (for soil samples)	Name: _____________
One Quality Assurance Inspector (QA) (for drums thickness)	Name: _____________
One heavy equipment operator (HEO)	Name: _____________
Two equipment operators (EO)	Name: _____________
Two HP technicians (HP)	Name: _____________
One Laborer	Name: _____________
One Photographer	Name: _____________

PREREQUISITES (Cont'd.)

1. GENERAL (Cont'd.)

_____ 1.4 (JS) Verify that wind speed as read at WMF-601 or WMF-613 does not exceed 75 mph. (RWMC OSR Add. A, 3.1.3.1)

_____ 1.5 (JS) Complete a shift briefing which will cover the anticipated operations coming up this shift as well as a summary of status to date, as applicable. The potential chemical, radiological and industrial hazards will be made explicitly clear. (In addition, a briefing will be held prior to starting a new phase of the operation if not covered in the pre-shift briefing.)

_____ 1.6 (JS) A portal monitor, large-area detector, or portable survey station is operating in the guard house (WMF-611) for use by personnel entering and exiting the RWMC/SWEPP (RWMC OSR, 3.3.3.1).

2. FINAL PAD OVERBURDEN PENETRATION and DRUM RETRIEVAL

_____ 2.1. (HP) Ensure that access control signs are posted, listing radiation levels, Anti-C requirements, respiratory protection and survey requirements.

_____ 2.2. (HP) All monitors and samplers shall be in operation in the vicinity of the work area. Location of the samplers and monitors will be determined by Health and Safety personnel.

_____ 2.3. (HP) Two (2) area TLD's shall be positioned near the work area.

_____ 2.4. (HP) Each worker entering the Exclusion Zone shall have the following equipment and dosimetry:

1. Alarming digital dosimeter
2. TLD
3. Appropriate safety equipment as required in this procedure
4. Air hood or airline respirator and TYVEK suit
5. Personal air sampler as required by IH/RE
6. Direct reading dosimeter

_____ 2.5. (JS) The CFA Fire Department personnel have been oriented on special hazards involved regarding a fire at Pad A. (RWMC SAR Add. A, 3.5)

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PREREQUISITES (Cont'd.)

2. FINAL PAD OVERBURDEN PENETRATION and DRUM RETRIEVAL (Cont'd.)

_____ 2.6. (JS) A summary of waste records, photographic files and existing log books for Pad A shall be reviewed thoroughly by the Pad A Job Supervisor with the crew for familiarization with the type of waste and waste containers which will be encountered.

_____ 2.5 (HP) Record HP/IH instruments assigned to this operation:

Instrument type	SERIAL #	CAL. DATE
Alpha Contamination	_____	_____
	_____	_____
	_____	_____
Beta/Gamma Contamination	_____	_____
	_____	_____
	_____	_____
Direct Radiation	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
Alpha CAM	_____	_____
Alpha CAM	_____	_____
Beta/Gamma CAM	_____	_____
Beta/Gamma CAM	_____	_____
HNu	_____	_____
HNu	_____	_____
Hi-Vol	_____	_____
Hi-Vol	_____	_____
Personal air sampler	_____	_____
Personal air sampler	_____	_____
Personal air sampler	_____	_____
Personal air sampler	_____	_____
Personal air sampler	_____	_____
Personal air sampler	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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PREREQUISITES (Cont'd.)

_____ 2.8 (JS) Once the ventilation system is operational and the exhumation vehicle is in place, have a smoke test performed to ensure that the exclusion area boundaries are properly delineated. Reposition exclusion area boundaries if necessary.

_____ 2.9 (JS) Waste disposal containers have been positioned and are available for use.

_____ 2.10 (JS) Spread plastic, tarp or Visquine in areas where the overburden dirt will be placed and where retrieved drums and overpack drums will be placed.

3. DRUM MOVEMENT to TSA

_____ 3.1. (JS) Waste Profile sheets, completed for waste to be stored in TSA, have been approved by RWMC/SWEPP Programs prior to storage in TSA.

_____ 3.2. (JS) A RWMC Hazardous Waste Inventory List as been completed by a qualified Hazardous Waste Shipper and transmitted to RWMC/SWEPP Operations prior to storage in TSA.

_____ 3.3. (JS) The flat bed truck is positioned for loading.

_____ 3.4. (JS) The Low Rider LOED or equivalent is available at Pad A.

4. BUILDING PLACEMENT/MOVEMENT

_____ 4.1. (JS) Weather forecasts shall indicate fair weather (no precipitation) for an 8 hr period of time prior to initiation of building placement/movement. Weather evaluation will be made by the Pad A Job Supervisor or Project Engineer and RWMC/SWEPP Shift Manager.

_____ 4.2. (JS) Maximum wind conditions shall be 15 mph during building movement.

_____ 4.3. (JS) Crane and operator are available.

_____ 4.4. (JS) Other personnel as listed in SWR RS-228X are available.

5. END of SHIFT

_____ 5.1 (JS) Complete a Shutdown Checklist prior to end of shift.

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WASTE MANAGEMENT DEPARTMENT

RWMC/SWEPP PROGRAMS

PERSONNEL BRIEFING LOG

Personnel Briefing Log (your signature and initials indicate your briefing attendance, understanding, and commitment to procedure compliance)

DATE	NAME (PRINT)	SIGNATURE	INITIALS	CLASSIFICATION	BRIEFED BY

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WASTE MANAGEMENT DEPARTMENT

RWMC/SWEPP PROGRAMS

PERSONNEL BRIEFING LOG (Cont'd.)

Personnel Briefing Log (your signature and initials indicate your briefing attendance, understanding, and commitment to procedure compliance)

DATE	NAME (PRINT)	SIGNATURE	INITIALS	CLASSIFICATION	BRIEFED BY

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OPERATION

Procedure Opened: _______________ (JS) Time ________ Date ________

The Pad A Job Supervisor must complete a Startup Checklist at start of each shift and a Shutdown Checkoff at the end of each shift.

1. Penetration Opening (South)

_____ 1.1 (JS) Verify that the "General" Prerequisites and Prerequisites for "Final Pad Overburden Penetration and Drum Retrieval" have been completed.

_____ 1.2 (JS) Remove the remaining overburden to achieve penetration using backhoe and/or hand shovels to expose drums or plastic sheet (whichever comes first). Place dirt adjacent to excavation.

a. If plywood, plastic sheeting, or drums are not encountered when 42 inches of overburden have been removed, the operation shall stop, the RWMC/SWEPP Shift Manager notified, and the situation will be evaluated by the RWMC/SWEPP Shift Manager, Pad A Job Supervisor, and Health and Safety personnel.

b. Before work continues, a formal procedure will be developed and approved to determine the exact location of the waste zone.

_____ 1.3 (JS) Once penetration has been achieved, conduct a smoke test to determine direction and pattern of air flow at the opening. If necessary make adjustments to area boundary and/or ventilation system to ensure that flow is from the opening out through ventilation system.

_____ 1.4 (JS) If plastic sheeting has been uncovered, remove it and the plywood. Dispose of wood and plastic. If contaminated, dispose of as contaminated waste. As the drums are exposed, Health Physics personnel sample the area using: 1. Radiation exposure meter, 2. Portable alpha and beta/gamma instruments, and 3. Wipe survey. All operations shall be conducted in a manner to minimize the activity and time spent on top of waste stack.

(See Precaution 13)

OPERATION (Cont'd.)

2. Visual Inspection of Drums (South)

The following procedure steps do not necessarily have to be done in sequential order. The actual order will be determined by the Pad A Job Supervisor.

_____ 2.1 (JS) Visually inspect drums for identification tags, labels, content code, corrosion and integrity. Enter applicable data in Tables 1 and 2. If drums are intact, continue. If drums are corroded through or otherwise breached, stop and evaluate (See Precaution 14). The results of the evaluation will be documented in the daily operations log and a detailed recovery plan will be made per DRR to this DOP.

CAUTION

If a "Non-Rocky Flats" drum is encountered, that drum must not be removed from its disposal location. (RWMC SAR Add A, Appendix 4)

3. Ultrasonic Inspection of Drum Thickness (South)

_____ 3.1 (QA) Perform ultrasonic inspection of drums in place if possible. If necessary complete measurements following drum removal. Record results of the inspection in Table 1. If results are satisfactory (.020 in. or greater), continue with drum retrieval section, if not, stop and evaluate.

4. Drum Retrieval/Overpacking/Transport to TSA (South)

NOTE A total of approximately 24 drums will be retrieved from each of the two penetrations. Because there is not enough room in the enclosure to overpack all the drums at once, drums will be retrieved and overpacked in batches per the Pad A Job Supervisor's discretion. Enough 83 gal overpacks should be brought into the enclosure to do one batch prior to retrieving that batch. The barcodes will be recorded in Table 1.

_____ 4.1 (JS) Verify that the "General" prerequisites and prerequisites for "Final Pad Overburden Penetration and Drum Retrieval" as well as "Drum Shipment to TSA" have been completed.

OPERATION (Cont'd.)

4. Drum Retrieval/Overpacking/Transport to TSA (South) (Cont'd.)

_____ 4.2 (JS) Retrieve drums one at a time from the penetration site using the backhoe and either a drum handling device per Figure 3 or rigging per Figure 5, moving them to the drum inspection/overpack area and place on previously prepared plastic, tarp, Visquine or plywood plastic covered surface.

_____ 4.3 (JS) Upright drums using hand uprighter as they are retrieved to optimize floor space.

_____ 4.4 (JS) Mark drums with overpack barcode numbers which correspond to the overpacks which were brought into the enclosure. Drums will be placed in the corresponding overpacks.

_____ 4.5 (JS) When enough drums have been accumulated to overpack (Job Supervisor's discretion), overpack those drums and transport to TSA cargo containers as follows:

a. Mark overpack to be used with drum identification information and fill out Table 2.

b. Rig to drum per Figure 4.

c. Lift drum and place in overpack drum.

d. Close and secure overpack drum lid.

e. HP shall make final survey of overpack drum prior to removal of drum from enclosure building.

f. Open the equipment access door and using the Low Rider LOED, rig to overpack per Figure 4 or utilize 83 gal drum barrel handlers.

g. Move overpack to flatbed truck for transport to TSA.

h. When truck is loaded, transport loaded overpacks to TSA cargo containers.

i. Using a forklift with hydraulic clamp handler, place the drums in the appropriate cargo container.

NOTE: All drums removed during a shift must be placed in the appropriate cargo container at TSA and a list of drums transferred given to RWMC/SWEPP Operations prior to the end of the shift. (Make entry in the Shutdown Checklist.)

OPERATION (Cont'd.)

5. Penetration Closure (South)

_____ 5.1 (HP) Collect soil samples from the penetration overburden which is stockpiled adjacent to the penetration and any soil which may be in the penetration itself. Chain of custody rules shall be invoked at this point and samples transfered to Sampling Team leader for further transfer to laboratories.

_____ 5.2. (JS) Cover penetration opening as follows:

a. Cover hole with plastic sheet or Visquine.
b. Cover hole with plywood at drum level.
c. Cover plywood with plastic, tarp or Visquine and secure to prevent wind damage.
d. Rope off hole area to prevent personnel access.

6. Building Removal (South)

_____ 6.1 (JS) Verify that the "General" prerequisites and prerequisites for "Building Placement/Movement" have been completed.

_____ 6.2. (HP) Survey and decontaminate building and equipment as required to meet the limits as shown in Precaution 13.

_____ 6.3. (JS) Shut down and disconnect all equipment from power.

_____ 6.4. (JS) Move all equipment to north penetration location.

NOTE: Steps 7.1 and 15.1 may be performed concurrently following building removal from north penetration.

7. Contour Area (South)

NOTE: Building must be removed from South penetration site per Step 8.1 prior to performing Step 7.1

_____ 7.1. (JS) Fill and contour the area over the South penetration with excavated overburden and clean dirt to match the surrounding contours such that there are no depressions to collect water.

8. Enclosure/Ventilation/Radiation Monitoring Equipment Installation (North)

_____ 8.1 (JS) Move and reinstall the Sprung Structure building at the north penetration location as shown in Figures 1 and 2 per SWR RS228X.

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OPERATION (Cont'd.)

8. Enclosure/Ventilation/Radiation Monitoring Equipment Installation (North) (Cont'd.)

_____ 8.2 (JS) Move power distribution equipment to north penetration area.

_____ 8.3 (JS) Install ventilation equipment and verify operability.

_____ 8.4 (HP) Install the various radiation monitoring equipment as follows:

1. One Alpha CAM and one Beta/Gamma CAM to monitor the Exclusion area
2. One Alpha CAM and one Beta/Gamma CAM to monitor the HEPA filter outlet flow
3. Other equipment located as desired.

Verify operability. Log results in Pad A Health Physics Log.

_____ 8.5 (JS) Position the following equipment as it will be during the retrieval operation:

1. Ten wheel flatbed truck
2. Backhoe (No. 75641)
3. Low Rider LOED or equivalent
4. Change area
5. Exclusion Zone boundaries
6. Contamination Reduction Zone boundaries.

_____ 8.6 (JS) After all equipment has been positioned in the enclosure building, and the ventilation system is running, have a smoke test performed to ensure that the exclusion area boundaries are properly positioned. Reposition Exclusion Area boundaries if necessary.

9. Penetration Opening (North)

_____ 9.1 (JS) Verify that the "General" Prerequisites and Prerequisites for "Final Pad Overburden Penetration and Drum Retrieval" have been completed.

_____ 9.2 (JS) Remove the remaining overburden to achieve penetration using backhoe and/or hand shovels to expose drums or plastic sheet (whichever comes first). Place dirt adjacent to excavation.

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a. If plywood, plastic sheeting, or drums are not encountered when 42 inches of overburden have been removed, the operation shall stop, the RWMC/SWEPP Shift Manager notified, and the situation will be evaluated by the RWMC/SWEPP Shift Manager, Pad A [illegible] [illegible] and [illegible] and [illegible] personnel.

b. Before work continues, a formal procedure will be developed and approved to determine the exact location of the waste zone.

_____ 9.3 (JS) Once penetration has been achieved, conduct a smoke test to determine direction and pattern of air flow at the opening. If necessary make adjustments to area boundary and/or ventilation system to ensure that flow is from the opening out through ventilation system.

OPERATION (Cont'd.)

9. Penetration Opening (North) (Cont'd.)

_____ 9.4 (JS) If plastic sheeting has been uncovered, remove it and the plywood. Dispose of wood and plastic. If contaminated, dispose of as contaminated waste. As the drums are exposed, Health Physics personnel sample the area using: 1. Radiation exposure meter, 2. Portable alpha and beta/gamma instruments, and 3. Wipe survey. All operations shall be conducted in a manner to minimize the activity and time spent on top of waste stack.

(See Precaution 13)

10. Visual Inspection of Drums (North)

_____ 10.1 (JS) Visually inspect drums for identification tags, labels, content code, corrosion and integrity. Enter applicable data in Tables 1 and 2. If drums are intact, continue. If drums are corroded through or otherwise breached, stop and evaluate. (See Precaution 14) The results of the evaluation will be documented in the daily operations log and a detailed recovery plan will be made per DRR to this DOP.

CAUTION

If a "Non-Rocky Flats" drum is encountered, that drum must not be removed from its disposal location. (RWMC SAR Add A, Appendix 4)

11. Ultrasonic Inspection of Drum Thickness (North)

_____ 11.1 (QA) Perform ultrasonic inspection of drums in place if possible. If necessary, complete measurements following drum removal. Record results of the inspection in Table 1. If results are satisfactory (.020 in. or greater), continue with drum retrieval section, if not, stop and evaluate.

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OPERATION (Cont'd.)

12. Drum Retrieval /Overpacking/Transport to TSA (North)

NOTE: A total of approximately 24 drums will be retrieved from each of the two penetrations. Because there is not enough room in the enclosure to overpack all the drums at once, drums will be retrieved and overpacked in batches per the Pad A Job Supervisor's discretion. Enough 83 gal overpacks should be brought into the enclosure to do one batch prior to retrieving that batch. The barcodes will be recorded in Table 1.

_____ 12.1 (JS) Verify that the "General" prerequisites and prerequisites for "Final Pad Overburden Penetration and Drum Retrieval" as well as "Drum Shipment to TSA" have been completed.

_____ 12.2 (JS) Retrieve drums one at a time from the penetration site using the backhoe and either a drum handling device per Figure 3 or rigging per Figure 5, moving them to the drum inspection/overpack area and place on previously prepared plastic, tarp, Visquine, or plywood surface.

_____ 12.3 (JS) Upright drums using hand uprighter as they are retrieved to optimize floor space.

_____ 12.4 (JS) Mark drums with overpack barcode numbers which correspond to the overpacks which were brought into the enclosure. Drums will be placed in the corresponding overpacks.

_____ 12.5 (JS) When enough drums have been accumulated to overpack (Job Supervisor's discretion), overpack those drums and transport to TSA cargo containers as follows:

a. Mark overpack to be used with drum identification information and fill out Table 2.

b. Rig to drum per Figure 4.

c. Lift drum and place in overpack drum.

d. Close and secure overpack drum lid.

OPERATION (Cont'd.)

12. Drum Retrieval /Overpacking/Transport to TSA (North) (Cont'd.)

e. HP shall make final survey of overpack drum prior to removal of drum from enclosure building.

f. Open the equipment access door and using the Low Rider LOED, rig to overpack per Figure 4, or utilize 83 gal drum barrel handlers.

g. Move overpack to flatbed truck for transport to TSA.

h. When truck is loaded, transport loaded overpacks to TSA cargo containers

i. Using a forklift with hydraulic clamp handler, place the drums in the appropriate cargo container.

NOTE: All drums removed during a shift must be placed in the appropriate cargo container at TSA and a list of drums transferred given to RWMC/SWEPP Operations prior to the end of the shift. (Make entry in the Shutdown Checklist.)

13. Penetration Closure (North)

_____ 13.1 (IH) Collect soil samples from the penetration overburden which is stockpiled adjacent to the penetration and any soil which may be in the penetration itself.

_____ 13.2 (JS) Cover penetration opening as follows:

a. Cover hole with plastic sheet or Visquine.
b. Cover hole with plywood at drum level.
c. Cover plywood with plastic, tarp or Visquine and secure to prevent wind damage.
d. Rope off hole area to prevent personnel access.

14. Building Removal (North)

_____ 14.1 (JS) Verify that the "General" Prerequisites and Prerequisites for "Building Placement/Movement" have been completed.

_____ 14.2 (HP) Survey and decontaminate building and equipment as required to meet the limits as shown in Precaution 13.

_____ 14.3 (JS) Shut down and disconnect all equipment from power.

OPERATION (Cont'd.)

14. Building Removal (North)

_____ 14.4 (JS) Remove the Sprung Structure building from the North penetration and store per the direction of the Pad A Job Supervisor and SWR RS228X.

15. Contour Area (North)

_____ 15.1 (JS) Fill and contour the area over the North penetration with excavated overburden and clean dirt to match the surrounding contours such that there are no depressions to collect water.

16. Contour Pad A (Overall)

_____ 16.1 (JS) Fill the cutouts on the East side of Pad A where the crane was and contour the overall shape of the pad overburden so that there are no depressions to collect water.

17. Reseed Areas (Both)

_____ 17.1 (JS) Reseed Pad A per the requirements of PD-RS-2.2 - Operation in the Subsurface Disposal Area.

18. Cleanup of Equipment/Area and Storage of Equipment

_____ 18.1 (JS) Clean up area following project to ensure that equipment is stored and waste has been disposed of etc.

Procedure Completed:

Signature _________________ Time _______ Date _______
(JS)

Shift Manager___________________________ Date________

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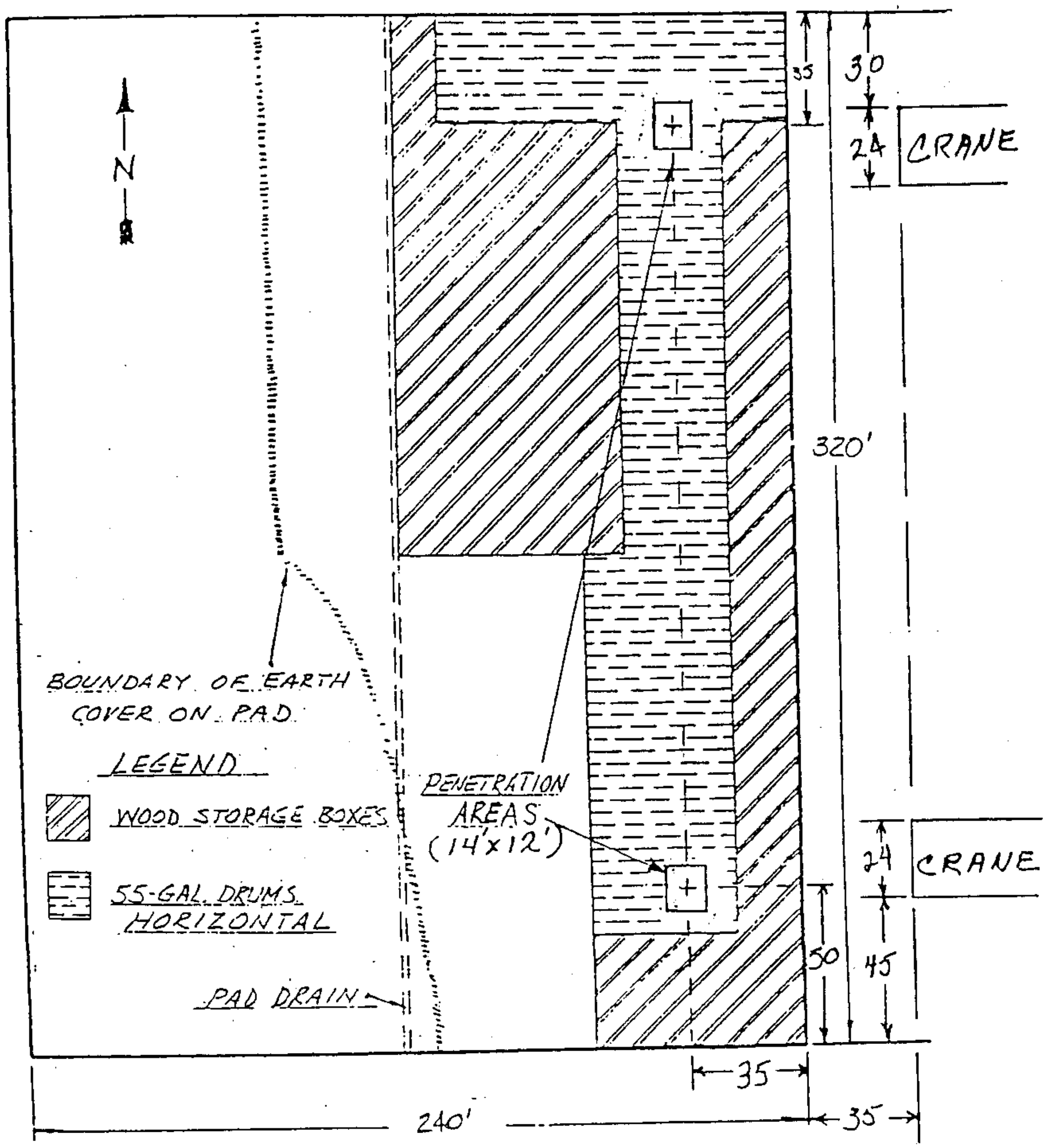

Figure 1. Plan View of Pad A and Penetration Area.

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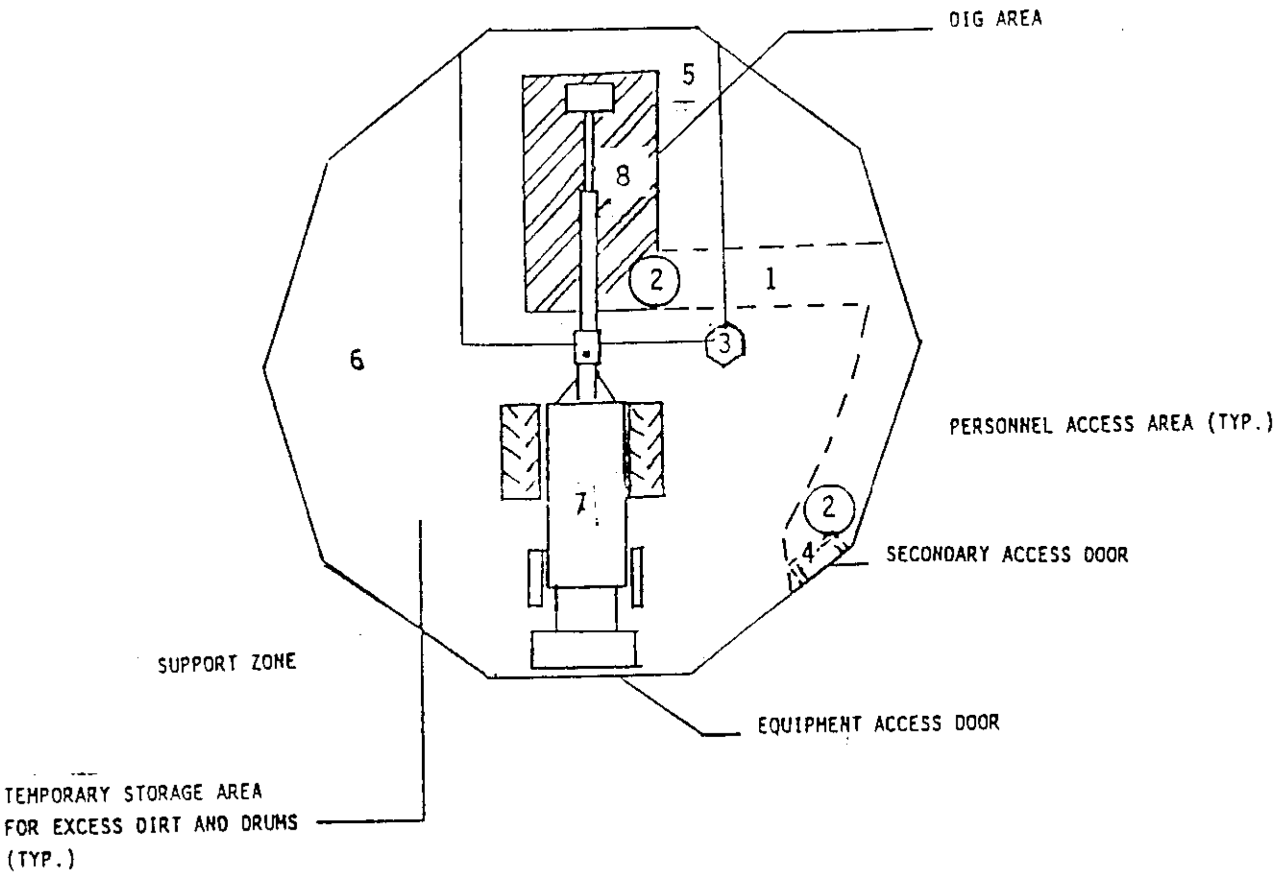

1. Contamination Reduction Corridor
2. Access Control Points
3. Decontamination Station A
4. Decontamination Station B
5. Exclusion Zone
6. Contamination Reduction Zone
7. Backhoe
8. Retrieval Area

Figure 2. Pad A Building/Penetration Layout.

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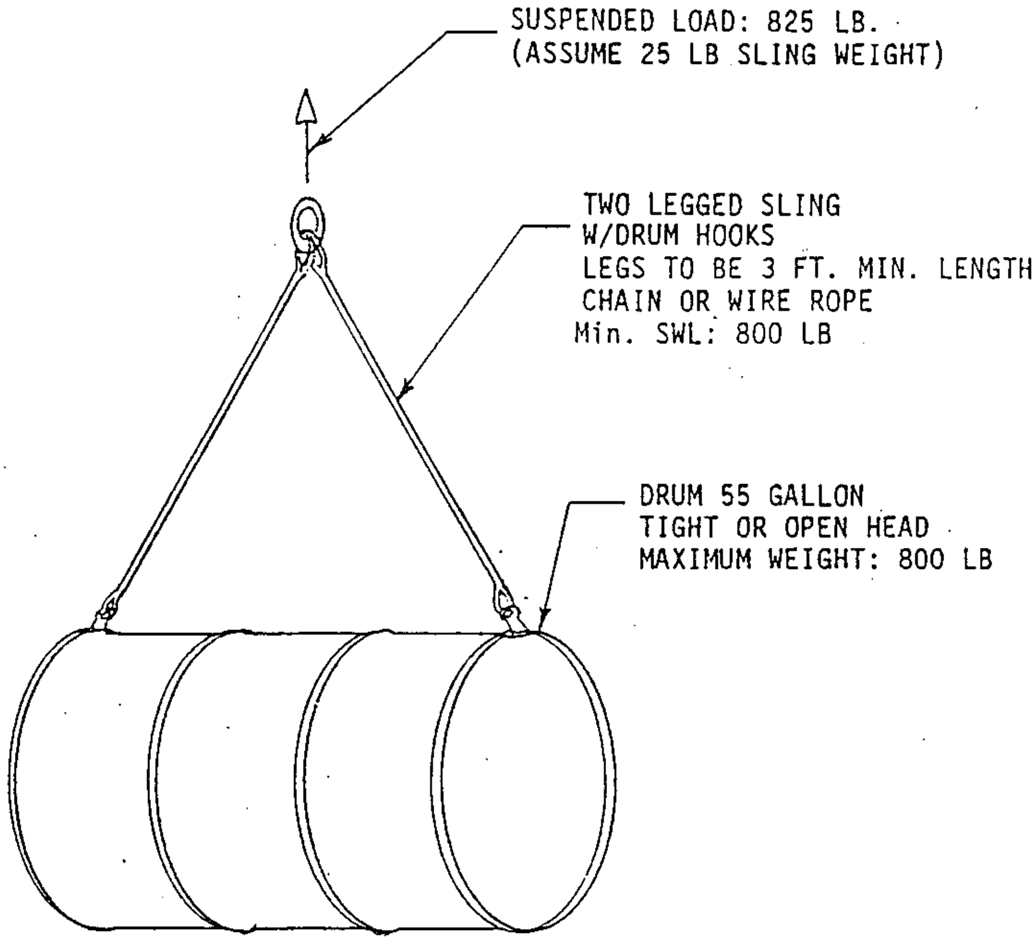

RWMC DRAWING
8/12/88

Richard O. Sanders

Figure 3. Horizontal drum handling.

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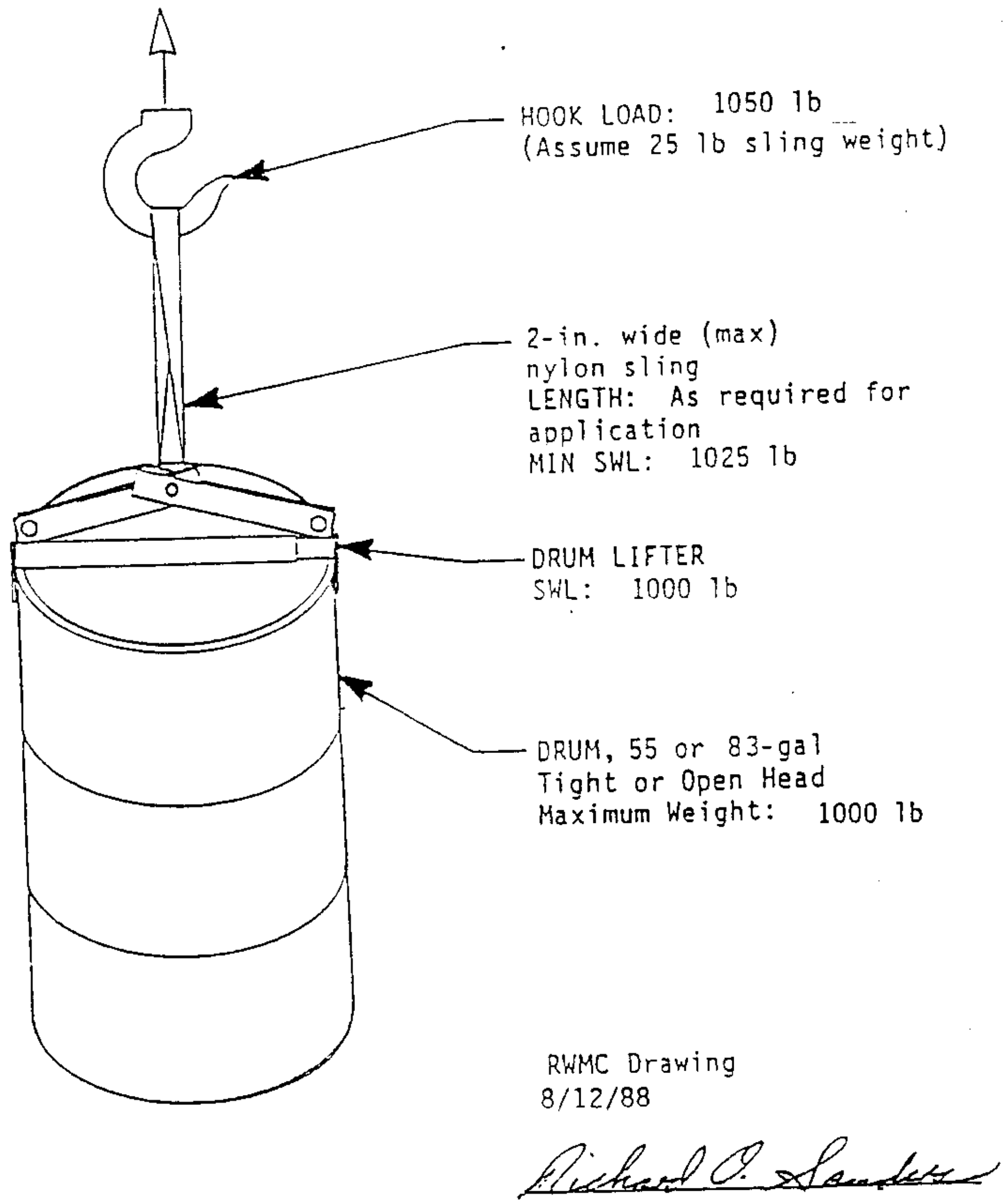

Figure 4. Vertical drum handling.

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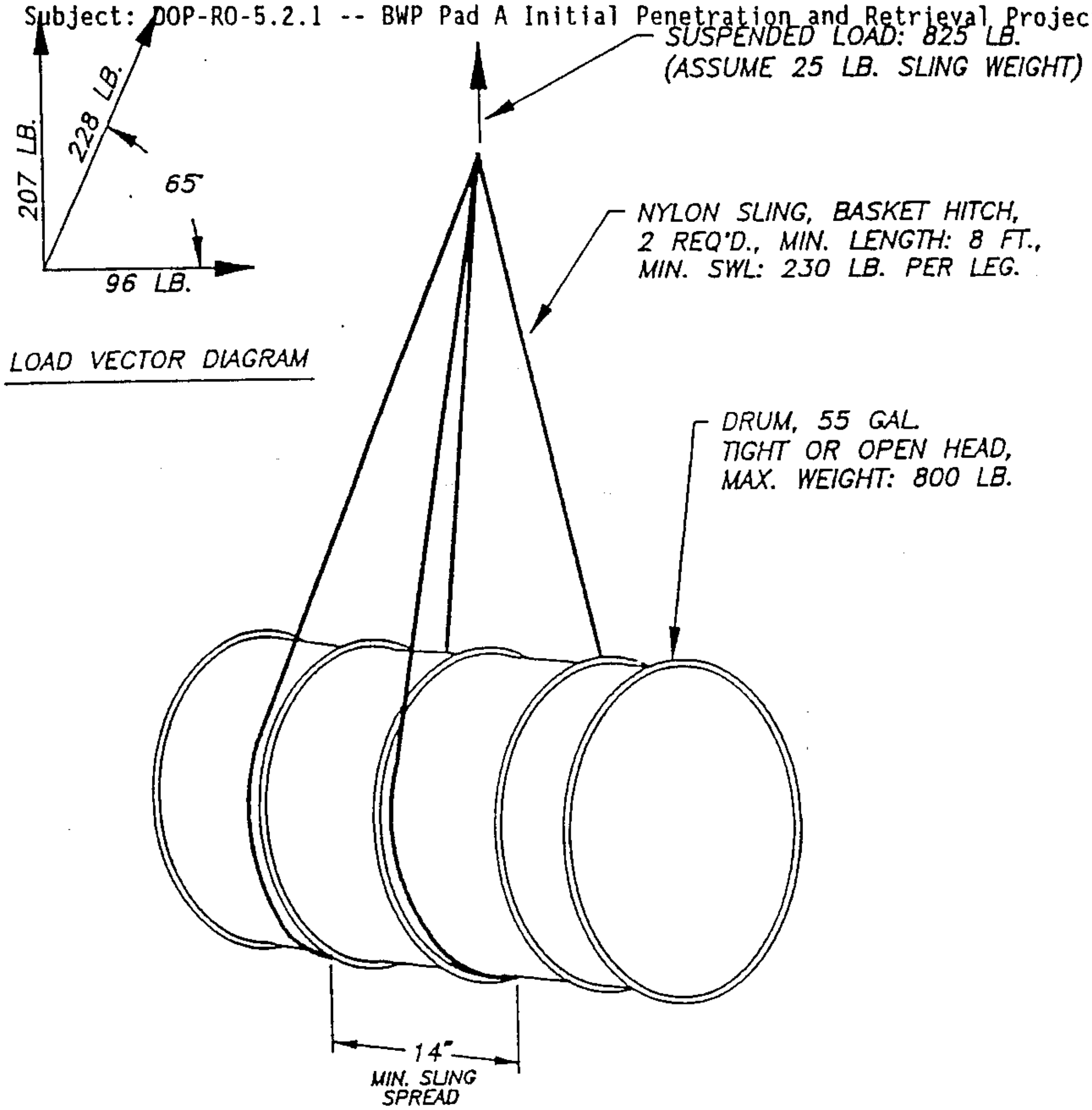

RWMC/SWEPP RIGGING SKETCH

APPROVED DATE

R.O. Sanders 11-22-88

RWMC/SWEPP RIGGING ENGINEER

Figure 5. Horizontal Drum Handling

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TABLE 1. ULTRASONIC TESTING OF DRUMS

Penetration (Circle one) SOUTH NORTH

Layer No.	Drum Ident.	RWMC Barcode Number	Top	Upper Side	Middle Side	Lower Side	Bottom
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)
____	____	____	____(in)	____(in)	____(in)	____(in)	____(in)

Instrument Number: ____________

Calibration Date: ____________

Performance Signature: ____________

Date: ____________

Note

Normal drum wall thickness ranges from .0533 to .0598 in.

Minimum wall thickness is .020 in.

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TABLE 1. ULTRASONIC TESTING OF DRUMS (continued)

Penetration (Circle one) SOUTH NORTH

Layer No.	Drum Ident.	RWMC Barcode Number	Top	Upper Side	Middle Side	Lower Side	Bottom
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)

Instrument Number: ____________

Calibration Date: ____________

Performance Signature: ____________

Date: ____________

Note

Normal drum wall thickness ranges from .0533 to .0598 in.

Minimum wall thickness is .020 in.

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RWMC Operations

Subject: DOP-RO-5.2.1 -- BWP Pad A Initial Penetration and Retrieval Project

TABLE 1. ULTRASONIC TESTING OF DRUMS (continued)

Penetration (Circle one) SOUTH NORTH

Layer No.	Drum Ident.	RWMC Barcode Number	Top	Upper Side	Middle Side	Lower Side	Bottom
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)
			(in)	(in)	(in)	(in)	(in)

Instrument Number: ____________________

Calibration Date: ________________

Performance Signature: ____________________

Date: ________________

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Note

Normal drum wall thickness ranges from .0533 to .0598 in.

Minimum wall thickness is .020 in.

TABLE 2. DRUM DATA

Drum Ident. No.	Rad.Level	Content Code	Contents

Content Codes Expected	Contents	EPA Waste No.
5	Nitrates	D001
995	Sewer Sludge	Awaiting Testing
None	Uranium/Beryllium	Awaiting Testing

RWMC Operations

Subject: DOP-RO-5.2.1 -- BWP Pad A Initial Penetration and Retrieval Project

TABLE 2. DRUM DATA (continued)

Drum Ident. No.	Rad.Level	Content Code	Contents

Content Codes Expected	Contents	EPA Waste No.
5	Nitrates	D001
995	Sewer Sludge	Awaiting Testing
None	Uranium/Beryllium	Awaiting Testing

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TABLE 2. DRUM DATA (continued)

Drum Ident. No.	Rad.Level	Content Code	Contents

Content Codes Expected	Contents	EPA Waste No.
5	Nitrates	D001
995	Sewer Sludge	Awaiting Testing
None	Uranium/Beryllium	Awaiting Testing

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ABNORMAL/EMERGENCY PROCEDURES

General

1. If prompt, life-saving first aid and/or medical treatment is required, decontamination procedures can be omitted. On site personnel should accompany contaminated victims to the medical facility to provide medical personnel information regarding contamination specifics.

2. Life-saving care will be instituted immediately without considering decontamination. Outer garments can be removed if they do not cause delay or interfere with treatment or aggravate medical problems. Respiratory equipment must always be removed. Chemical-resistant clothing can be cut away. If the outer contaminated garments cannot be removed, the victim should be wrapped in cloth to help prevent contamination of transporting vehicles or medical personnel. Outer garments can then be removed at the medical facility. Medical radiation and chemical decontamination facilities are located at CFA. The transport vehicle and medical facility may have to be decontaminated.

3. Hand signals and the buddy system will be used if an emergency situation should arise and normal communication becomes impossible or unsafe. The following hand signals will be used in an emergency:

   - Hand gripping throat - out of air, can't breathe;
   - Grip partner's wrist or both hands around waist - leave area immediately;
   - Hands on top of head - need assistance;
   - Thumbs up - okay, I'm all right, I understand; and
   - Thumbs down - no, negative.

4. In cases of life-threatening emergencies such as fire or explosion, personnel should leave the vicinity using the shortest possible route without regard for decontamination at that time. When the situation has stabilized, personnel will take necessary steps to decontaminate themselves, equipment, and other affected areas.

5. Prior to personnel entry into the Pad A containment, radiological and gross volatile organic levels will be determined. If during operations, the IH detects organic levels in excess of 200 parts per million (PPM) above background for 15 minutes, work will be suspended and personnel will evacuate the containment. An evacuated canister sample will be taken and analyzed for constituents present. The IH will continue to monitor the fluctuation of vapor levels with a Combustible Gas Indicator (CGI) and photo or flame ionization detector (PID/FID). If the elevated vapor levels do not dissipate, the IH, JS, and HSO will jointly determine a course of action that will allow safe operations.

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6. Emergency phone numbers:

   - Warning Communication Center (WCC) 777
   - Occupational Medical Program (OMP) 6-2356

7. Other phone numbers:

o Work Package Manager:	Buck Horton Work - 526-2116 Home - 529-2368
o Cost Account Manager:	Steve Fogdall Work - 526-6265 Home - 529-3220
o Health and Safety Officer:	Jeff Ginsburg Work - 526-9698 Home - 523-2945
o Explosives Expert:	Richard Green Work - 526-2702
o Industrial Hygienist	Mel Garcia Work - 526-8072

Personnel Injury in the Exclusion Zone

1. Sound a continuous blast on either the self contained air horn or a vehicle horn.
2. Shut down all equipment within the Exclusion Zone unless necessary to respond to the emergency.
3. On site personnel transport the injured personnel to the boundary between the Exclusion Zone and the Contamination Reduction Zone.
4. Assemble all other personnel at the decontamination line.
5. Notify RWMC Shift Manager.
6. The HSO and/or JS immediately contact the Occupational Medical Program (OMP) at 6-2356 through WMF-601 and "6 NET" radio to evaluate the nature of the injury.
7. If deemed necessary, contact the INEL WCC at 777 for emergency transportation and medical aid.
8. Decontaminate the injured person to the most reasonable extent possible prior to movement to the support zone. Decontamination may be omitted if prompt, life saving first aid and/or medical treatment is required.
9. Administer appropriate first aid to injured.
10. Record the injury in the logbook.

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Personnel Injury in the Support Zone

1. The JS and HSO assess the nature of the injury.
2. Notify RWMC Shift Manager.
3. If the cause of the injury or the loss of the injured person does not affect the performance of site personnel, operations will continue with the administration of first aid to the injured and

Personnel Injury in the Support Zone (Cont'd.)

4. If the injury may increase the risk to other site workers, the emergency signal (horn) will be sounded, nonessential equipment will be shut down and all Pad A personnel will move to the decontamination line for further instructions.
5. Activities on site will not start up again until the added risk is removed or minimized.

Transportation of and Follow up of Injury

1. If an injured worker is transported to the medical facility, he/she will be accompanied by at least one other Pad A worker (an HP if possible) to inform medical personnel of the level of decontamination performed prior to leaving the Pad A site and to provide specific details as to the nature of the injury. If radiological contamination is suspected, the HP will accompany the victim; likewise, if hazardous chemical exposure is suspected, the IH will accompany the victim.

2. In the event of contaminant exposure, the above procedures will be followed and affected personnel monitoring devices will be immediately transported to the analytical lab to aid in the appropriate testing and treatment of the injured worker.

Fire

1. Stop retrieval operations.
2. If possible put out fire with fire extinguishers.
3. Notify RWMC Shift Manager.
4. If necessary, call RWMC personnel on "6" net radio and have Fire Department called (6-2211).
5. Keep all personnel a safe distance upwind from the involved area until the situation is remedied and the risks have been eliminated.

Explosion

1. Stop retrieval operations.
2. Evacuate the building and area.
3. Administer first aid to the injured (if any).
4. Notify RWMC Shift Manager, Fire and Explosives experts.
5. Transport the injured for medical assistance.

Bulging drum

1. Stop retrieval operation.
2. Notify RWMC Shift Manager.
3. JS, IH and HSO jointly determine safe handling method prior to movement of drum.

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Breached Drum (in place)

1. Stop retrieval operations.
2. If required, stabilize the area with soil stabilizer and/or nylon reinforced plastic or poly sheeting.
3. Evacuate the building.
4. Notify RWMC Shift Manager.
5. Situation will be evaluated by RWMC Shift Manager, Pad A Job Supervisor and/or Project Engineer, BWP Project Manager and Health and Safety personnel.

Breached Drum (while lifting)

1. Stop retrieval operations.
2. If required, stabilize the area with soil stabilizer and/or nylon reinforced plastic/or poly sheeting.
3. Evacuate the building.
4. Notify Shift Manager.
5. Situation will be evaluated by RWMC Shift Manager, Pad A Job Supervisor and/or Project Engineer, BWP Project Manager and Health and Safety personnel.

High Radioactive Air Activity (as Sampled in Plenum Downstream of Hepa's ($>2\times10^{-12}$ uCi/ml Alpha or $>1\times10^{-10}$ uCi/ml Beta/Gamma)

1. Stop retrieval operations.
2. Evacuate the building.
3. Notify Shift Manager.
4. HP perform survey to determine extent of problem.

High Volatile Organic Gas Concentration (>200 PPM for 15 minutes).

1. Stop retrieval operations.
2. Evacuate the building.
3. Notify Shift Manager.
4. Perform follow up actions as shown in the Abnormal/Emergency Procedures, " General" section, Step 5.

High Combustible Gas Indicator (CGI) readings [10 % of the Lower Explosive Limit (LEL) or greater]

1. Stop retrieval operations.
2. Evacuate the building.
3. Notify Shift Manager.
4. Perform follow up actions as shown in the Abnormal/Emergency Procedures, " General" section, Step 5.

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Radioactive Contamination
($>$200 dpm/100 cm^2 beta-gamma and/or 20 dpm/100 cm^2 alpha)

1. Stop retrieval operations.
2. Evacuate the building.
3. Notify Shift Manager.
4. Perform follow up actions as shown in the Abnormal/Emergency Procedures, " General" section, Step 5.

Encountering a Waste Box (In-Place)

Pad A contains over 2000 plywood boxes of Rocky Flats waste that are in a degraded condition based upon the 1979 penetration inspection. The penetration sites have been picked to encounter and inspect drums only based upon historic documents and pictures. if a plywood waste box is uncovered or encountered during drum examination/retrieval:

1. Stop retrieval operations.
2. if required, stabilize the area involved with soil stabilizers/or nylon reinforced plastic or poly sheeting.
3. Evacuate the building.
4. Notify the RWMC shift manager.
5. Situation will be evaluated by the RWMC Shift Manager, Pad A Job Supervisor and/or Project Engineer, BWP Project Manager and Health and Safety personnel.
6. Corrective action and site closure based upon developed procedure from No. 5 above.

Personal Protective Equipment Failure

If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy will immediately leave the Exclusion Zone. Reentry will not be permitted until the equipment has been repaired or replaced. The HP, IH, and HSO will determine potential exposures and evaluate the need for biological sampling.

Other Equipment Failure

If any other equipment on site fails to operate properly, the JS and HSO will be notified and they will determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of Technical Work Plan tasks, all personnel will leave the Exclusion Zone until the situation is evaluated and appropriate actions are taken.

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Start-up Checklist

(To be filled in at the start of operations each day)

_______ 1. (JS) Complete a shift briefing which will cover the anticipated operations coming up this shift as well as a summary of status to date, as applicable. The potential chemical, radiological and industrial hazards will be made explicitly clear. (In addition, a briefing will be held prior to starting a new phase of the operation if not covered in the pre-shift briefing.)

_______ 2. (JS) Start the four ventilation blowers. Verify proper operation of all four blowers.

_______ 3. (JS) Read and record magnehelic gage reading on all four blowers to insure 4 inches wg. is not exceeded. (If 4 inches wg. is read, stop operations, change out filter prior to continued operation).

_______ 4. (IH) Verify that volatile and explosive gas concentrations are satisfactory.

_______ 5. (HP) The Alpha 5A CAM inside the building is operating properly and is set at 2×10^{-12} uCi/ml.

_______ 6. (HP) The Alpha 5A CAM at the HEPA filters is operating properly and is set at 2×10^{-12} uCi/ml.

_______ 7. (HP) The Beta/Gamma CAM inside the building is operating properly and is set at 1×10^{-10} uCi/ml.

_______ 8. (HP) The Beta/Gamma CAM at the HEPA filters is operating properly and is set at 1×10^{-10} uCi/ml.

_______ 9. (IH) The breathing air compressor has been started per EG&G Standard Practice 840-12 and is operating properly.

_______ 10. (JS) Verify prerequisites for the work to be done.

Checklist Complete____________________Date______ Time______
(JS)

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Shutdown Checklist

(To be filled in at the end of operations each day)

_______ 1. (WE) All drums removed during this shift have been overpacked and placed in the appropriate cargo container at TSA and a list of drums transferred has been given to RWMC/SWEPP Operations.

_____ 2. (HP) Perform a survey of the building,the area and equipment inside and the outside of the building for contamination. Record results in Pad A HP Log.

_______ 3. (JS) Read and record magnehelic gage readings on all four blowers to insure 4 inches wg. is not exceeded.

_______ 4. (JS) Secure all blowers.

_______ 5. (HP) CAM filters have been removed for counting and new filters have been installed. (Leave all CAMs running.)

_______ 6. (JS) Building doors are shut.

_______ 7. (IH) The breathing air compressor has been shut down per EG&G Standard Practice 840-12

_______ 8. (HP) Filters from CAMs have been counted for gross beta and gross alpha activity using a gas proportional smear counter. Results have been recorded in this step and the Pad A HP log.

Alpha CAM (inside building)	____________________
Alpha CAM (at filters)	____________________
Beta/Gamma CAM (inside building)	____________________
Beta/Gamma CAM (at filters)	____________________

_______ 9. (JS) Vehicle heaters are plugged in, if applicable

Checklist Complete______________________Date______ Time______
(JS)

COMMENT SHEET

Init	Date	Page Number	Step Number	Comments/Notes/Observations

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COMMENT SHEET (Continued)

Init	Date	Page Number	Step Number	Comments/Notes/Observations

ADD CONTINUATION SHEETS AS REQUIRED

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COMMENT SHEET (Continued)

Init	Date	Page Number	Step Number	Comments/Notes/Observations

ADD CONTINUATION SHEETS AS REQUIRED

RWMC/SWEPP PROGRAMS
TRAINING CHECKLIST FOR
BWP Pad A Initial Penetration and Retrieval Project

Name ______________________ S Number ______________________

Date ______________ Classification Job Supervisor

Each item listed below is to be completed by each individual who is to work this task. The personnel responsible for signing each item is as noted.

		Signature	Date
1.0	Attend a Briefing and self study on the following: PD-RS-6.6 Control of Radiological Spills RWMC Emergency Action Plan V1.A.2 - Radiological Emergencies V1.A.3 - Operational Emergencies Pad A Initial Penetration Health and Safety Plan Pad A Sections of the RWMC OSR/SAR	Individual	Date
2.0	Attend a Briefing and self study on the following Detailed Operating Procedure: DOP RO Number 5.2.1 BWP Pad A Initial Penetration and Retrieval Project	Individual	Date
3.0	Participate in a Dry Run which will include actual On the Job training for entry into and exit from the portable building as well as some anticipated abnormal situations.	Operations Specialist	Date
4.0	Complete an oral checkout on the items listed in 1 and 2 above		
	HP	HP Work Leader	Date
	All other team member	Operations Specialist	Date
5.0	Qualification Completed	RWMC/SWEPP Oper.Mgr.	
6.0	Checklist Included in Individual's Training Record	Training Coordinator	

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RWMC/SWEPP PROGRAMS
TRAINING CHECKLIST FOR
BWP Pad A Initial Penetration and Retrieval Project

Name______________________________ S Number____________________________

Date____________________ Classification Job Supervisor

Each item listed below is to be completed by each individual who is to work this task. The personnel responsible for signing each item is as noted.

		Signature	Date
1.0	Review the RWMC/SWEPP Document Tree with Production/Planning Manager or designated alternate	Production/Planning Manager	
2.0	Review the following with Operations Manager or designated alternate:	Operations Manager	

Project Directives:
- PD-RS-1.5 -- Work Control
- PD-RS-1.13-- Use of DOPs and SOPs
- PD-RS-2.2 -- RWMC Operations in the Subsurface Disposal Area
- PD-RS-3.6 -- RWMC/SWEPP Document Preparation and Control
- PD-RS-6.1 -- Radiation and Contamination Control
- PD-RS-6.2 -- Industrial and Fire Safety
- PD-RS-6.6 -- Control of Radiological Spills
- PD-RS-6.8 -- RWMC Access Control

RWMC Emergency Action Plan
- V1.A.2 - Radiological Emergencies
- V1.A.3 - Operational Emergencies

DOP RO 5.2.1- BWP Pad A Initial Penetration and Retrieval Project

DOE Hoisting and Rigging Manual

		Signature	Date
3.0	Review the RWMC Operations Safety Requirements Document, Appendix A to OSR and Safety Analysis Report with Engineering Manager or designated alternate	Engineering Manager	
4.0	Complete an oral checkout on the items in 1, 2, and 3 above with RWMC/SWEPP Progams Manager or designated alternate	RWMC/SWEPP Programs Manager	
5.0	Qualification Completed	RWMC/SWEPP Oper.Mgr.	
6.0	Checklist Included in Individual's Training Record	Training Coordinator	

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Appendix 13–2

APPENDIX 13-2

PHASE 1 SAMPLE COLLECTION LOGBOOK

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0830 Arrived at Pad A

In Attendance

Karen Koslow Team Leader
Joe Lords Decon / Sampler
Lee Frieburger Decon / sample packer
H. Richardson Quality
Wayne Schofield - H.P.
Larry Miller - H.P.
Craig Davis - Safety
Jeff Ginsburg - Safety Engineer
R.B. Horton - WPM

Sampling equipment has been cleaned and triple plastic bagged.

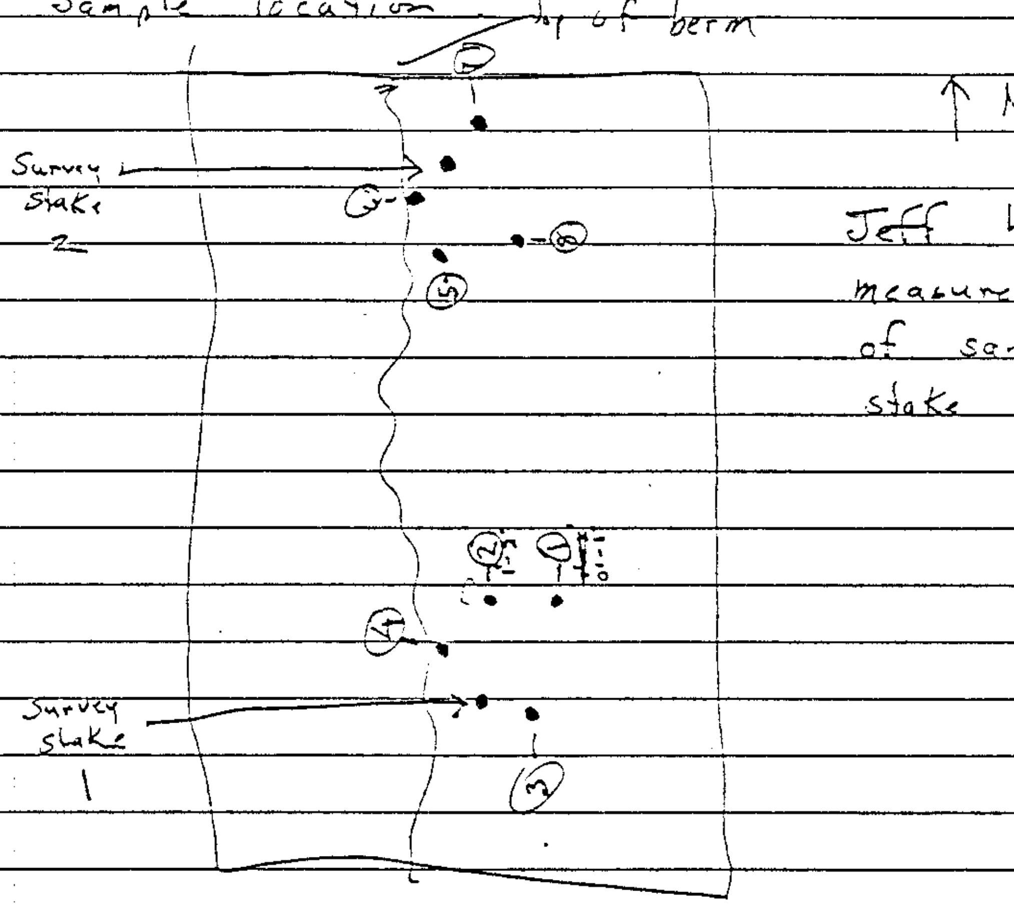
0840 Equipment blank prepared by running DI water of a cleaned SS spoon which was removed from plastic bag just before collection of sample.
3 - 40ml glass vials collected
Water from lab meets 18megOHM min.
1 - 1000ml plastic preserved with nitric acid Ph < 2
1 - 500 ml plastic preserved with sulfuric acid Ph < 2
Labels, Seals, plastic bags, In cooler with blue ice.

0945 Briefing. WPM has established that procedure deviations for sampling can be authorized by the team leader. Deviations affecting safety must be approved by The WPM. K. Koslow

H Richardson

250 ml glass containers are clear rather than amber per procedure. Team Leader and Jeff Ginsburg indicate these containers are acceptable

Sample location



Jeff has measurements of sample stake locations.

Work station is established on east rather than west side of Pad A as indicated in procedure. Approved by team leader.

Pad A mound established as exclusion area. No yellow ribbons will be strung as indicated in procedure. Everyone informed. Approved by team leader.

K. Kahn
[signature]

Sampling areas will not be ~~[illegible]~~ photographed during initial entry as indicated in procedure. Approved by team leader and Jeff Ginsburg.

Entry Party Equipment.
Full face Respirators
Blue coveralls
Organic vapor monitors, on at 1017
Yellow plastic shoe covers
Canvas shoe covers
Cotton gloves
Rubber gloves

GM SN 125889 source checked 8/16 calibrated 3/9/88
2A 113750 source checked 8/15 cal 3/11/88
61 130809 " " 8/15 " 7/27/88
Response checked This AM

Entry Party:
Joe Lords Sampler
L.O. Miller
Craig Davis
Wayne Schofield.
Karen Koslow - without Respirator - will stay upwind.
1027 Initial Entry

[signature] 8/18/88
K. Koslow

Laydown area established. Clean tools at location.

Radiation checked: Background < .1 mr.
Organic vapors checked none measured

1033 Sample taken from Survey location 1 sample 1
Sample taken 4" N of stake.
1 - 60ml glass bottle filled Surface to 10 ~~ft~~ inches
1 - 250ml glass bottle filled surface to 10 inches
Excess soil ~~removed~~ returned to hole.
Radiation checked - None above background
Vapors checked - None measured.
Soil - silty clay - dry.
1040 Samples removed to packer
Weather: Temp ≈ 70°F
Wind - From S ≈ 5mph
Sky clear.

Sample Survey location 1 sample 2.
1042 Auger removed from plastic to collect sample.
Sample 16" N of stake.
Clean sample mix plan and spoons removed from plastic
1 - 60ml glass bottle filled (1'-2')
1 - 250ml glass bottle filled (1'-2')
Radiation - None above background
Organic vapors - None Measured
1048 Samples removed to packer
Soil - Silty clay - dry
Weather - Same as 1040

K. Kostow

8/18/88

Survey location 1 sample 3.
Clean SS pan + spoons to sample location
Clean Auger for this sample
Sample taken ~~2~~ 16" N of stake.
1 - 60ml glass bottle filled (1'-2')
1 - 250 ml glass bottle filled (1'-2')
Radiation - None above background
Vapors - None measured.
Soil - Silty clay - dry.
1112 Samples to packer
Weather: Temp ≈ 75°F
Wind from S ≈ 5 mph
Sky - Clear
Excess soil returned to hole.

Survey location 1 Sample 4
Clean SS pans, spoons and auger to
sample location.
Equipment previously used has been decon'ed
per decon procedure. (HP took radiation swipe)
Sampler wearing clean outer gloves.
Sample taken 6" South of stake.
1 - 60ml glass bottle filled (2' - 3')
1 - 250ml glass bottle filled (2' - 3')
Radiation - None above background
Vapors - None measured.
Soil - Moist sand, silt, clay.
1129 Samples to packer
Weather - same as 1112

K. Koston
[signature] 8/18/88

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1130 Tools & personnel removed from survey location 1.

Holes all filled

1131 Shoe covers, gloves & waste plastic placed in yellow radiation bag

Samples sealed, evidence tape, tagged, double plastic bagged. Placed in cooler with vermiculite packing and Blue Ice. Chain of custody forms completed. Trip blank in cooler.

1255 Equipment used at survey location 1 decontaminated and bagged in accordance with decontamination procedure for use at survey location 2. H.P took swipes on cleaned pans. No radiation detected when measured

Survey location 2.

Equipment: Blue coveralls
Full Face respirators
Plastic shoe covers
Canvas shoe covers
Cotton ~~gloves~~ gloves
Rubber gloves
Organic vapors monitors

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K. Kolbe
8/18/88

Entry Party
Joe Lord Sampler
Craig Davis Safety
Larry Miller HP
Wayne Schofield HP
Karen Koslow - w/o respirator (will stay downwind)

1338 Initial entry to survey location 2
Sample 5
Clean SS Pans spoon auger taken to sample location
Sample taken 6" N of stake
Radiation - None above background (<.1mr)
Vapors - None detected.
1-60ml glass bottle filled (2'-3')
1-250ml glass bottle filled (2'-3')
Radiation - none above background
Vapors - none detected
Soil - Silty clay - dry.
1350 Sample to packer
Weather: Temp ≈ 85°F
Wind - From S at ≈ 10 mph
Sky - Clear.

Survey location 2 - Sample 6
Clean SS pan, spoon, auger to site.
Sample taken 6" N of stake.   K. Koslow
Spoon and auger used to take sample   [signature] 8/18/88

1335 1 - 60 ml glass bottle filled (0'-1')
1 - 250 ml glass bottle filled (0'-1')
Radiation - None above background
Vapors - None detected
Soil - silty clay - dry.
1410 Sample to packer
Weather - Same as 1350

Survey location 2 Sample 7
Clean SS pan & spoon taken to location
Auger deconed per procedure for sample collection
Sample location ~~10"~~ 12" E of stake
Clean gloves on sampler.
HO took swipe from auger
1-60 ml glass bottle filled (2'-3')
1-250 ml glass bottle filled (2'-3')
Radiation - None above background
Vapors - None measured
Soil - Sandy silty soil, damp
1425 Samples to packer
Weather - Same as 1330

Survey location 2 Sample 8
Clean SS pan, spoon, auger.
Clean gloves on sampler

8/18/88
K. Koslow

1430 Sample location 6" N of stake.
1- 60 ml glass bottle filled
1- 250 ml glass bottle filled
Radiation - None above background
Vapors - None measured
Soil - Silt - damp.
Sample to packer
Weather - Temp ≈ 85°F
Wind from S ≈ 5MPH
Sky clear
~~2 Sample~~
All holes filled
1435 Equipment and personnel removed
Equipment surveyed

Samples taken from locations 7 + 8
for radionuclide analysis.

Sample packing

Bottles labels, seals, evedence tape, tag.
Placed in double plastic bags.
Chain of custody forms completed.

Placed in cooler, with vermiculite +
blue ice. Filled with vermiculite.
Chain of custody form in cooler.
Cooler has up-arrows on four sides
taped closed + drain
Lab. sample labels
1450 Job complete

K. Koster
[signature]
8/18/88

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QUALITY FIELD OFFICER CHECKLIST

AREA Pad A Cover Soil QFO H. Richardson Date 8/18/88

Item No.	Parameter	Comply Yes	Comply No	Remarks	Date Corrected
1.	Job Briefing and Documented				
	a. Emergency Actions	✓			
	b. Safety Precautions	✓			
	c. Hold Points Established	✓			
	d. Procedural Review	✓			
	e. Notifications	✓			
2.	Material Available				
	a. Safety Equipment	✓		Eye Wash, First Aid Kit	
	b. Sample Containers	✓		250ml containers are clear.	
	c. Sampling Equipment	✓			
	d. Communication System	✓ NA			
	e. Waste Containers				
	f. Camera, Film				
	g. Logbooks				
3.	Access Controls				
	a. Control Area Established	✓		Mound	
	b. Designated Access Control Person	✓			
	c. Documentation of Persons Entered Access Control Area	✓			
	d. Trained Persons only in Access Control Access Area	✓			
4.	Procedures Available/Performed				
	a. Logbooks	✓			
	b. Sample Procedures	✓			
	c. Health and Safety Plan	✓			
	d. SWR, SWP	✓			
	e. Decontamination Proc.	✓			
5.	Quality Documentation/Items				
	a. Field Logbook Controls	✓			
	b. Procedure Controls	✓			
	c. Sampling/Sample Equipment Controls	✓			

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TABLE 3: Audit Checklist

QUALITY FIELD OFFICER CHECKLIST

AREA Pad A Cover Soil QFO H. Richardson Date 8/18/88

Item No.	Parameter	Comply Yes	Comply No	Remarks	Date Corrected
6.	Sampling/Packaging Requirements Followed				
	a. Field Logbook Notes Dates, time, purpose, names, weather cond., calibration of equipment, observations, sample of identifications, chain-of-custody, etc.	✓			
	b. Labels	✓			
	c. Identification	✓			
	d. Approved Containers	✓			
	e. Preservation	✓			
7.	Chain-of-Custody maintained	✓			
	a. Custody Forms Completed				
8.	Debriefing of Checklist items	✓			

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TABLE 3: Audit Checklist (continued)

HEALTH AND SAFETY CERTIFICATION FORM

Project Title:	Pad A Initial Penetration
Retrieval Cost Accountant Manager:	S. P. Fogdall
Pad A Work Package Manager:	R. B. Horton
Pad A Health and Safety Officer:	J. F. Ginsburg
Industrial Hygienist:	Craig Davis

I certify that I have been given a copy of the Health and Safety Plan for the Pad A Initial Penetration and agree to comply with the procedures described therein. I further certify that I understand the potential health and safety hazards of the program (as outlined in the Health and Safety Plan) and have been trained in the use of the personal protection equipment selected for this project.

Employee: ______________________________
(Print) (Signature) (Date)

Company of Employment: EG&G

Work Package Manager: R.B. Horton, Jr [signature] 8-18-88
(Print) (Signature) (Date)

Health and Safety Officer: J.F. Ginsburg [signature] 8/18/88
(Print) (Signature) (Date)

Operations Personnel

Print	Signature	Date
H. Richardson	H Richardson	8/18/88
L. Freiburger	Lu Freiburger	8/18/88

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Operations Personnel

Print	Signature	Date
KAREN NINA KOSLOW	Karen Nina Koslow	8/18/88
JOSEPH R LORD	Joseph R Lord	8/18/88
A. C. DAVIS	A. C. Davis	8/18/88
Wayne Schofield	[illegible]	8/18/88
L. O. Miller	Larry O. Miller	8/18/88

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CALIBRATION / RESPONSE CHECK

OF

INDUSTRIAL HYGIENE INSTRUMENTS

INSTRUMENT: HNU Photoionizer Model PI 101
(type; model no.; property ID no.; etc.)

CALIBRATION METHOD USED: Tegal 34ppm @ 9.8 Span with 10.2eV (Table 8
(enter appropriate Table(s) from Standard Practice)

CALIBRATION GAS DATA, IF APPLICABLE:

Tegal Scientific 34ppm – 9.8 Span – 10.2eV
(type; manufacturer; concentration; percent accuracy; percent by volume; etc.)

DATE	TIME	ACTION		ACTUAL READING	PERFORMED BY *			
						Cal.Lab.		User
		Cal.	RC		Mnfr	Cal.	PM	(signature)
6/7	0810	X		34ppm (no adjustment)				Burg/PDW
6-17-88	0910	X		34 ppm				A.C. Davis
7-25-88	8:37	X		34 ppm [illegible]				A.C.D.
7-28-88	10:15	X		34 ppm (no adjustment)				A.C. Davis
7-29-88	6:21	X		34 ppm (no adjustment)				A.C. Davis
8-5-88	8:15	X		"				A.C Davis
8-9-88	8:45	X		"				A.C Davis
8-18-88	8:10	X		"				A.C. Davis

* User maintains file of manufacturer's calibration data when calibration is performed by the manufacturer

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163655

EG&G Idaho, Inc.

FORM EG&G 17
Rev 02-87)

SAFE WORK PERMIT ☒
SPECIAL SAFE WORK PERMIT ☐

(See Instructions and Standard Safety Procedures on back of this form)
NOTE. SSWPs require Area Safety Manager & Facility Manager Signatures

SECTION I—TO BE COMPLETED BY JOB SUPERVISOR

SWR/Contract Number: [illegible] Job Location (Inc. Bldg. No.): [illegible] System(s) Involved: [illegible]

Job Description (Detailed): [illegible]

① Date and shift work is to: Begin: [illegible] Date Night ☐ Day ☑ Eve. ☐ End 2/13/87 Date Night ☐ Day ☑ Eve. ☐

Area Inspection Made? No ☐ Yes ☒ By. [signature] Job Supervisor

Associated Hazards
Radiation ☒ Contamination ☒ Other ☐

Initial*	Names of Workers	Craft	② Safety Training Current?	③ Prior Exposure Month	⑤ Current	④ Allowable Per Day	⑤ Final
[illegible]	[illegible]	TECH	[illegible]	0	0	40	0
[illegible]	[illegible]	TECH	[illegible]	[illegible]	0	40	0
KAK	K Kislow	ENG	YES	0	0	40	0

(For Radiological Work Only — Dosimeter Readings)

☐ See continuation sheet for additional names

*Each worker is to initial in the space next to name after reading the instructions of the completed form.

JOB SUPERVISOR OR DESIGNATED ALTERNATE:
Reviewed job and associated hazards with workers. Approved job to be performed within listed requirements. Ensured all necessary safety training for workers is current.

⑤ Signature: [signature]

SECTION II—TO BE COMPLETED BY HEALTH PHYSICS REPRESENTATIVE ⑦ ☐ Not Applicable (must be signed below when checked)

⑧ RADIATION Gamma ☒ Beta ☐ Neutron ☐

Current General Working Field: <1 mrem/hr
Highest Current Local Level: <5 mrem/hr
Expected General Working Field: <1 mrem/hr
Location: [illegible]

CONTAMINATION Beta-Gamma ☐ Alpha ☐

Current General Level: <200/<20 dpm/100 cm²
Highest Current Level: <200/<20 dpm/100 cm²
Expected General Level: <200/<20 dpm/100 cm²

⑨ Zone I ☐ Zone II ☐ Zone III ☐

REQUIREMENTS

⑩ MONITORING OF AREAS
_ At Start of Job
_ Intermittent
X Continuous
_ On Completion of Job

⑪ DOSIMETRY
X Gamma (DRD)
_ Audible/Digital
_ Neutron
X TLD (badge)
_ Extremity TLD

RESPIRATORY PROTECTION
_ Full-Face
Canister/Cartridge (type)
_ Supplied-Air (type)
_ Other

ANTI-Cs
X Gloves (latex)
_ Gloves (surgeon)
X Cotton Liner
_ Shoe Covers (scuffs)
X Booties (plastic)
_ Boots (rubber)
X Other lanyard

_ Coveralls (cloth)
_ Coveralls (Tyvek)
_ Wet Suit
_ Hood (cloth)
_ Hood (Tyvek)
_ TAPE OPENINGS SHUT

Special Instructions: Anti-C will be required while taking samples on top of pad

Health Physics Representative Signature: [signature]

SECTION III—TO BE COMPLETED BY AREA SAFETY REPRESENTATIVE ⑦ ☐ Not Applicable (must be signed below when checked)

DESCRIPTION OF HAZARD
⑫ _ Acid or Caustic
⑬ _ Electrical
⑭ _ Welding / Burning
⑮ _ Hazardous/Inert Atmosphere
⑯ _ Elevated Work
⑰ _ Tank or Confined Space Entry (not reactor)
⑱ _ High Temperature/Pressure Fluids
⑲ _ Hoisting and Rigging
⑳ _ Toxic Materials (Incl. Asbestos)
㉑ _ Excavation
_ Other (state):

㉒ PROTECTIVE EQUIPMENT
X Safety-toe Shoes
_ Toe Guards
_ Gloves (cotton)
_ Gloves (rubberized)
_ Gloves (leather)
_ Gloves (neoprene)
_ Gloves (SolVex)
_ Gloves (PVA)
_ Safety Belt
_ Life-Line
_ Inspect indicating layer on purification system
_ Other

_ Safety Glasses
_ Chemical Goggles
_ Face Shield
_ Hard Hat
_ Hearing Protection
_ Coveralls (impermeable)
_ Coveralls (non-Anti-C)
_ Suit (acid)
_ Suit (thermal)
_ BACK-UP MAN

SYSTEM/AREA REQUIREMENTS
㉓ _ Electrical or Valve Danger Tag and Lockout (equipment isolation)
㉔ _ Rope Off and Post Area
㉕ _ Fire Watch
㉖ _ Additional Ventilation required
X No Smoking
X Other No Eating

INDUSTRIAL RESPIRATORY PROTECTION REQUIREMENTS
_ Half Face
X Full Face
Canister/Cartridge (type)
_ Other

Special Instructions: IH must be present. Follow his instructions

Safety Representative Signature: [signature]

SECTION IV— TO BE COMPLETED BY AREA SUPERVISOR

The applicable Sections of this S/SWP have been filled out and approvals indicated by Signatures. All affected systems and equipment are in readiness for the work to safely proceed.

Special Instructions:

⑥ ㉗ Signature: [signature]

SECTION V— TO BE COMPLETED BY THE JOB SUPERVISOR OR THE DESIGNATED ALTERNATE

Good radiological and housekeeping practices have been followed, and the work area has been returned to an as-found or better condition. Final dosimeter readings have been recorded in Section I.

IMMEDIATELY RETURN COMPLETED FORM TO HP OFFICE Signature: [signature]

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EG&G Idaho, Inc.

FORM EG&G 17-A
(Rev. 09-86)

SAFE WORK PERMIT CONTINUATION SHEET ☒
SPECIAL SAFE WORK PERMIT CONTINUATION SHEET ☐

NOTE: SSWPs require Branch level signature

SWR/Contract Number: 3X2RWP140

SWP Number: 163655

Initial*	Names of Workers	Craft	② Safety Training Current?	For Radiological Work Only — ③ Prior Exposure Month	Dosimeter Readings — ⑤ Current	④ Allowable Per Day	⑤ Final
WDS	W. D. SCHOFIELD	RAD ENG	Y	0	0	40	0
LOM	L. O. MILLER	HP	Y	25	0	40	0
A.C.D.	A C DAVIS	IH	Y	0	0	40	0
JFG	J F GINSBURG	ENGR	Y	0	0	40	0
RBH	R. B. HORTON, JR	ENGR	Y	0	0	40	0
HR	H RICHARDSON	QE	Y	0	0	40	0

*Each worker is to initial in the space next to name after reading the instructions of the completed form.

Remarks/Observations:

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PAD A COVER
SOIL SAMPLING

PADA18800 — a13-2
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EG&G HAZARDOUS WASTE

FIELD LOG BOOK
TABLE OF CONTENTS

SITE ID	SITE DESCRIPTION	SAMPLE DATE	SAMPLE ID #	PAGE #
	INEL PAD A SOIL COVER	8/18/88	PADA1880E1	1
	PAD A SOIL COVER	8/18/88	PADA1880F1	4
	PAD A SOIL COVER	8/18/88	PADA188001	7
	PAD A SOIL COVER	8/18/88	PADA18800[illegible]	10
	PAD A SOIL COVER	8/18/88	PADA188002	13
	PAD A SOIL COVER	8/18/88	PADA188003	16
	PAD A SOIL COVER	8/18/88	PADA188004	19
	PAD A SOIL COVER	8/18/88	PADA188009	22
	PAD A SOIL COVER	8/18/88	PADA188005	25
	PAD A SOIL COVER	8/18/88	PADA188006	28
	PAD A SOIL COVER	8/18/88	PADA188007	31
	PAD A SOIL COVER	8/18/88	PADA188008	34
	MAP OF SAMPLE SITES	8/18/88		3
		/ /		
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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	
PADA1880E1	A	40ml	glass vial	VOC - TCE, PCE, TCA, Carbon Tet	4°C	100
	A	40ml	glass vial	VOC - TCE, PCE, TCA, Carbon Tet	4°C	101
	A	40ml	glass vial	VOC - TCE, PCE, TCA, Carbon Tet	4°C	102
	B	1000ml	plastic	Metals - Be, Li	4°C / HNO_3	104
	B	500ml	plastic	Metals - Nitrates, Na K	4°C / H_2SO_4	105

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Karen N. Koslow — DATE: 08/18/88 — CHECKED BY: K. N. Koslow — DATE: 08/18/88

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

ID # |P|A|0|A|1|8|8|0|E|1| DATE (mm/dd/yy) |0|8|/|1|8|/|8|8|
SITE TIME (24 hrs) |0|9|:|0|0|
DESCRIPTION Equipment Blank - taken off S.S. Spoon

LOCATION N| | | | | | |.| | |E| | | | | | |.| | |
SAMPLE DEPTH CODE | | | FROM ______ TO ______ ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |1|8|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

OTHER Equipment Blank

FIELD OBSERVATIONS: ______

SAMPLE DESCRIPTION: ______

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE | |
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______
SAMPLE TYPE: CODE |2|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______

SAMPLING PLAN FOLLOWED: Yes |✓| No | |. If [No] explain..

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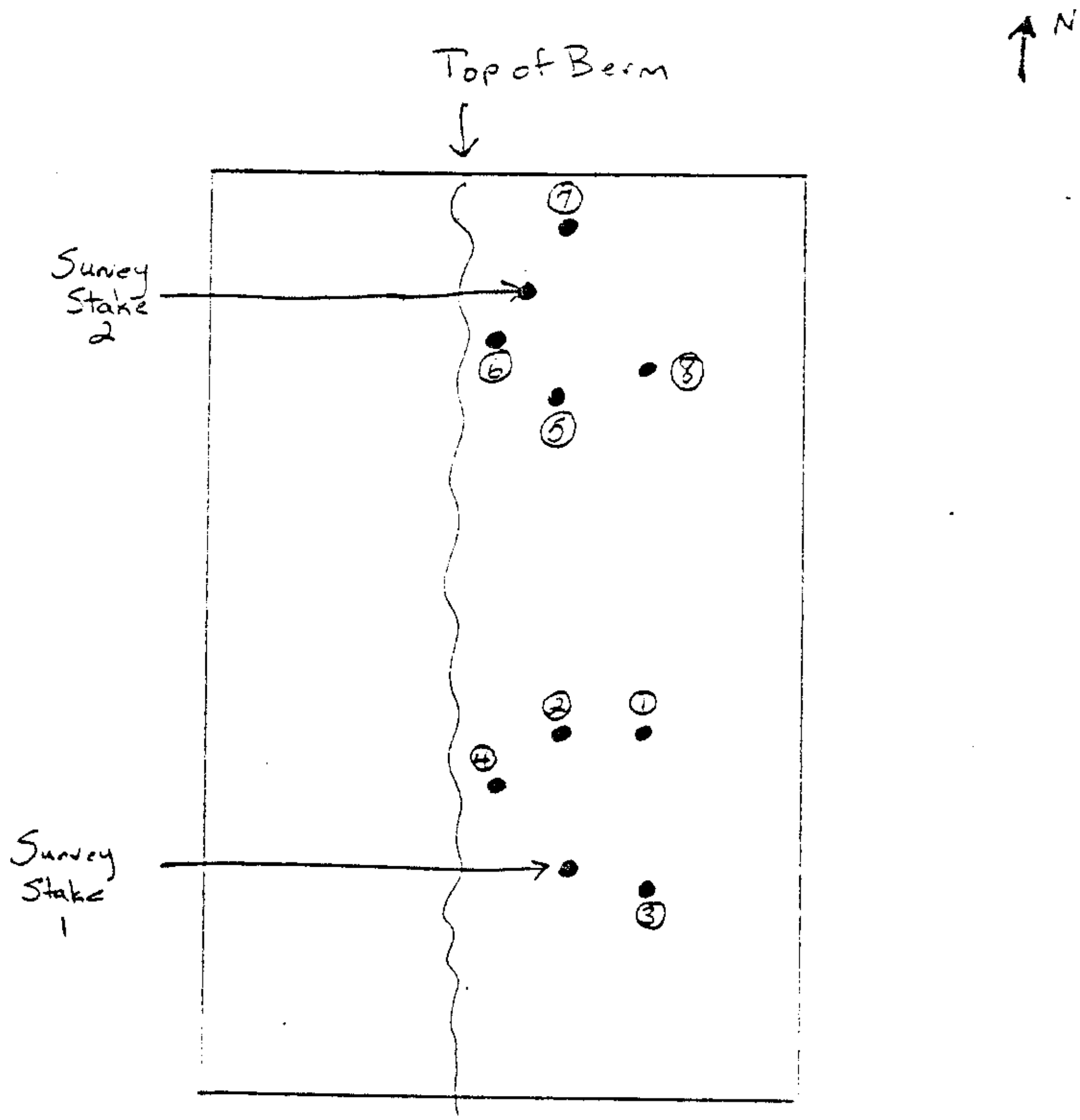
SAMPLED BY: Joe Loro



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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL
PADA1880F1A	40ml	A.G	VOC	4°C

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

-------------------------WATER-------------------------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Karin N. Koslow DATE: 8/18/88 CHECKED BY: K N Koslow DATE: 8/19/88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # |0|A|0|A|1|8|8|0|F|1| DATE (mm/dd/yy) |0|8|/|1|8|/|8|8|

SITE   TIME (24 hrs) |0|9|:|2|0|

DESCRIPTION Field Blank of D.I. Water

LOCATION N| | | | | | | .| | | E| | | | | | | .| | |

SAMPLE DEPTH CODE | | FROM ______ TO ______ ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |1|8|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

OTHER Field Blank of DI Water

FIELD OBSERVATIONS: ______

SAMPLE DESCRIPTION: ______

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |3|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other Field Blank

SAMPLE TYPE: CODE | |
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: All samples shipped in same cooler for this phase of PAOA sampling effort.

SAMPLING PLAN FOLLOWED: Yes |✓| No | |. If [No] explain..

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SAMPLED BY: Karen Koslow

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	[illegible] CAG #
PA0018800I	A	60mL	AG	8010, TCE VOC-PCE, TCA [illegible]	4°C	105
	B	250mL	C NaOH G	Metals - Be, Li, [illegible], Nitrate	4°C	106

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

---------------------WATER---------------------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaCH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Lee Freiburger DATE: 08/18/88 CHECKED BY: K. [illegible] DATE: 8/19/88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # PADA 1880 01 — DATE (mm/dd/yy) 08/18/88
SITE — TIME (24 hrs) 10:30
DESCRIPTION SDA – Pad A
East side – south end
LOCATION N ______ . ___ E ______ . ___
SAMPLE DEPTH CODE ___ FROM Surface TO 10" ______ (UNITS) BELOW SURFACE

SAMPLE MEDIA CODE 00

SOIL/ROCK
- [00] Surf. Soil
- [01] Surf. Sediment
- [02] Basalt
- [03] Sediment Interbed
- [04] Other

OTHER ______

SEDIMENT/SLUDGE
- [05] Lake/Pond
- [06] River/Stream
- [07] Impoundment
- [08] Drum/Tank
- [09] Other

LIQUIDS
- [10] Lake/Pond
- [11] River/Stream
- [12] Impoundment
- [13] Drum/Tank
- [14] Plant Discharge
- [15] Spring/Seep
- [16] Perched Aquifer
- [17] Regional Aquifer
- [18] Other

FIELD OBSERVATIONS: Temp. ≅ 70°F Wind from S ≅ 5mph
Clear sky
SAMPLE DESCRIPTION: Silty clay – dry

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE 0
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______
SAMPLE TYPE: CODE 0
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______

SAMPLING PLAN FOLLOWED: Yes [X] No [ ]. If [No] explain..

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SAMPLED BY: J. Lord

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	Shippin tag #
PADAI88OCT1A	60 mL	A G	8010 TCE VOC-PCE TCA CARBON TET	4°C	107

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Lee Freiburger DATE: 08/18/88
CHECKED BY: Karen N Koslow DATE: 8/19/88

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

ID # P14DA/BEK101TVA DATE (mm/dd/yy) 08/18/86
SITE TIME (24 hrs) 10:30
DESCRIPTION SDA - Pad - A
East Side
LOCATION N________.___E________.___
SAMPLE DEPTH CODE ___ FROM ________ TO ________ ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE 18 4

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

OTHER trip blank

FIELD OBSERVATIONS:

SAMPLE DESCRIPTION:

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. =
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE 3
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other Trip Blank
SAMPLE TYPE: CODE 6
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: PADA188001A

SAMPLING PLAN FOLLOWED: Yes ✓ No ___. If [No] explain..

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SAMPLED BY: J. Lord

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	Sample Tag#
PAdA1880002A	60mL	AG	VOC	4°c	108
B	35mL	Clear G	Metals	4°c	109

------SOIL--------

[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------

[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Lee Freiburger DATE: 08/18/88 CHECKED BY: Karen N. Kaslow DATE: 08/22/88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # PADA189002 DATE (mm/dd/yy) 08/18/88
SITE TIME (24 hrs) ~~10:45~~ ~~11:10~~ 10:45
DESCRIPTION SDA Pad A – east side – south end

LOCATION N . E .
SAMPLE DEPTH CODE FROM 1' TO 2' ft (UNITS) BELOW SURFACE

SAMPLE MEDIA CODE 00

SOIL/ROCK
- [00] Surf. Soil
- [01] Surf. Sediment
- [02] Basalt
- [03] Sediment Interbed
- [04] Other

SEDIMENT/SLUDGE
- [05] Lake/Pond
- [06] River/Stream
- [07] Impoundment
- [08] Drum/Tank
- [09] Other

LIQUIDS
- [10] Lake/Pond
- [11] River/Stream
- [12] Impoundment
- [13] Drum/Tank
- [14] Plant Discharge
- [15] Spring/Seep
- [16] Perched Aquifer
- [17] Regional Aquifer
- [18] Other

OTHER

FIELD OBSERVATIONS: Temp ≅ 70°F Wind from S ≅ 5mph
Clear sky

SAMPLE DESCRIPTION: Silty clay dry

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE 0
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other
SAMPLE TYPE: CODE 0
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES:

SAMPLING PLAN FOLLOWED: Yes ✓ No . If [No] explain..

SAMPLED BY: J. Lord

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	Shipping C#
PADA1EE0034	A	60 mL	AG	VOC	4°C	110
	B	250 mL	Clear Glass	Metals	4°C	111

------SOIL--------

[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------

[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Lee Freiburgen DATE: 08/18/88 CHECKED BY: Karen N. Koster DATE: 08/22/88

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EG&G HAZARDOUS WASTE   SAMPLE LOG SHEET

ID # P4D4/E6003   DATE (mm/dd/yy) 08/18/88
SITE   TIME (24 hrs) 11:10
DESCRIPTION SDA — Pad A
Eastside — south 2nd Sample taken 16" N of stake

LOCATION N| | | | | | | | | |.| | | |E| | | | | | | | | |.| | | |
SAMPLE DEPTH CODE | | FROM 1' TO 2' ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE 00

SOIL/ROCK	SEDIMENT/SLUDGE	LIQUIDS
[00] Surf. Soil	[05] Lake/Pond	[10] Lake/Pond
[01] Surf. Sediment	[06] River/Stream	[11] River/Stream
[02] Basalt	[07] Impoundment	[12] Impoundment
[03] Sediment Interbed	[08] Drum/Tank	[13] Drum/Tank
[04] Other	[09] Other	[14] Plant Discharge
		[15] Spring/Seep
		[16] Perched Aquifer
		[17] Regional Aquifer
OTHER ______		[18] Other

FIELD OBSERVATIONS: Temp ≅ 75°F Wind from S ≅ 5mph
Clear sky

SAMPLE DESCRIPTION: Soil silty clay dry

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. =
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE 0
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______
SAMPLE TYPE: CODE 0
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______

SAMPLING PLAN FOLLOWED: Yes ✓ No | |. If [No] explain..

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SAMPLED BY: J. Lord

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	
PAOAIE0064	A	60 mL	AC	VOC	4°C	112
	B	250 mL	Clear G	Metals	4°C	113

------SOIL--------

[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

----------WATER----------

[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: [signature] DATE: 08/18/88

CHECKED BY: Karen N. Koslow DATE: 08 22 88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # P4D4/88004 DATE (mm/dd/yy) 08/18/88

SITE TIME (24 hrs) 11:30

DESCRIPTION SDA - Pad A Sample taken 6" south of stake east side - south end

LOCATION N|_|_|_|_|_|_|_|.|_|_|E|_|_|_|_|_|_|_|.|_|_|

SAMPLE DEPTH CODE |_| FROM 2' TO 3' _____(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |0|0|

SOIL/ROCK
- [00] Surf. Soil
- [01] Surf. Sediment
- [02] Basalt
- [03] Sediment Interbed
- [04] Other

SEDIMENT/SLUDGE
- [05] Lake/Pond
- [06] River/Stream
- [07] Impoundment
- [08] Drum/Tank
- [09] Other

LIQUIDS
- [10] Lake/Pond
- [11] River/Stream
- [12] Impoundment
- [13] Drum/Tank
- [14] Plant Discharge
- [15] Spring/Seep
- [16] Perched Aquifer
- [17] Regional Aquifer
- [18] Other

OTHER ________

FIELD OBSERVATIONS: Temp ≅ 75°F Wind from S ≅ 5mph Clear sky

SAMPLE DESCRIPTION: Moist sand silty clay

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |0|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ________

SAMPLE TYPE: CODE |0|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ________

SAMPLING PLAN FOLLOWED: Yes |✓| No |_|. If [No] explain..

SAMPLED BY: J. Lord

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Shipping ticket

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	
PAdA18E009	A	~~500~~ 40 mL	AG	VOC	4°c	114
	A	~~500~~ 40 mL	AG	VOC	4°c	115
	B	500 mL	Plastic	Metals	4°c H_2SO_4	116
	B	1000 mL	Plastic	Metals	4°c HNO_3	117

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Lisa Ellenberger DATE: 08/18/88 CHECKED BY: Karen H. Koslow DATE: 08/22/88

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EG&G HAZARDOUS WASTE 9 SAMPLE LOG SHEET

ID # P A d A / 8 8 0 0 9 DATE (mm/dd/yy) 0 8 / 1 2 / 8 8

SITE TIME (24 hrs) 1 3 : 0 0

DESCRIPTION SDA - Pad
East Side

LOCATION N . E .

SAMPLE DEPTH CODE FROM TO (UNITS) BELOW SURFACE

SAMPLE MEDIA CODE 1 8

SOIL/ROCK	SEDIMENT/SLUDGE	LIQUIDS
[00] Surf. Soil	[05] Lake/Pond	[10] Lake/Pond
[01] Surf. Sediment	[06] River/Stream	[11] River/Stream
[02] Basalt	[07] Impoundment	[12] Impoundment
[03] Sediment Interbed	[08] Drum/Tank	[13] Drum/Tank
[04] Other	[09] Other	[14] Plant Discharge
		[15] Spring/Seep
		[16] Perched Aquifer
		[17] Regional Aquifer
OTHER Spikes		[18] Other

FIELD OBSERVATIONS:

SAMPLE DESCRIPTION:

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other Spike

SAMPLE TYPE: CODE 3
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES:

SAMPLING PLAN FOLLOWED: Yes [✓] No [ ]. If [No] explain..

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SAMPLED BY: J. Lord

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page 2/3

EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	Shipping Tag #
PACA185005A	60mL	AG	VOC	4°C	118
B	250mL	Clear G	Metals	4°C	119

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

--------------------------WATER--------------------------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: Leo Freiburger DATE: 08/12/88 CHECKED BY: Karen N. Koslow DATE: 8/22/88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # |0|A|d|A|/|8|8|0|0|5| DATE (mm/dd/yy) |08|/|18|/|88|
SITE TIME (24 hrs) |1|3|:|45|
DESCRIPTION SDA- Pad A
east Side - NORTh end (6" N of stake)
LOCATION N| | | | | | | | . | | | |E| | | | | | | | . | | | |
SAMPLE DEPTH CODE | | FROM 3' TO 3' ft (UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |0|0|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

OTHER ______

FIELD OBSERVATIONS: Temp ≅ 85°F Wind from S ≅ 10mph
Clear sky

SAMPLE DESCRIPTION: Silty clay dry

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |0|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______
SAMPLE TYPE: CODE |0|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______

SAMPLING PLAN FOLLOWED: Yes |✓| No | |. If [No] explain..

SAMPLED BY: J. Lord

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000021

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

Shipped 120

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL
PAdA1EE006	A	60 mL	A G	VOC	4°C
	B	250 mL	Clean G	Metals	4°C

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET. HNO3
[L] 2 L PL - HCN. NaOH
[M] 4 L AG - EXT. NONE
[N] OTHER

RECORDED BY: Lee Freiburger DATE: 08/18/88 CHECKED BY: Karen N. Koster DATE: 08/22/88

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

ID # 14AA/ A / 88006 DATE (mm/dd/yy) 08/18/88

SITE TIME (24 hrs) 14:00

DESCRIPTION SDA - Pad A (Sample taken 6" N of stake) east side - North end

LOCATION N| | | | | | | | . | | |E| | | | | | | | . | | |

SAMPLE DEPTH CODE | | FROM 0 TO 1' ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |0|0|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

OTHER ____________

FIELD OBSERVATIONS: Temp ≅ 85°F Wind from S @ 10 mph Clear sky

SAMPLE DESCRIPTION: Silty clay dry

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |0|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ________
SAMPLE TYPE: CODE |0|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ____________

SAMPLING PLAN FOLLOWED: Yes |✓| No | |. If [No] explain..

SAMPLED BY: J. Lord

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EG&G HAZARDOUS WASTE | SAMPLE LOG SHEET

SAMPLE ID		CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	Shipping tag #
PAdA188007	A	60mL	A G	VOC	4°C	123
	B	250ML	Clear G	Metals	4°C	124

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------WATER------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: [signature] DATE: 02/18/88 CHECKED BY: Kevin N. [signature] DATE: 02/22/88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # P|A|d|A|Ø|8|8|0|0|7| DATE (mm/dd/yy) |0|8|/|1|8|/|8|8|
SITE TIME (24 hrs) |1|4|:|1|5|
DESCRIPTION SDA - Pad A (Sample taken 1ft E. of stake) east side - North end
LOCATION N| | | | | | | |.| | |E| | | | | | | |.| | |
SAMPLE DEPTH CODE | | | FROM 0' TO 3' ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |0 0|

SOIL/ROCK	SEDIMENT/SLUDGE	LIQUIDS
[00] Surf. Soil	[05] Lake/Pond	[10] Lake/Pond
[01] Surf. Sediment	[06] River/Stream	[11] River/Stream
[02] Basalt	[07] Impoundment	[12] Impoundment
[03] Sediment Interbed	[08] Drum/Tank	[13] Drum/Tank
[04] Other	[09] Other	[14] Plant Discharge
		[15] Spring/Seep
		[16] Perched Aquifer
		[17] Regional Aquifer
		[18] Other

OTHER ______

FIELD OBSERVATIONS: Temp ≅85°F Wind from S @ 10mph Clear sky

SAMPLE DESCRIPTION: Sandy Silty soil - damp

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |0|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______
SAMPLE TYPE: CODE |0|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______

SAMPLING PLAN FOLLOWED: Yes |✓| No | |. If [No] explain..

SAMPLED BY: Joe Lord

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000033

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL	Shippin tag #
PAdA18E008 A	60 mL	AG	VOC	4°C	125
B	250 mL	Clear G	F ~~VO~~ Metal	4°C	126

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

-----------WATER-----------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: [signature] DATE: 08/18/88 CHECKED BY: Karen N. Koslow DATE: 08/22/88

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # P|A|d|A|/|8|8|0|0|8| DATE (mm/dd/yy) |0|8|/|1|8|/|8|8|

SITE TIME (24 hrs) |1|4|:|3|0|

DESCRIPTION S.D.A - Pad A Sample taken 6" N of stake east side - North end

LOCATION N| | | | | | | |.| | |E| | | | | | | |.| | |

SAMPLE DEPTH CODE | | FROM 1' TO 2' ______ (UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |0|0|

SOIL/ROCK	SEDIMENT/SLUDGE	LIQUIDS
[00] Surf. Soil	[05] Lake/Pond	[10] Lake/Pond
[01] Surf. Sediment	[06] River/Stream	[11] River/Stream
[02] Basalt	[07] Impoundment	[12] Impoundment
[03] Sediment Interbed	[08] Drum/Tank	[13] Drum/Tank
[04] Other	[09] Other	[14] Plant Discharge
		[15] Spring/Seep
		[16] Perched Aquifer
		[17] Regional Aquifer
OTHER ______		[18] Other

FIELD OBSERVATIONS: Temp. ≅ 85°F Wind from S ≅ 5mph Clear sky

SAMPLE DESCRIPTION: Silt - damp

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity	<.1mr		0		
OVA	0		0		
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |0|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______

SAMPLE TYPE: CODE |0|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______

SAMPLING PLAN FOLLOWED: Yes |✓| No | |. If [No] explain..

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SAMPLED BY: J. Lord

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EG&G HAZARDOUS WASTE

SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL

------SOIL--------
[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

--------------------WATER--------------------
[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: ______________ DATE: ___/___/___ CHECKED BY: ______________ DATE: ___/___/___

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

ID # |_|_|_|_|_|_|_|_|_|_|_| DATE (mm/dd/yy) |_|_|/|_|_|/|_|_|
SITE TIME (24 hrs) |_|_|:|_|_|
DESCRIPTION ______________________________

LOCATION N|_|_|_|_|_|_|_|.|_|_|E|_|_|_|_|_|_|_|.|_|_|
SAMPLE DEPTH CODE |_| FROM ________ TO ________ ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |_|_|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

OTHER ________________

FIELD OBSERVATIONS: ______________________________

SAMPLE DESCRIPTION: ______________________________

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |_|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ________
SAMPLE TYPE: CODE |_|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______________________________

SAMPLING PLAN FOLLOWED: Yes |_| No |_|. If [No] explain..

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SAMPLED BY: ______________________________

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL

------SOIL--------

[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

------------------------WATER------------------------

[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: ______________ DATE: __/__/__ CHECKED BY: ______________ DATE: __/__/__

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EG&G HAZARDOUS WASTE — SAMPLE LOG SHEET

ID # |_|_|_|_|_|_|_|_|_|_| DATE (mm/dd/yy) |_|_|/|_|_|/|_|_|
SITE TIME (24 hrs) |_|_|:|_|_|
DESCRIPTION ____________________

LOCATION N|_|_|_|_|_|_|_|.|_|_| E|_|_|_|_|_|_|_|.|_|_|
SAMPLE DEPTH CODE |_| FROM ________ TO ________ ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |_|_|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

OTHER ____________________

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

FIELD OBSERVATIONS: ____________________

SAMPLE DESCRIPTION: ____________________

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |_|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ________
SAMPLE TYPE: CODE |_|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ____________________

SAMPLING PLAN FOLLOWED: Yes |_| No |_|. If [No] explain..

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SAMPLED BY: ____________________

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EG&G HAZARDOUS WASTE

SAMPLE LOG SHEET

SAMPLE ID	CONTAINER VOLUME	CONTAINER TYPE	ANALYSIS	PRESERVATIVES TYPE/VOL

------SOIL--------

[A] .25 L GL - VOL
[B] 1 L GL - MET
[C] 1 L GL - EXT
[D] OTHER

-----------------------WATER-----------------------

[E] 40 ML GL - VOL, NONE
[F] .25 L GL - TOX, NONE
[G] .25 L PL -
[H] 0.5 L GL -
[I] 0.5 L PL - S,NaOH+ZnAc
[J] 1 L GL - TOC, H2SO4
[K] 1 L PL - MET, HNO3
[L] 2 L PL - HCN, NaOH
[M] 4 L AG - EXT, NONE
[N] OTHER

RECORDED BY: ____________________ DATE: __/__/__ CHECKED BY: ____________________ DATE: __/__/__

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EG&G HAZARDOUS WASTE SAMPLE LOG SHEET

ID # |_|_|_|_|_|_|_|_|_|_|_| DATE (mm/dd/yy) |_|_|/|_|_|/|_|_|

SITE TIME (24 hrs) |_|_|:|_|_|

DESCRIPTION ______________________________

____

LOCATION N|_|_|_|_|_|_|_|.|_|_|E|_|_|_|_|_|_|_|.|_|_|

SAMPLE DEPTH CODE |_| FROM ________ TO ________ ______(UNITS) BELOW SURFACE

SAMPLE MEDIA CODE |_|_|

SOIL/ROCK
[00] Surf. Soil
[01] Surf. Sediment
[02] Basalt
[03] Sediment Interbed
[04] Other

OTHER ______________

SEDIMENT/SLUDGE
[05] Lake/Pond
[06] River/Stream
[07] Impoundment
[08] Drum/Tank
[09] Other

LIQUIDS
[10] Lake/Pond
[11] River/Stream
[12] Impoundment
[13] Drum/Tank
[14] Plant Discharge
[15] Spring/Seep
[16] Perched Aquifer
[17] Regional Aquifer
[18] Other

FIELD OBSERVATIONS: ______________________________

____

SAMPLE DESCRIPTION: ______________________________

____

FIELD MEASUREMENTS:

	Background	Outside/ Inside	Sample	Units	Instr. #
Radioactivity					
OVA					
Temperature					
pH					
Flow/Level					

SAMPLE METHOD: CODE |_|
[0] Grab [1] Spatial Comp. [2] Time Comp. [3] Other ______________

SAMPLE TYPE: CODE |_|
[0] Normal [1] Equip Blank (Prior) [2] Equip Blank (Post) [3] Spike
[4] Split [5] Replicate [6] Trip Blank

ASSOC. SAMPLES: ______________________________

SAMPLING PLAN FOLLOWED: Yes |_| No |_|. If [No] explain..

____

____

____

SAMPLED BY: ______________________________

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Appendix 13–3

APPENDIX 13-3

PHASE 2 SAMPLE COLLECTION LOGBOOK

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page 0

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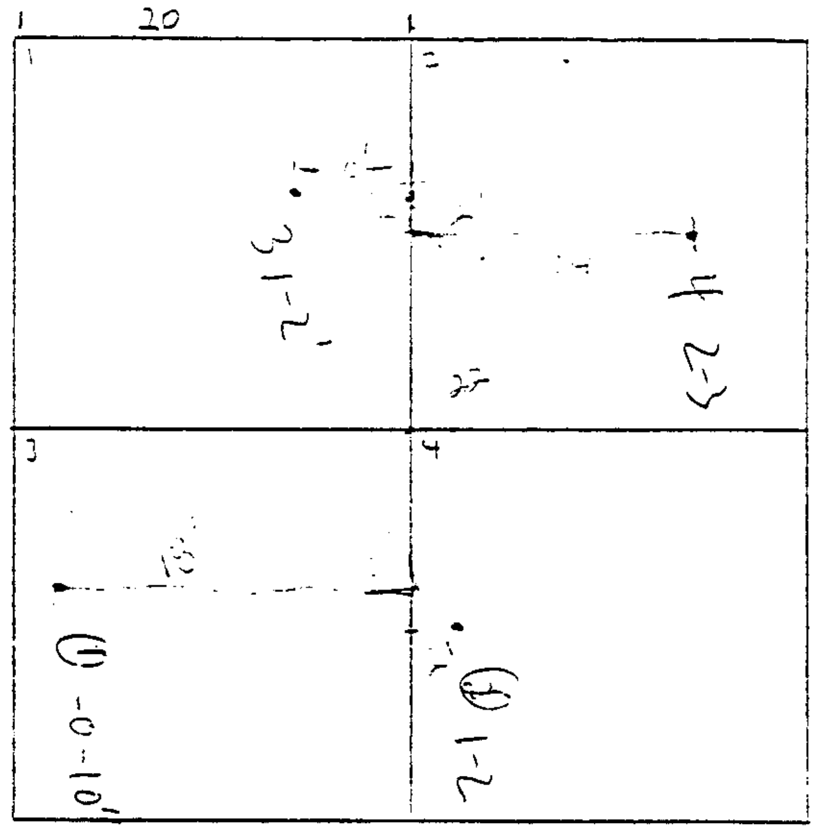
page 1

Pad A Location 2 South

each block 2'

E

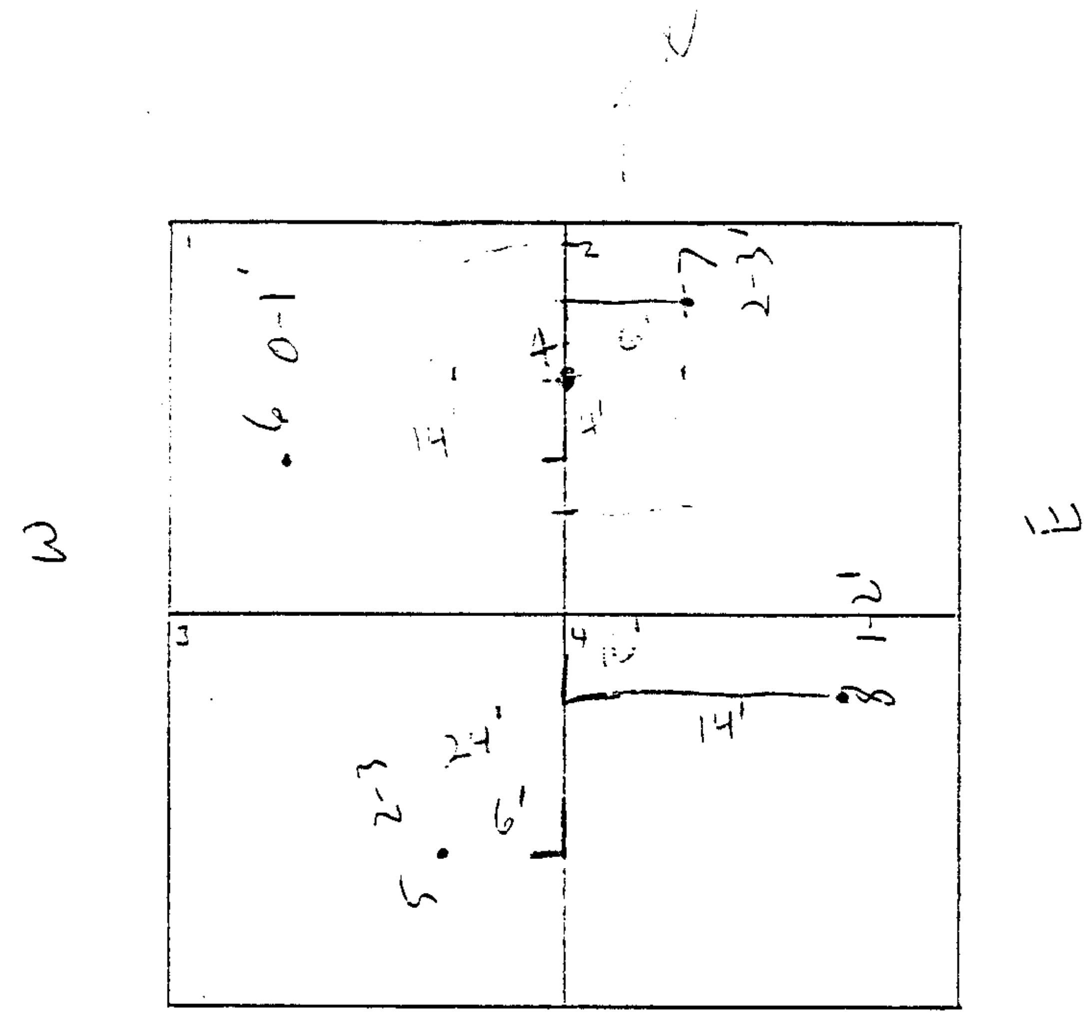


W

Grid #	X	Y
1	7	6
2	7	5
3	1	6
4	1	5

a13-3
page 2

Pad A Location 1 North



Grid #	X	Y
1	3	4
2	3	8
3	7	4
4	7	8

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page 3

Sampling begins
with A-01 at
1422 Hrs 11/21/88.
Approx. 6" deep.

Sample A-02
at ~~at~~ 1434 Hrs.
11/21/88, Approx.
6" deep.

Sample A-~~02~~ 03
at 1443 Hrs 11/21/
88, approx 6" deep

Sample A-04 at
1450 Hrs, 11/21/88,
approx. 8" deep.

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page 4

Sample A-05 at
1502 Hrs 11/21/88,
approx. 7" deep.

Sample A-06 at
1511 Hrs 11/21/88
approx. 6" deep.

Sample A-07 at
1520 Hrs 11/21/88
approx. 6" deep.

Sample A-08 at
1529 Hrs 11/21/88
approx. 6" deep.

Sample A-09 Background
1635 Hrs 11/21/88, approx
6" deep.

Left site at 2000 Hrs.

11/22/88
cold / 25° / wet

Left Idaho Falls at
0630 Hrs

Arrived at site at
0815 Hrs

Sampling technique

- Remove with shovel about 6" of soil and remove soil that may have come in contact with the shovel. This is down with a deconed stainless steel spoon. After this procedure, a soil sample is collected with a stainless steel scoopula.

Decon Procedure:

DI rinse
Methanol rinse
DI rinse
Air dry

Sample A-~~09~~ 10 M.H taken at 0938 Hrs, approx 6" in depth.

Sample A-11 taken at 0948 Hrs, approx. 6" in depth

Sample A-12 take at 0957 Hrs, approx 6" in depth

Sample A-13 taken at 1004 Hrs at approx 6" in depth.

Sample A-14 taken at 1010 Hrs at approx 6" in depth

Sample A-15 taken at 1016 Hrs at approx 6" in depth

Sample A-16 taken at 1023 Hrs at approx 6" in depth

Sample A-17 taken at 1032 Hrs at approx 6" in depth

Sample A-18 taken at 1040 Hrs at approx 6" in depth

Sample A-19 taken at 1047 Hrs at approx 6" in depth

Sample A-20 taken at 1053 Hrs at approx 6" in depth

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page 7

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Page 8

Sampled A-21 at 1100 hrs at a depth of approx. 6"

Sample A-22 is trip blank [illegible]

Sampling is completed [illegible]

Jeff Ginsberg was present during all sampling and also a PH was there for checking for possible radiation

Time to begin packing up equipment while John Harris runs samples

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Appendix 13–4

APPENDIX 13-4

PHASE 1 SAMPLE ANALYSIS REPORT

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page 0

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page 1

WESTON
MANAGERS DESIGNERS/CONSULTANTS
7720 LORRAINE AVENUE
SUITE 105
STOCKTON, CA 95210
PHONE: 209-957-3405

9-14-88

Original analytical data enclosed

September 12, 1988

Jeff Ginsburg/Kathy MacKay
E G & G Inel, Inc.
1955 Fremont Avenue
Idaho Falls, ID 83415

Dear Mr. Ginsburg/Ms. MacKay:

Enclosed please find the analytical results for the PAD A OVERBURDEN AND INTERSTITIAL SOILS sent into our laboratory August 19, 1988. These samples have been run for Halogenated Volatile compounds using Method 8010 and for the Metals Be, U, Na, K. These samples were also analyzed for No3. Those results are summarized on the following pages.

If there should be questions or further need, please don't hesitate to call me at (209)957-3405.

Sincerely,

ROY F. WESTON, INC.

Kris Hinds
Project Manager

KH:te

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page 2

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Water   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-001

% Solids   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) ug/L

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	0.005	U		P
	Uranium	1.0	U		P
7440-23-5	Sodium	5.0	U		P
7440-09-7	Potassium	5.0	U		P
7757-79-1	Nitrate as NO3	0.5	U		

Color Before: Colorless   Clarity Before: Clear   Texture: Medium

Color After: Colorless   Clarity After: Clear   Artifacts:

Comments:

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page 3

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-003

% Solids: 98.0   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.10			P
	Uranium	200	U		P
7440-23-5	Sodium	1000	U		P
7440-09-7	Potassium	2249			P
7757-79-1	Nitrate as NO3	5.7			

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments:

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page 4

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics Contract No.: 3399-03-01 EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil Case No.: 29833 SAS No.: SDG No.: PADA188

Level (Low/Med): Low Lab Sample ID: 8808S041-005

% Solids: 90.8 Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.0	U		P
	Uranium	200	U		P
7440-23-5	Sodium	1081			P
7440-09-7	Potassium	2634			P
7757-79-1	Nitrate as NO3	5.0			

Color Before: Brown Clarity Before: Texture: Medium

Color After: Yellow Clarity After: Artifacts:

Comments:

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page 5

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-006

% Solids: 85.6   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.18			P
	Uranium	200	U		P
7440-23-5	Sodium	1351			P
7440-09-7	Potassium	3347			P
7757-79-1	Nitrate as NO3	5.3			

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments:

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page6

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-007

% Solids: 90.5   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.15			P
	Uranium	200	U		P
7440-23-5	Sodium	1001			P
7440-09-7	Potassium	3122			P
7757-79-1	Nitrate as NO3	5.5			

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments:

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page 7

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics Contract No.: 3399-03-01 EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Water Case No.: 29833 SAS No.: SDG No.: PADA183

Level (Low/Med): Low Lab Sample ID: 8808S041-008

% Solids: Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) ug/L

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	0.964			P
	Uranium	11.1			P
7440-23-5	Sodium	50.5			P
7440-09-7	Potassium	50			P
7757-79-1	Nitrate as NO3	1.9			

Color Before: Colorless Clarity Before: Clear Texture: Medium

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

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page 8

U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-009

% Solids: 92.4   Date Received: 08/22/83

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.34			P
	Uranium	200	U		P
7440-23-5	Sodium	1520			P
7440-09-7	Potassium	3418			P
7757-79-1	Nitrate as NO3	0.5	U		

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments:

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U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-010

% Solids: 96.3   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.06			P
	Uranium	200	U		P
7440-23-5	Sodium	1213			P
7440-09-7	Potassium	2544			P
7757-79-1	Nitrate as NO3	45.7			

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments:

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U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-011

% Solids: 89.4   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight) mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.30			P
	Uranium	200	U		P
7440-23-5	Sodium	1709			P
7440-09-7	Potassium	3508			P
7757-79-1	Nitrate as NO3	0.5	U		

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments: ________________________________

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U.S EPA - CLP
1AA (EXTENSION)
INORGANICS DATA SHEET

Lab Name: Weston Analytics   Contract No.: 3399-03-01   EPA SAMPLE NO.: PADA188

Lab Code: Wesca

Matrix (Soil/Water): Soil   Case No.: 29833   SAS No.:   SDG No.: PADA188

Level (Low/Med): Low   Lab Sample ID: 8808S041-012

% Solids: 95.7   Date Received: 08/22/88

Concentration Units (ug/L or mg/kg dry weight)   mg/kg

Cas No.:	Analyte	Concentration	C	Q	M
7440-41-7	Beryllium	1.25			P
	Uranium	200	U		P
7440-23-5	Sodium	1206			P
7440-09-7	Potassium	3118			P
7757-79-1	Nitrate as NO3	0.5	U		

Color Before: Brown   Clarity Before: Texture: Medium

Color After: Yellow   Clarity After: Artifacts:

Comments:

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WESTON

ORGANICS CASE NARRATIVE WORKSHEET

FRACTION: 601 RFW#: 8808S041

CLIENT: E.G.& G.-29833

1: All required holding times were met with the following exceptions:

2: All tuning and calibration criteria were met for all samples, with the exception of:

3: All blanks analysed were below allowable limits of contamination as set forth in the EPA CLP SOW.

4: Other problems encountered were: The percent moisture for soil samples was not taken into account. The measurment for this data was not available at the time of reporting.

The following data qualifiers are used in the report:
- U - Indicates that the compound was analysed for but not detected.
- J - Indicates an estimated trace value.
- B - Indicates the compound was found in the blank.
- D - Indicates dilution of the sample
- X -

Date: Analyst:

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WESTON

Client: EG&G/29833

Sample ID: METHANOL BLANK

Sampled: NA — Matrix: SOIL

Received: NA — % Moist: 0 — RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS — EPA 8010

Extracted:	08/29/88	Ext Fact:	0.01
Analyzed:	08/31/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	880831H

RFW Lab #: 880829M2

Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane............	U	0.050
Carbon tetrachloride..............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U Compound analyzed for but not detected

All values are corrected for moisture content

Approved: [signature]

Declan Cowley

Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188001A

Sampled: 08/18/88 Matrix: SOIL
Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted: 08/29/88 Ext Fact: 0.01
Analyzed: 08/30/88 Dil Fact: 1
Confirmed: NO Blank ID: 880830H

RFW Lab #: 003H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride..............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected
All values are corrected for moisture content

Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188002A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted:	08/29/88	Ext Fact:	0.01
Analyzed:	08/30/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	880830H

RFW Lab #: 005H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride.............	U	0.050
Trichloroethene..................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected

All values are corrected for moisture content

Approved:

Declan Cowley

Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188003A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted:	08/29/88	Ext Fact:	0.01
Analyzed:	08/30/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	880830H

RFW Lab #: 006H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane............	U	0.050
Carbon tetrachloride.............	U	0.050
Trichloroethene..................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected

All values are corrected for moisture content

Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188004A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted: 08/29/88 Ext Fact: 0.01
Analyzed: 08/30/88 Dil Fact: 1
Confirmed: NO Blank ID: 880830H

RFW Lab #: 007H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride..............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected
All values are corrected for moisture content

Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188005A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted: 08/29/88 Ext Fact: 0.01

Analyzed: 08/30/88 Dil Fact: 1

Confirmed: NO Blank ID: 880830H

RFW Lab #: 009H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride..............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected

All values are corrected for moisture content

Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188006A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted:	08/29/88	Ext Fact:	0.01
Analyzed:	08/31/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	880831H

RFW Lab #: 010H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride.............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected

All values are corrected for moisture content

Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188007A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted: 08/29/88 Ext Fact: 0.01

Analyzed: 08/31/88 Dil Fact: 1

Confirmed: NO Blank ID: 880831H

RFW Lab #: 011H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride..............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected Approved:

All values are corrected for moisture content

Declan Cowley
Organic Section Manager

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WESTON

		Client:	EG&G
		Sample ID:	PADA18800T1A
Sampled: 08/18/88	Matrix: WATER		
Received: 08/20/88		RFW Job #:	8808s041

HALOGENATED VOLATILE ORGANICS — EPA 601

Extracted:	NO	Ext Fact:	1
Analyzed:	08/29/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	880829H

RFW Lab #: 004H

Compound	Results (ppb) ug/L	Det Limit Sample ug/L
1,1,1-Trichloroethane.............	U	0.50
Carbon tetrachloride..............	U	0.50
Trichloroethene...................	U	0.50
1,1,2,2-Tetrachloroethane.........	U	0.50

U - Compound analyzed for but not detected

Approved: [signature]

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G/29833

Sample ID: PADA188008A

Sampled: 08/18/88 Matrix: SOIL

Received: 08/20/88 % Moist: 0 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 8010

Extracted: 08/29/88 Ext Fact: 0.01

Analyzed: 08/31/88 Dil Fact: 1

Confirmed: NO Blank ID: 880831H

RFW Lab #: 012H Compound	Results (ppm) mg/Kg	Det Limit Sample mg/Kg
1,1,1-Trichloroethane.............	U	0.050
Carbon tetrachloride..............	U	0.050
Trichloroethene...................	U	0.050
1,1,2,2-Tetrachloroethane.........	U	0.050

U = Compound analyzed for but not detected

All values are corrected for moisture content

Approved:

Declan Cowley

Organic Section Manager

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WESTON

Client: EG&G

Sample ID: LAB WATER BLANK

Sampled: NA

Matrix: WATER

Received: NA

RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS — EPA 601

Extracted: NO — Ext Fact: 1

Analyzed: 08/31/88 — Dil Fact: 1

Confirmed: NO — Blank ID: NA

RFW Lab #: 880831H Compound	Results (ppb) ug/L	Det Limit Sample ug/L
1,1,1-Trichloroethane.............	U	0.50
Carbon tetrachloride..............	U	0.50
Trichloroethene...................	U	0.50
1,1,2,2-Tetrachloroethane.........	U	0.50

U = Compound analyzed for but not detected

Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G

Sample ID: LAB WATER BLANK

Sampled: NA

Received: NA

Matrix: WATER

RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS — EPA 601

Extracted:	NO	Ext Fact:	1
Analyzed:	08/30/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	NA

RFW Lab #: 880830H

Compound	Results (ppb) ug/L	Det Limit Sample ug/L
1,1,1-Trichloroethane.............	U	0.50
Carbon tetrachloride.............	U	0.50
Trichloroethene..................	U	0.50
1,1,2,2-Tetrachloroethane.........	U	0.50

U = Compound analyzed for but not detected

Approved: [signature]

Declan Cowley
Organic Section Manager

a13-4
page 24

Client: EG&G

WESTON

Sample ID: LAB WATER BLANK

Sampled: NA
Received: NA

Matrix: WATER

RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS — EPA 601

Extracted:	NO	Ext Fact:	1
Analyzed:	08/31/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	NA

RFW Lab #: 880829H Compound	Results (ppb) ug/L	Det Limit Sample ug/L
1,1,1-Trichloroethane.............	U	0.50
Carbon tetrachloride..............	U	0.50
Trichloroethene...................	U	0.50
1,1,2,2-Tetrachloroethane.........	U	0.50

U = Compound analyzed for but not detected

Approved: [signature]

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G

Sample ID: PADA1880E1A

Sampled: 08/18/88 Matrix: WATER

Received: 08/20/88 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 601

Extracted:	NO	Ext Fact:	1
Analyzed:	08/29/88	Dil Fact:	1
Confirmed:	NO	Blank ID:	880829H

RFW Lab #: 001H Compound	Results (ppb) ug/L	Det Limit Sample ug/L
1,1,1-Trichloroethane.............	U	0.50
Carbon tetrachloride.............	U	0.50
Trichloroethene..................	U	0.50
1,1,2,2-Tetrachloroethane.........	U	0.50

U = Compound analyzed for but not detected Approved:

Declan Cowley
Organic Section Manager

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WESTON

Client: EG&G

Sample ID: PADA1880F1

Sampled: 08/18/88 Matrix: WATER

Received: 08/20/88 RFW Job #: 8808s041

HALOGENATED VOLATILE ORGANICS EPA 601

Extracted: NO Ext Fact: 1

Analyzed: 08/29/88 Dil Fact: 1

Confirmed: NO Blank ID: 880829H

RFW Lab #: 002H

Compound	Results (ppb) ug/L	Det Limit Sample ug/L
1,1,1-Trichloroethane.............	U	0.50
Carbon tetrachloride..............	U	0.50
Trichloroethene...................	U	0.50
1,1,2,2-Tetrachloroethane.........	U	0.50

U Compound analyzed for but not detected Approved:

Declan Cowley
Organic Section Manager

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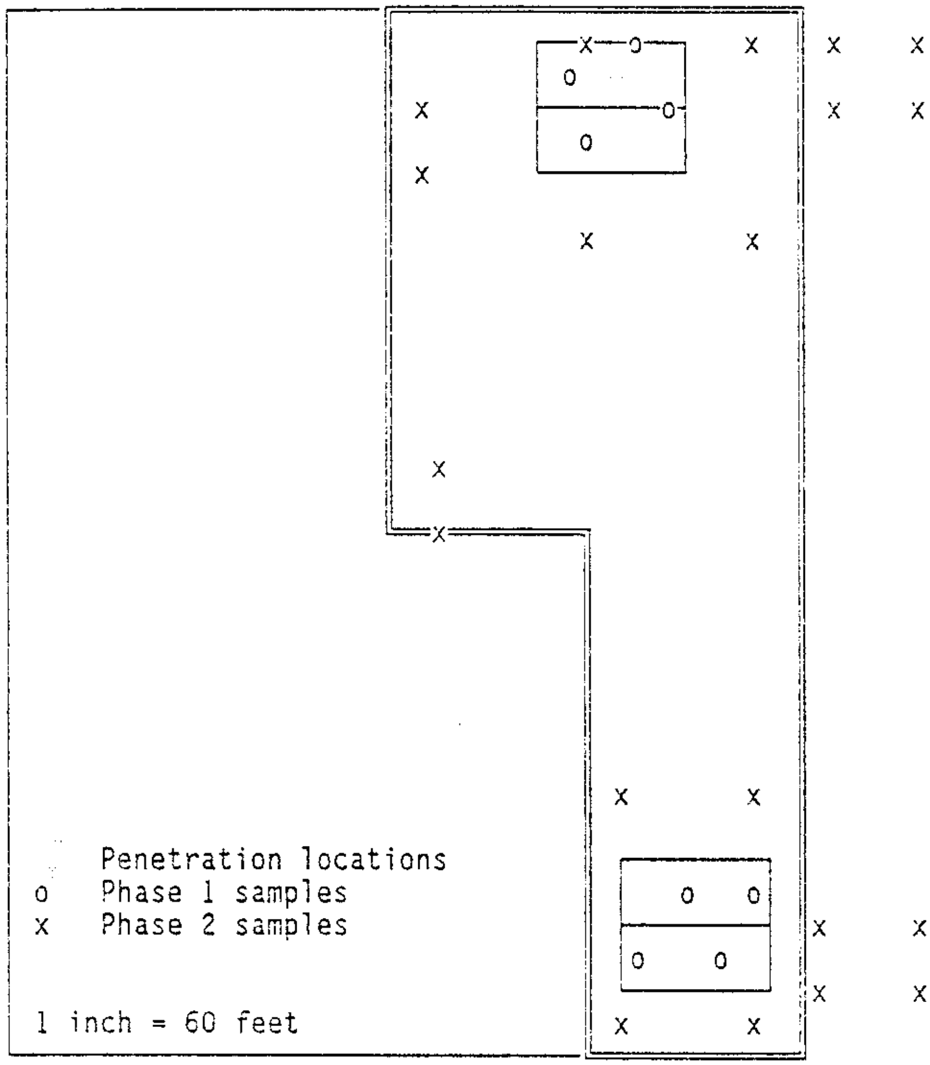
Penetration locations
o Phase 1 samples
x Phase 2 samples
1 inch = 60 feet

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Appendix 13–5

APPENDIX 13-5

PHASE 2 SAMPLE ANALYSIS REPORT

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page 0

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page 1

Robinson Plaza II, Suite 200
Pittsburgh, Pennsylvania
15205-1017

412/788-9200

ICF TECHNOLOGY INCORPORATED

December 15, 1988

Mr. Jeffrey F. Ginsburg
Senior Engineer
Idaho National Engineering Laboratory
EG & G Idaho, Inc.
P.O. Box 1625
Idaho Falls, Idaho 83415

Dear Jeff:

Please find enclosed our report on results obtained from the analysis of soils collected and tested for volatile organics, at the Idaho National Engineering Laboratory (INEL). These soils were the sandy-clay material used as the closure cap for a buried radiological waste storage area (Pad "A") at the waste management facility. Testing of these materials was in support of the EG & G Buried Waste Remediation Plan, and was conducted to investigate wheterh or not the cap material is a hazardous waste. In addition the tests were conducted to clarify discrepancies of positive volatile organic results obtained from previous soil gas testing within and under the cap material.

ICF/SRW Associates would like to thank EG & G Idaho for considering and contracting our services in support of your work efforts at the INEL. If we can be of further assistance, please do not hesitate to contact us. If there are questions in regards to this report or you need other information, please call me at (412) 788-9200 Ext. 275.

Sincerely,

ICF/SRW ASSOCIATES
A DIVISION OF ICF TECHNOLOGY INC.

Andrew Richardson for John W. Harris

John W. Harris
Chemist

JWH:mdb

Enclosure

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page 2

Technical Memorandum

Subject: Volatile Organic Compound Screening Results for Soil Samples (30753-000-00)

Date: December 9, 1988

Soil samples were collected and tested for the presence of targeted volatile organic compounds on November 21 & 22, 1988. Samples were collected from Pad "A", which is an above ground radiological waste burial mound, at the Waste Management facility of the Idaho National Engineering Laboratory (INEL). Testing of the soils produced real-time quantitative measurements using an ambient temperature gas chromatograph with photoionization detector.

Sampling locations and depths were predetermined by EG&G personnel. Originally, twenty four sampling locations were designated for collection and analysis. Four samples were to be grabbed from locations on the mound where utility poles were to be installed, and the additional samples encompassed the two proposed penetration areas (see Figure 1). The four samples were taken from the proposed utility pole positions but only one was analyzed due to time constraints and a switch in priority. Actual and Final sampling locations are shown in Figure 1. A total of twenty two samples were collected, including one background used to identify analytical interferences, and one trip blank. Nineteen of these samples were analyzed.

PURPOSE

The purpose of this memo is to present the analytical findings of the targeted volatile organic analyses, in order for EG&G personnel to evaluate possible contaminated soils which may be excavated. Rationale and procedures analysis are presented in the methodology accompanying this report, which were used in order to accomplish the analytical task in the time frame allotted.

PROCEDURE

Three volatile organic compounds were analyzed for, onsite, using headspace analysis. These compounds are trichloroethene, carbon tetrachloride, and tetrachloroethene.

Surface soil was removed to a depth of six inches using a shovel. A stainless spoon was used to remove soil which may have come in contact with this shovel and soil was sampled with a stainless steel spatula and placed into pre-weighed 40 ml vials containing organic free water (HPLC Grade).

RESULTS

Results of the analysis are as follows:

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Standards Calibration File:

Compound	Retention Time	Inj. Vol.	Response	Conc.
Trichloroethene	121.9	25 ul	13.0 vs	910 ng/ul.
Carbon Tetrachloride	299.2	25 ul	15.2 vs	992.5 ng/ul.
Tetrachloroethene	825.1	25 ul	12.5 vs	1012.5 ng/ul.

where vs = visible response

Standards were created in the following manner:

- 1 ul of each "neat" chemical was introduced to a capped 40 ml VOA vial which produces the above gaseous concentrations, when allowed to evaporate, and using the formula:

$$c = d \times a \times 1{,}000 / v$$

where c = concentration in nanograms per microliter.
d = density of the neat standard in milligrams per microliter.
a = amount injected in microliters.
v = volume of VOA vial in milliliters.

As an example, if 1 ul of trichloroethene is injected into the 40 ml VOA vial the concentration would be:

$$c = \frac{1.456 \times 1 \text{ ul} \times 1{,}000}{40 \text{ ml}} = 36.4 \text{ ng/ul}$$

A visible chromatographic response was observable with a 25 ul injection. This would be equal to 910 ng of trichloroethene. Half of this amount or 455 ng was set as the detection limit for this compound. However, sample analysis was conducted using a 500ul injection instead of 25ul so our detectable concentration would be:

455ng / 20 or 22.75ng

Chromatographic quantitation is reported as parts per million (ppm) at the bottom of each analysis in the raw data, which is converted to nanograms of constituent per gram of soil (ng/g) in the following manner:

- if 1.861 is reported, this is equal to 1.861 ng/ul, so if 20 grams of soil was extracted then using the formula at the back of the analytical procedure we would have:

$$\text{conc. in ng/g} = \frac{(1.861 \text{ ng/ml}\ (20 \text{ ml})}{20 \text{ g}}\ \frac{(500\text{ul})}{25\text{ul}}$$

$$= 37220 \text{ ng/g or } 37.2 \text{ ppm}$$

The background sample (A-09) showed concentrations of 28.8 ng/g and 14.4 ng/g for trichloroethene and carbon tetrachloride respectively which would be subtracted out of any reportable results.

a13-5
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Results for Soil Samples Analyzed
for Target Volatile Organic Compounds

Waste Management Facility
INEL
Testing Conducted for EG&G Idaho, Inc.
All results in ng/g

	A-01	A-02	A-03	A-04	A-05	A-06	A0-7
trichloroethene	Not Analyzed	Not Analyzed	<650	Not Analyzed	<730	<760	<770
carbon tetrachloride			<600		<670	<700	<710
tetrachloroethene			<670		<750	<770	<790

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Results for Soil Samples Analyzed
for Target Volatile Organic Compounds

Waste Management Facility
INEL
Testing Conducted for EG&G Idaho, Inc.
All results in ng/g

	A-08	A-09*	A-10	A-11	A-12	A-13	A-14
trichloroethene	<670	29000	<1000	<1400	<1200	<1300	<1100
carbon tetrachloride	<610	14000	< 910	<1200	<1100	<1200	< 980
tetrachloroethene	<680	<782	<1000	<1400	<1200	<1300	<1100

*Background sample (Analysis #6) had interfering peaks in the calibration windows of trichloroethene and carbon tetrachloride which are evident in most analyses, and are subtracted out of results.

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Results for Soil Samples Analyzed
for Target Volatile Organic Compounds

Waste Management Facility
INEL
Testing Conducted for EG&G Idaho, Inc.
All results in ng/g

	A-15	A-16	A-17	A-18	A-19	A-20	A-21
trichloroethene	<1200	<1000	<1100	<860	<920	<1100	<970
carbon tetrachloride	<1100	< 930	< 970	<790	<840	<1000	<890
tetrachloroethene	<1200	<1000	<880	<880	<930	<1100	<980

SAMPLE WEIGHTS

Sample #	Initial Wt.	Final Wt.	Wt. of Soil	Comments
A-01	52.62	78.70	26.08	Not Analyzed
A-02	52.34	84.15	31.81	Not Analyzed
A-03	51.80	82.25	30.45	
A-04	52.02	78.16	26.14	Not Analyzed
A-05	51.91	79.04	27.13	
A-06	51.59	77.83	26.24	
A-07	51.51	77.78	26.27	
A-08	51.85	81.70	29.85	
A-09	51.39	77.28	25.89	Background
A-10	51.31	71.23	19.92	
A-11	51.29	65.96	14.67	
A-12	51.76	69.25	17.49	
A-13	51.63	67.16	15.53	
A-14	52.11	70.71	18.60	
A-15	51.22	68.38	17.16	
A-16	51.66	71.49	19.83	
A-17	51.82	70.51	18.69	
A-18	51.38	74.50	23.12	
A-19	52.24	73.91	21.67	
A-20	51.65	69.55	17.90	
A-21	51.65	72.21	20.56	
A-22	52.20	52.20	0.00	Trip Blank - HPLC Grade H_2O

All wts. are in grams

SOIL/SEDIMENT SAMPLE SCREENING
FOR PURGEABLE ORGANICS

I. INTRODUCTION

This procedure is used to screen soil and sediment samples for volatile organic contaminants. Sample screening can occur within a mobile laboratory located on or near the investigation site, or in a close proximity laboratory. Accurate, valid sampling techniques must be maintained to assure sample integrity. These data may be used to influence and support both Central Laboratory Program sample selection decisions and site investigative decisions such as drilling depths and locations for use in horizontal and vertical delineation of contamination.

II. METHOD

Soils and sediments are screened for the presence of volatile organics by headspace analysis using gas chromatography with photoionization detection.

III. PROCEDURE

A. Sampling and Preservation:

1. 20 ml. of organic-free water is added to a clean 40 ml. VOA vial, which is then capped with a septum top and weighed to the nearest 0.1 gram. This can be done using a "triple beam" style or electronic balance.

2. This is recorded as the tarred weight (see sample calculations sheet).

3. During sampling, introduce enough soil/sediment to approximately occupy an additional 10 ml. volume of the VOA vial leaving approximately 10 ml. volume of headspace. Recap and weigh the vial and record the weight.

4. Refrigerate sample vial at 4 degrees C.

B. Standards Preparation:

Aqueous standards are prepared as outlined in EPA Method 601 (attached). Working standards are placed into known volumetrics and allowed to equilibrate between liquid and gaseous headspace.

C. Screening:

1. The analytical instrumentation must first be proven to be reliable and data reproducible. This is accomplished by developing three standard levels covering the expected sample concentration range and analyzing each level separately to

produce a calibration curve. Method blanks and background samples are analyzed to determine internal and matrix interference.

2. Instrument calibration is created by analyzing one or more of the standard levels and storing a response factor calculated from targeted analyte responses in an instrument file. Sample responses are then compared to standard runs giving concentrations for each compound of interest.

3. Prior to analysis, field samples are brought to ambient temperature from cold storage and hand-shake vigorously for one minute, after which they are placed into a 90°C water bath or oven for 1 hour.

4. Next an aliquot of varying volume, dependent on expected concentration, of headspace above the solid/aqueous substrata is obtained with a syringe and injected onto the analytical column (do not inject water). If concentrations are unknown or expected to be high, injection aliquots should be kept small or the instrument sensitivity decreased and the instrument recalibrated.

IV. QUALITY ASSURANCE/QUALITY CONTROL

Performance samples from external sources (EPA) can be run to verify that established analytical quality control is sufficient toward supporting data requirements with procedures being used. Audits can be initiated by client, in-house, or third party officials for these evaluations.

Quality control for this method is performed in the following manner:

1. Samples are handled in daily sets (sample set).

2. A standard is run at the beginning of each sample set, followed by a method blank. Method blanks should also be analyzed after occurrence of a highly contaminated sample analysis.

3. A positive sample is split and run as a laboratory duplicate, which can be spiked with the target compounds at known concentrations to monitor sample matrix effects and to determine percent recovery.

4. Quality control samples obtainable from EPA EMSL can be run to check in-house standards.

5. Duplicate samples and field blanks should be obtained and analyzed, one for every 20 samples analyzed, to assess sampling accuracy and to check for crossover contamination from sample to sample.

V. SITE SPECIFIC CRITERIA

ICF/SRW Associates personnel will analyze soil/sediment samples obtained from a sandy-clay cap covering a radiological waste storage area to assess the possible existence of volatile organic contaminants. This area is located on the U.S. Atomic Energy Commission Reservation, Idaho Falls facility, and is managed by EG&G personnel whose offices are located in Idaho Falls, Idaho, approximately 50 miles east of the facility. The instrumentation to be used to analyze the samples will be a Photovac series 10 S50 gas chromatograph which includes a built-in integrator for data generation. This unit is a ambient temperature chromatograph and will use either zero grade air or ultra pure nitrogen as a carrier gas. The lab will be established in an onsite building with heat and electricity available for steady environmental conditions.

There have been previous surveys conducted which have been contradictory as to the presence of organic constituents in the cap materials. Four organic compounds have supposedly been detected. These compounds are tetrachloroethene, 1,1,2,2-tetrachloroethane, trichloroethene and carbon tetrachloride, with the latter two compounds being most prevalent. The possible existence of these compounds would also be low level (ppb).

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Calculation for the Concentration of Volatile Organics Within Soil/Sediment Samples

$$\text{conc. in ng/g} = \frac{(\text{ng/ml of analyte})^{*}(\text{ml H2O extract})}{\text{grams of soil extracted}} \quad \frac{(\text{ul headspace sample inj.})}{(\text{ul headspace std. in.} \quad)}$$

* This is concentration of analyte derived from chromatographic analysis based upon standardization using gaseous standards prepared in-house.

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page 12

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page 12

11/22/88

Fig. 1

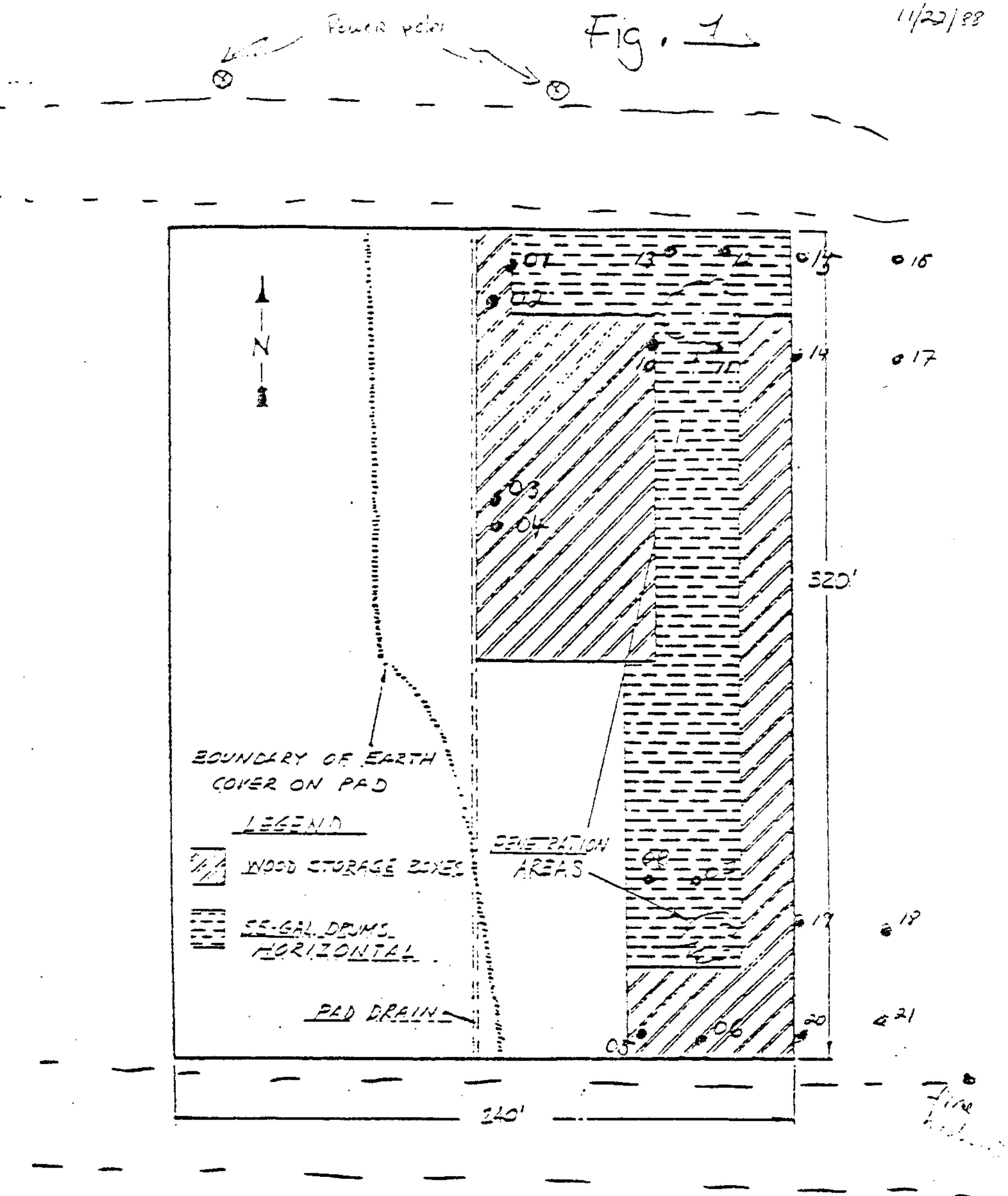

Figure 3. Plan view of pad and penetration area.

5000 counts

Notes:

09 : background sample from Big Lost River Drainage

10 : hot particle ~ 200,000 dpm

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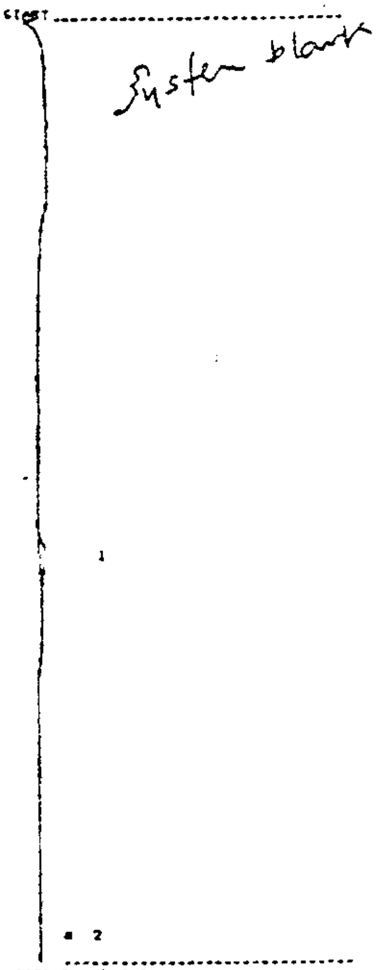
PHOTOVAC

START



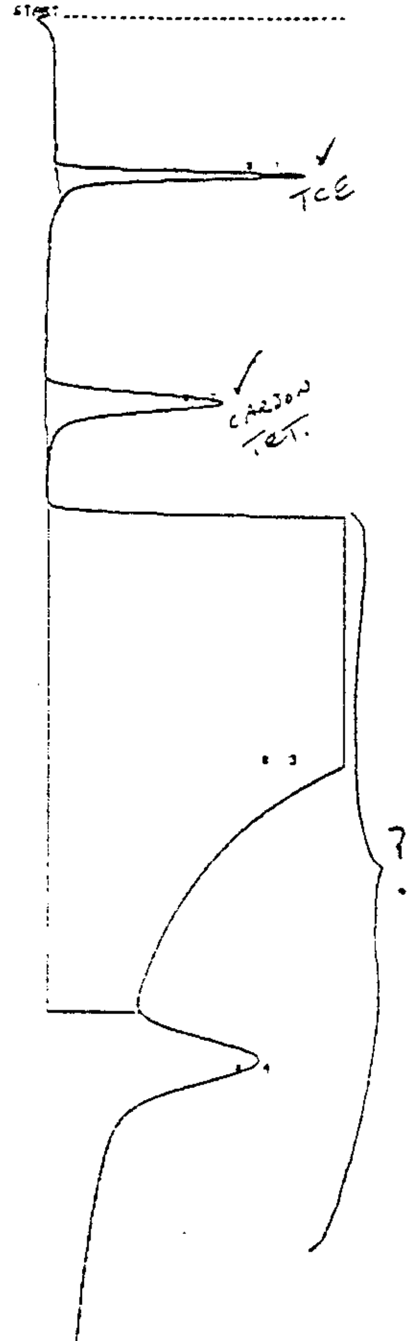
STOP @ 217.7

SAMPLE RUN NOV 22 1988 9:28
ANALYSIS # 1 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPP
UNKNOWN	1	415.3	371.0 AVS

PHOTOVAC

START



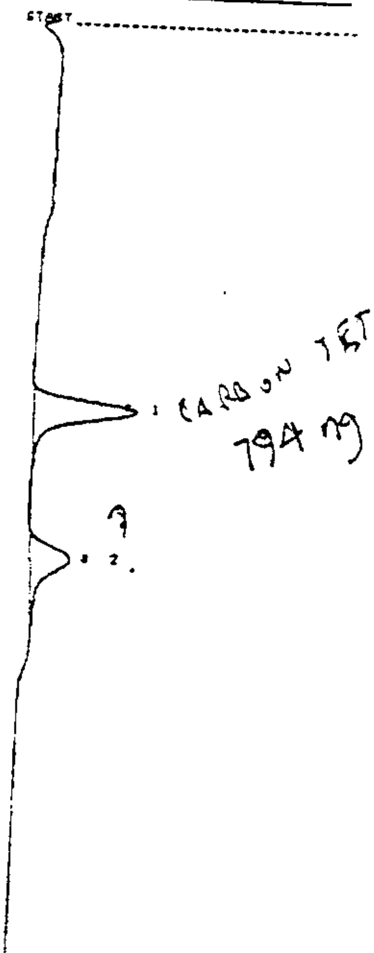
STOP @ 1019.3

SAMPLE RUN NOV 22 1988 9:38
ANALYSIS # 2 EG AND G-BUP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPP
UNKNOWN	8	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	3	426.5	6.2 AVS

PHOTOVAC

START



STOP @ 722.9

SAMPLE RUN NOV 22 1988 9:51
ANALYSIS # 3 EG AND G-BUP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPP
UNKNOWN	1	229.5	5.4 VS
UNKNOWN	2	413.5	3.9 VS

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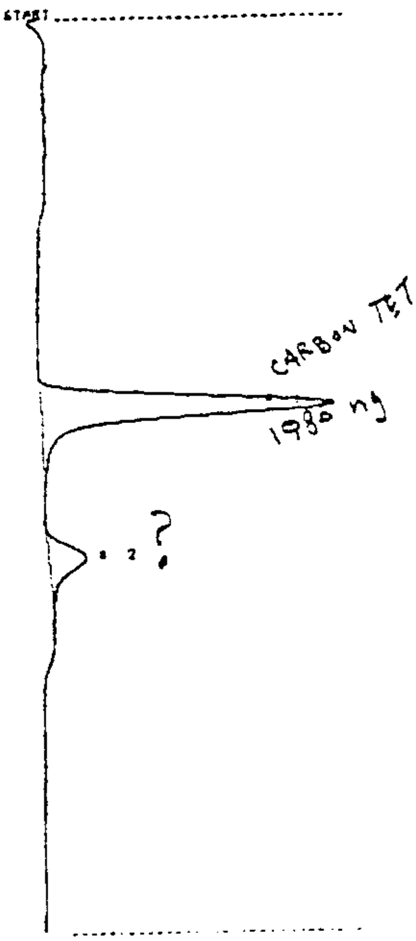
PHOTOVAC



STOP # 822
SAMPLE RUN NOV 22 1988 10: 4
ANALYSIS # 4 EG AND G-BWP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	234.5	[illegible]
UNKNOWN	2	415.2	[illegible] VS

120.7% of Analysis #3

PHOTOVAC

NOV 22 1988 10: 0

SOURCE FIELD: 31
SOURCE POWER: 40

SAMPLE	LEVEL	9.0	10.0
CAL	LEVEL	0.0	0.0
EVENT 3	LEVEL	0.0	150.0
EVENT 4	LEVEL	0.0	0.0
EVENT 5	LEVEL	0.0	0.0

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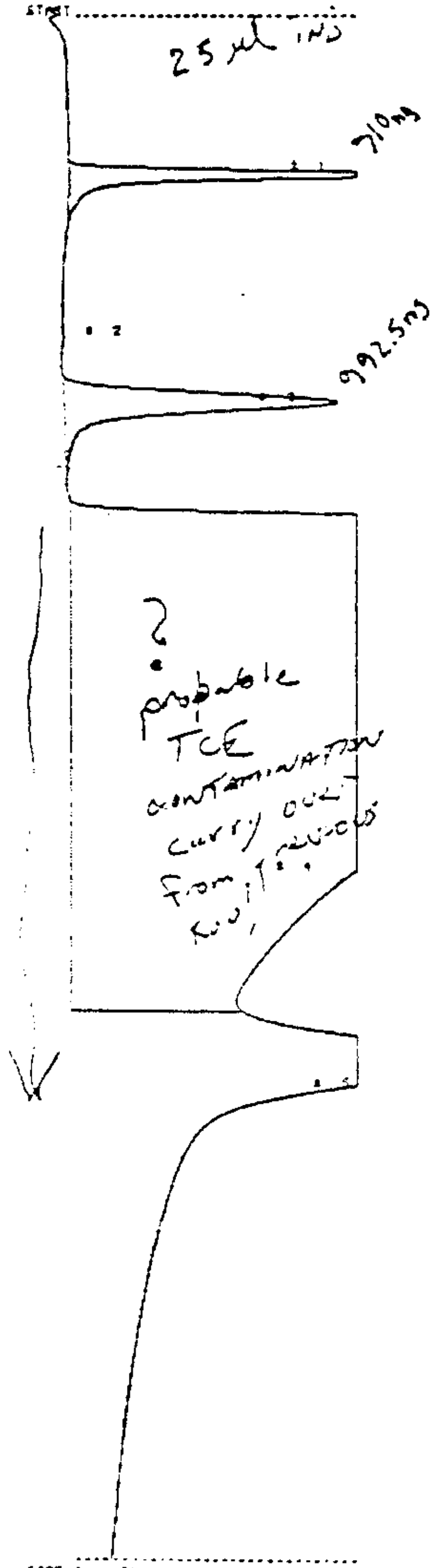
PHOTOVAC



STOP # 1171.4
SAMPLE RUN NOV 22 1988 10:31
ANALYSIS # 5 EG AND G-BWP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

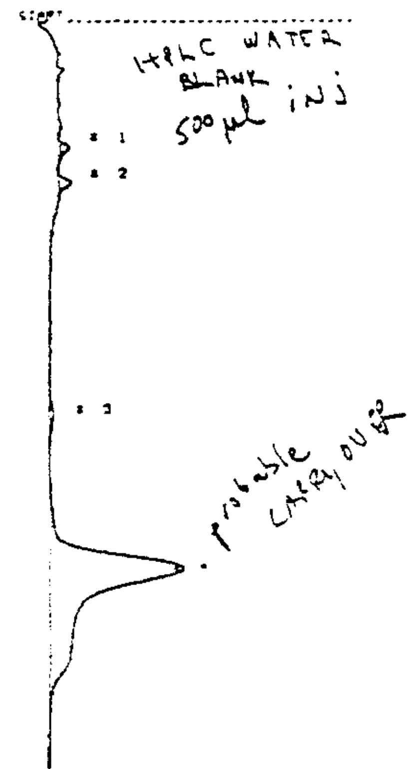
COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	171.0	10.0 VS
UNKNOWN	2	333.2	12.7 VS
UNKNOWN	4	512.3	11.4 mV.

CALIBRATION File CREATED

PHOTOVAC

#	COMPOUND	ID #	R.T.	LIMIT
	TCE	1	121.5	500.0 ppm
	CARBON TET.	2	233.2	500.0 ppm

PHOTOVAC

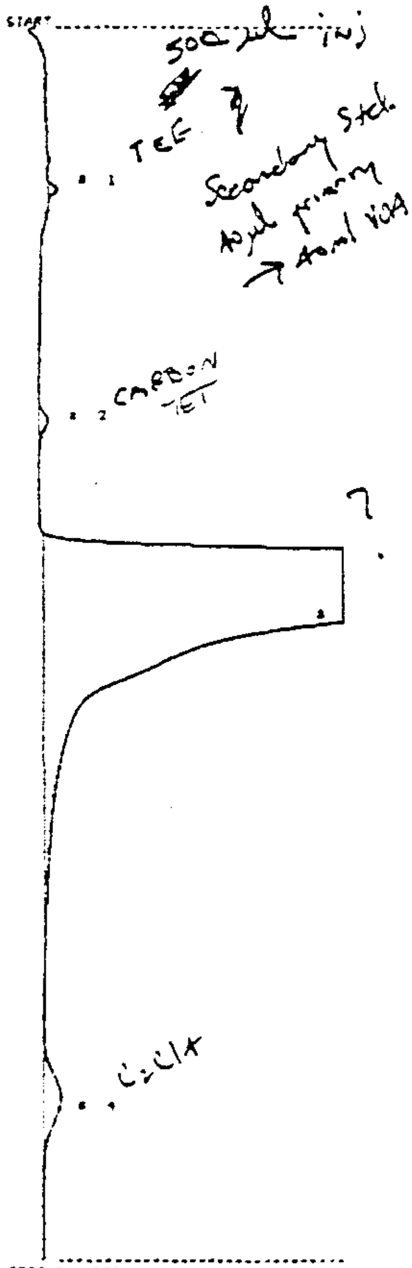


STOP # 573.6
SAMPLE RUN NOV 22 1988 10:46
ANALYSIS # 1 EG AND G-BWP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

OFFSET	83.0	mV
CHART SPEED	1	cm/min
SLOPE SENS.	20.	mV/Sec
WINDOW	12.	Sec
MINIMUM AREA	100.	mVSec
PLOTTER DELAY	10.0	Sec
ANALYSIS TIME	2000.0	Sec
CYCLE TIME	2	Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	32.4	100.0 mVS
UNKNOWN	2	174.4	333.5 mVS
UNKNOWN	3	297.7	332.8 mVS
UNKNOWN	4	410.7	10.1 VS

PHOTOVAC

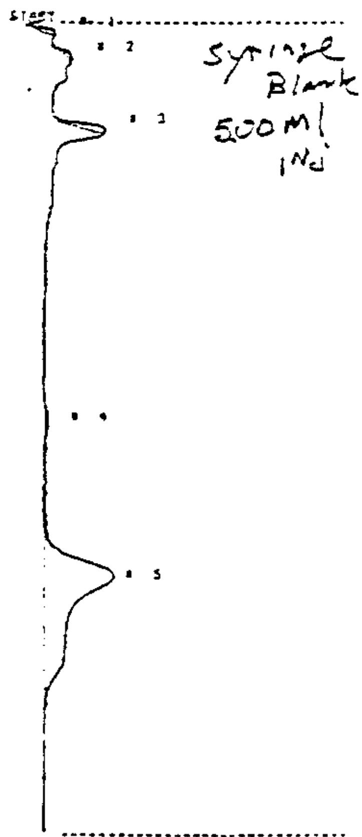


STOP @ 373.0
SAMPLE RUN NOV 22 1988 11:10
ANALYSIS # 2 EG AND G-BWP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

OFFSET	87.0	µV
CHART SPEED	1	cm/min
SLOPE SENS.	20	µV/Sec
WINDOW +/-	2	Sec
MINIMUM AREA	100	µVSec
PLOTTER DELAY	10.0	Sec
ANALYSIS TIME	3000.0	Sec
CYCLE TIME	0	Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	[illegible]	[illegible] µVS
UNKNOWN	2	[illegible]	[illegible] µVS
UNKNOWN	3	[illegible]	[illegible] VS
UNKNOWN	4	[illegible]	[illegible] VS

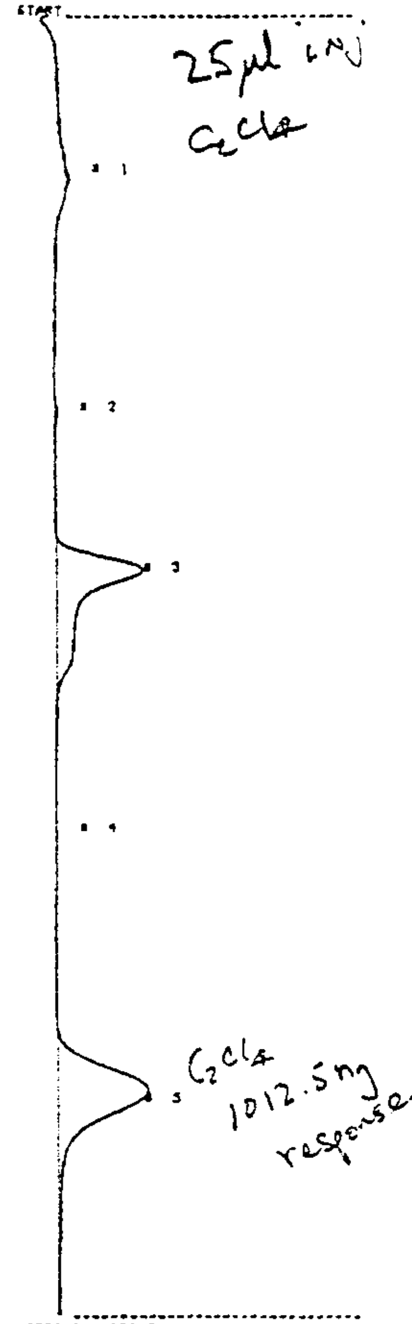
PHOTOVAC



STOP @ 417.1
SAMPLE RUN NOV 22 1988 11:21
ANALYSIS # 3 EG AND G-BWP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	3.8	179.7 µVS
UNKNOWN	2	78.7	100.9 µVS
UNKNOWN	3	87.3	767.0 µVS
UNKNOWN	4	209.3	[illegible] µVS
UNKNOWN	5	377.0	[illegible] VS

PHOTOVAC



STOP @ 373.5
SAMPLE RUN NOV 22 1988 11:33
ANALYSIS # 4 EG AND G-BWP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	3	173.7	3.8 VS
UNKNOWN	5	[illegible]	[illegible] VS

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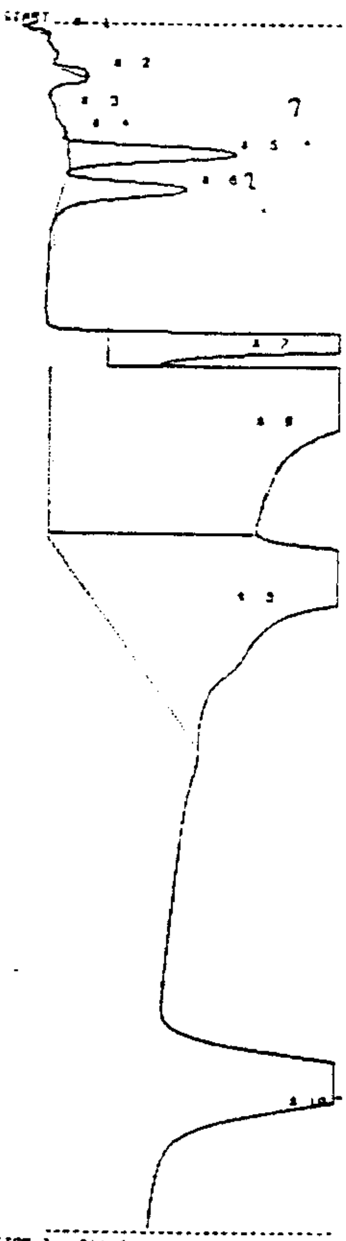
CALIBRATION TABLE

PHOTOVAC

I COMPOUND	ID #	R.T.	LIMIT
TCE	1	171.3	500.0 PPM
CARBON TET.	2	222.7	500.0 PPM
C2CL4	3	505.1	500.0 PPM

500 µl inj
A-17

PHOTOVAC



STOP # 311.6

SAMPLE RUN NOV 22 1988 12: 8

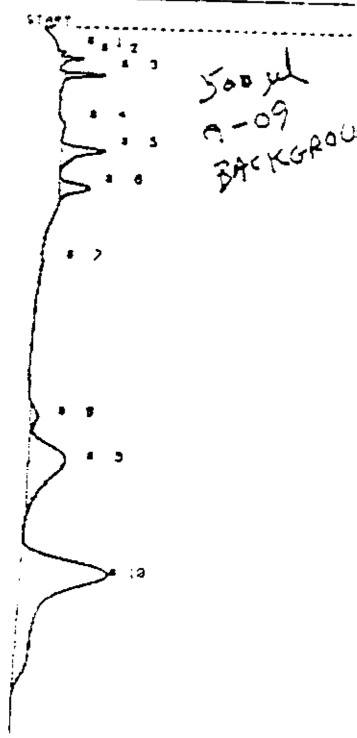
ANALYSIS # 5 EG AND G-BWP

TEMPERATURE 22 PAD A

GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	2.4	124.1 AVS
UNKNOWN	2	55.5	125.7 AVS
UNKNOWN	[illegible]	121.0	4.3 VS
UNKNOWN	[illegible]	[illegible]	4.3 VS
UNKNOWN	[illegible]	[illegible]	41.4 VS
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	479.0	[illegible] VS

PHOTOVAC



500 µl
A-09
BACKGROUND

STOP # 743.3

SAMPLE RUN NOV 22 1988 12:13

ANALYSIS # 6 EG AND G-BWP

TEMPERATURE 22 PAD A

GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	2	55.1	127.0 AVS
UNKNOWN	3	76.2	710.7 AVS
UNKNOWN	4	91.2	37.1 AVS
TCE	6	127.9	1.961 PPM
CARBON TET.	8	222.2	2.373 PPM
UNKNOWN	9	392.1	2.6 VS
UNKNOWN	10	4[illegible]2.3	3.1 VS

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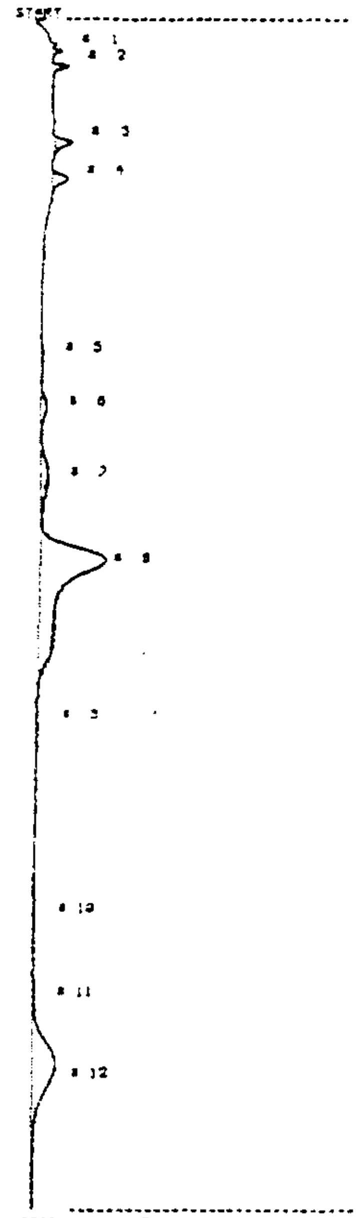
500 µl inj
A-17

PHOTOVAC



STOP # 604.7

SAMPLE RUN NOV 22 1998 12:22

ANALYSIS # 7 EG AND G-BWP

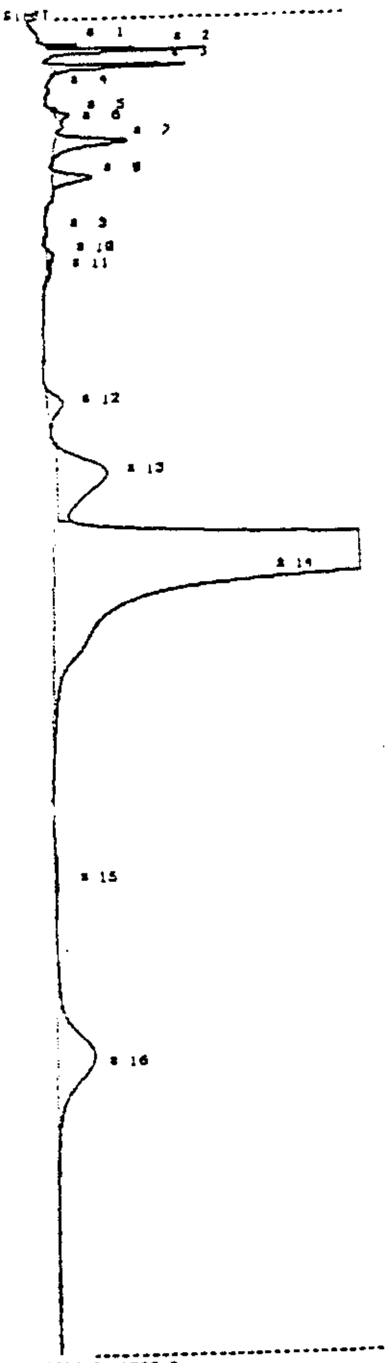
TEMPERATURE 22 PAD A

GAIN 100 VOLATILE ORG

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	3	55.3	754.4 AVS
TCE	4	127.5	2.292 PPM
CARBON TET.	5	227.8	2.575 PPM
UNKNOWN	7	338.1	577.0 AVS
UNKNOWN	9	415.3	7.9 VS
UNKNOWN	12	607.4	7.0 VS

500 µl inj
A-18

PHOTOVAC

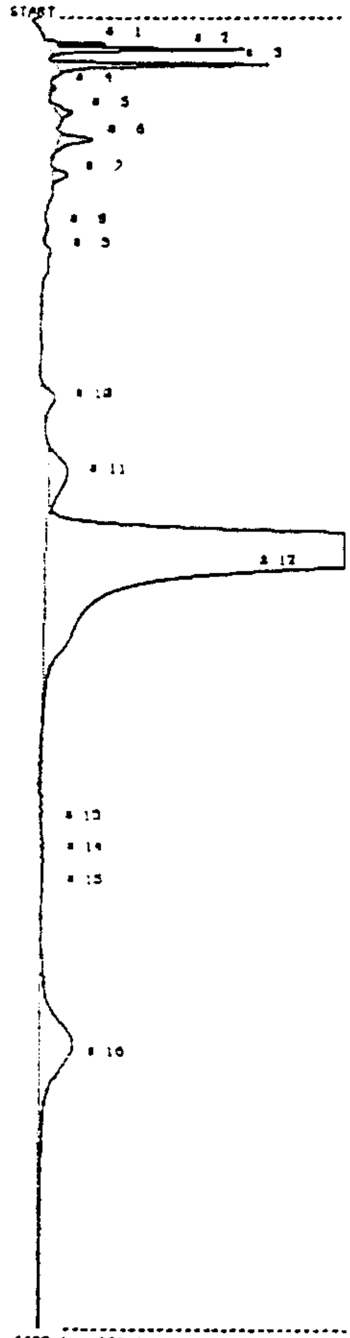


STOP @ 1800.0
SAMPLE RUN NOV 22 1988 12:49
ANALYSIS # 8 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM	
UNKNOWN	[illegible]	22.4	[illegible]	AVS
UNKNOWN	2	73.0	279.0	AVS
UNKNOWN	3	74.2	1.0	VS
UNKNOWN	5	75.5	145.9	AVS
UNKNOWN	7	[illegible]	1.3	VS
TCE	8	[illegible]	2.235	PPM
UNKNOWN	10	[illegible]	762.3	AVS
UNKNOWN	11	129.6	168.7	AVS
CARBON TET.	12	[illegible]	1.284	PPM
UNKNOWN	13	[illegible]	5.4	VS
UNKNOWN	14	[illegible]	[illegible]	VS
UNKNOWN	[illegible]	438.1	[illegible]	AVS
UNKNOWN	16	[illegible]	[illegible]	VS

500 µl inj
A-26

PHOTOVAC

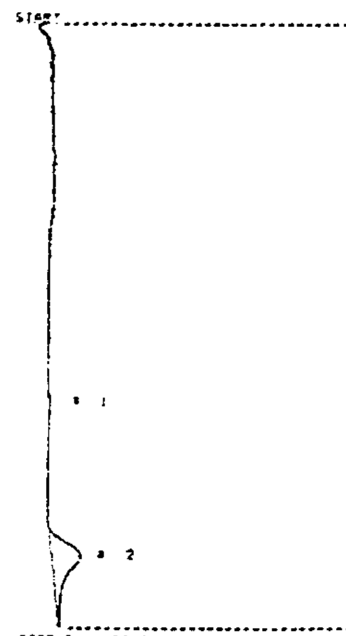


STOP @ 2211.1
SAMPLE RUN NOV 22 1988 13: 8
ANALYSIS # 9 EG AND G-BUP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM	
UNKNOWN	[illegible]	22.6	[illegible]	[illegible]
UNKNOWN	2	[illegible]	[illegible]	VS
UNKNOWN	3	56.7	1.0	VS
UNKNOWN	5	71.7	[illegible]	AVS
UNKNOWN	6	91.7	869.6	AVS
TCE	7	[illegible]	0.873	PPM
UNKNOWN	9	[illegible]	[illegible]	AVS
CARBON TET.	10	[illegible]	[illegible]	PPM
UNKNOWN	11	[illegible]	[illegible]	VS
UNKNOWN	[illegible]	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]	[illegible]

500 µl inj
syringe blk.

PHOTOVAC



STOP @ 955.6
SAMPLE RUN NOV 22 1988 13:17
ANALYSIS # 10 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM	
UNKNOWN	2	493.3	7.4	VS

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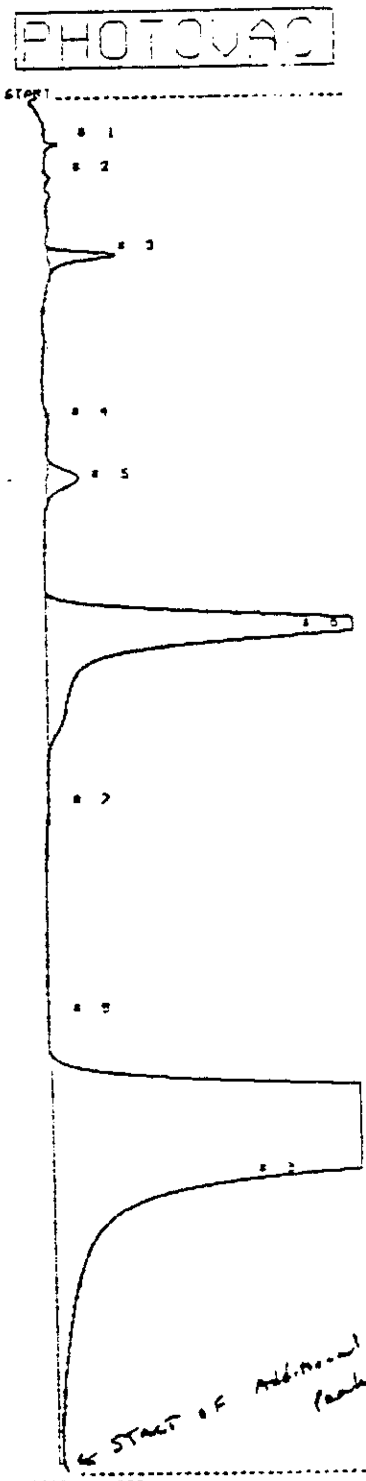
250 µl inj
C2Cl4 405 ng/µl

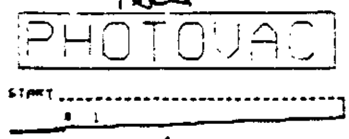


← START OF Additional peak

STOP @ 1??7.?		
SAMPLE RUN		NOV 22 1988 13:35
ANALYSIS #	11	EG AND G-SUP
TEMPERATURE	23	PAD A
GAIN	100	VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
TCE	3	[illegible]	[illegible]
UNKNOWN	4	[illegible]	[illegible] AVG
UNKNOWN	5	[illegible]	1.5 VG
UNKNOWN	6	[illegible]	45.3 VG
UNKNOWN	7	[illegible]	[illegible] VG

BAD inj
Injection on peak



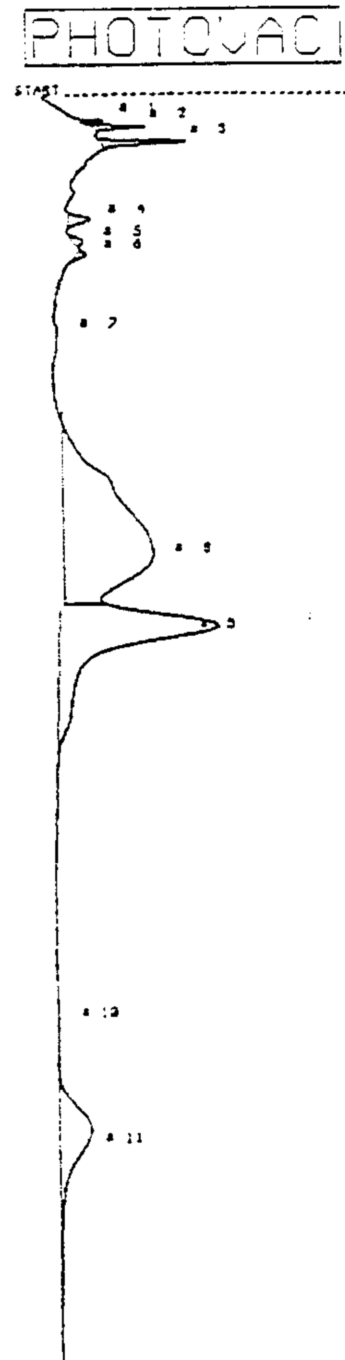
← Baseline Below Scale

^ carry over of run (Analysis) #11

STOP @ [illegible]		
SAMPLE RUN		NOV 22 1988 13:48
ANALYSIS #	12	EG AND G-SUP
TEMPERATURE	23	PAD A
GAIN	100	VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	422.0	[illegible] VG

500 µl inj
A-012

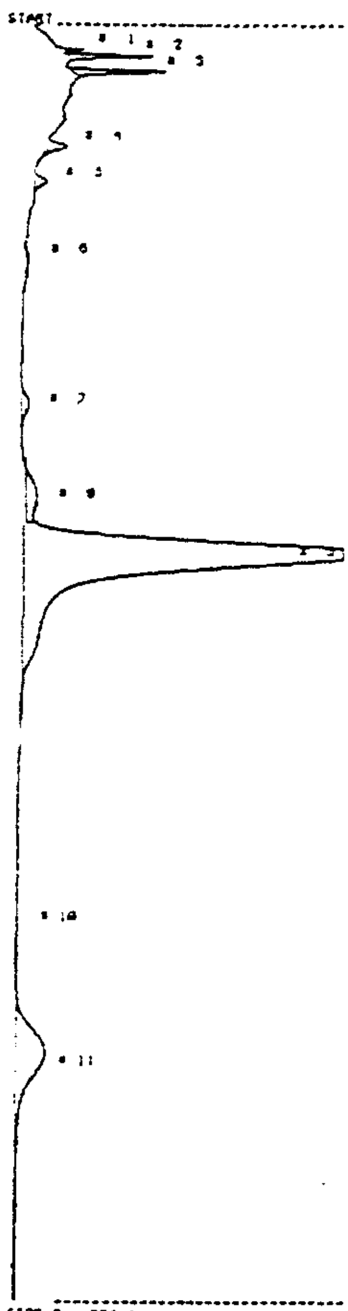


STOP @ 345.4		
SAMPLE RUN		NOV 22 1988 14:?5
ANALYSIS #	13	EG AND G-SUP
TEMPERATURE	23	PAD A
GAIN	100	VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	[illegible]	[illegible]
UNKNOWN	2	[illegible]	[illegible]
UNKNOWN	3	[illegible]	[illegible]
UNKNOWN	4	[illegible]	[illegible]
UNKNOWN	5	[illegible]	[illegible]
TCE	6	[illegible]	[illegible] PPT
UNKNOWN	[illegible]	[illegible]	[illegible] VG
UNKNOWN	[illegible]	[illegible]	[illegible] VG
UNKNOWN	11	[illegible]	[illegible] VG

500 ul inj
A-05

PHOTOVAC



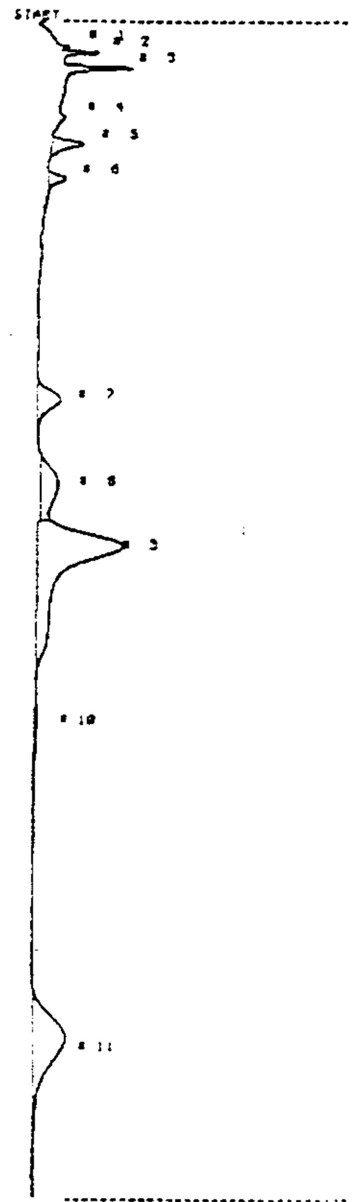
STOP @ 364.1

SAMPLE RUN NOV 22 1988 14:23
ANALYSIS # 14 ZS AND G-BUP
TEMPERATURE 22 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	22.4	[illegible] AVS
UNKNOWN	2	24.2	896.7 AVS
UNKNOWN	3	28.2	290.5 AVS
UNKNOWN	4	34.3	346.2 AVS
TCE	6	122.3	0.651 PPM
PERCH TET.	7	234.3	0.255 PPM
UNKNOWN	8	264.5	1.3 VS
UNKNOWN	9	434.7	72.1 VS
UNKNOWN	11	723.2	4.3 VS

500 ul inj
A-15

PHOTOVAC



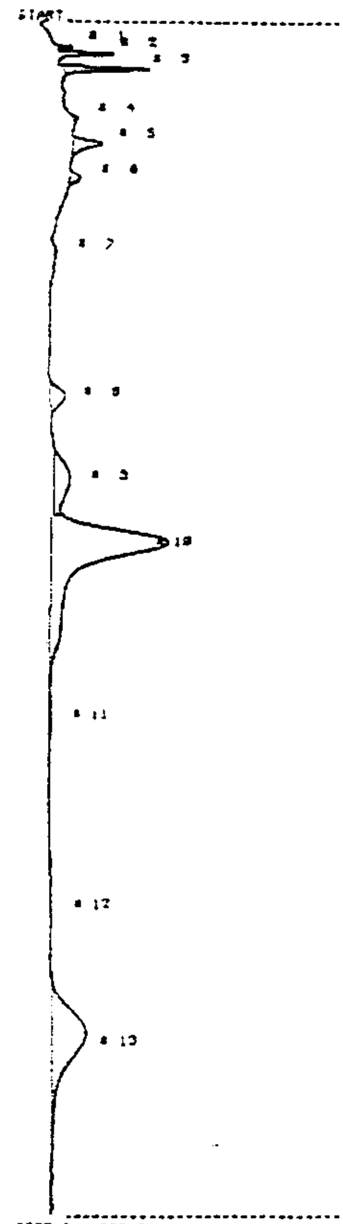
STOP @ 898.4

SAMPLE RUN NOV 22 1988 14:35
ANALYSIS # 15 ZS AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	2	25.2	212.4 AVS
UNKNOWN	3	36.8	937.0 AVS
UNKNOWN	5	[illegible]	2,575.1 AVS
TCE	6	12[illegible].3	0.282 PPM
UNKNOWN	7	[illegible]	[illegible] VS
UNKNOWN	8	[illegible]	7.2 VS
UNKNOWN	9	40[illegible]	[illegible] VS
UNKNOWN	[illegible]	[illegible]	[illegible] VS

500 ul inj
A-16

PHOTOVAC



STOP @ 390.2

SAMPLE RUN NOV 22 1988 14:55
ANALYSIS # 16 ZS AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	25.2	222.2 AVS
UNKNOWN	2	34.5	716.7 AVS
UNKNOWN	3	20.3	621.7 AVS
TCE	6	122.3	0.472 PPM
UNKNOWN	8	[illegible]	[illegible] AVS
UNKNOWN	9	257.5	1.3 VS
UNKNOWN	10	421.3	10.2 VS
UNKNOWN	13	779.6	5.1 VS

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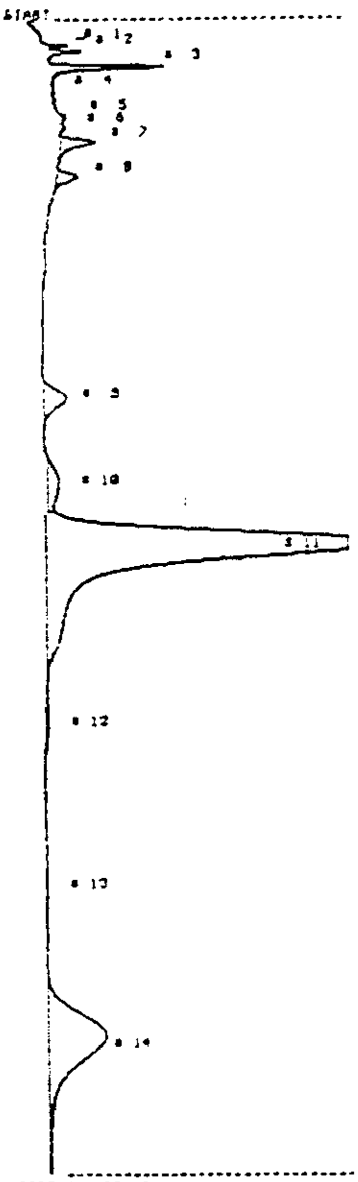
500µl inj
A-13

PHOTOVAC



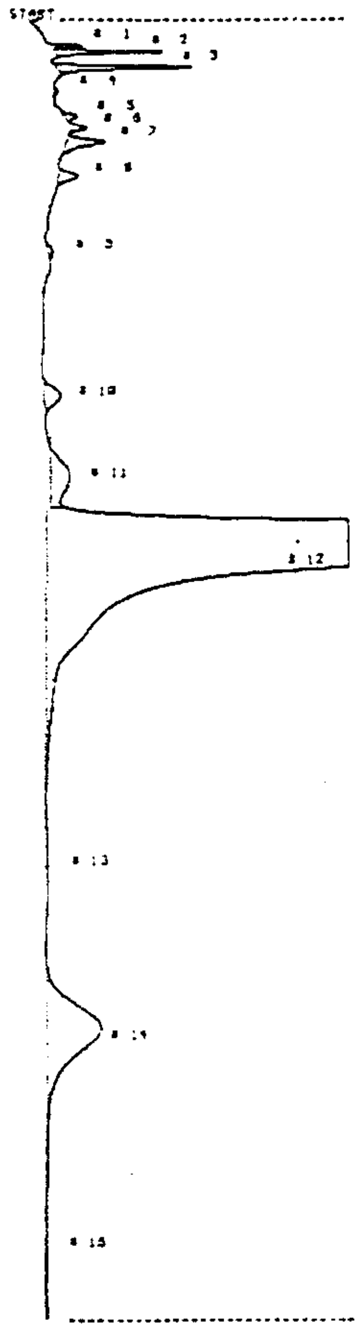
STOP @ 871.0
SAMPLE RUN NOV 22 1988 15:11
ANALYSIS # 17 EG AND G-SUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPB
UNKNOWN	[illegible]	52.2	162.9 AVG
UNKNOWN	[illegible]	76.5	299.4 AVG
UNKNOWN	[illegible]	94.5	462.0 AVG
TCE	[illegible]	171.7	1,147 PPB
UNKNOWN	[illegible]	[illegible]	1.1 VS
UNKNOWN	[illegible]	[illegible]	1.3 VS
UNKNOWN	[illegible]	[illegible]	37.9 VS
UNKNOWN	[illegible]	[illegible]	[illegible] AVG
UNKNOWN	[illegible]	757.9	2.2 VS

a 13-5
page 21

500µl inj
A-08

PHOTOVAC

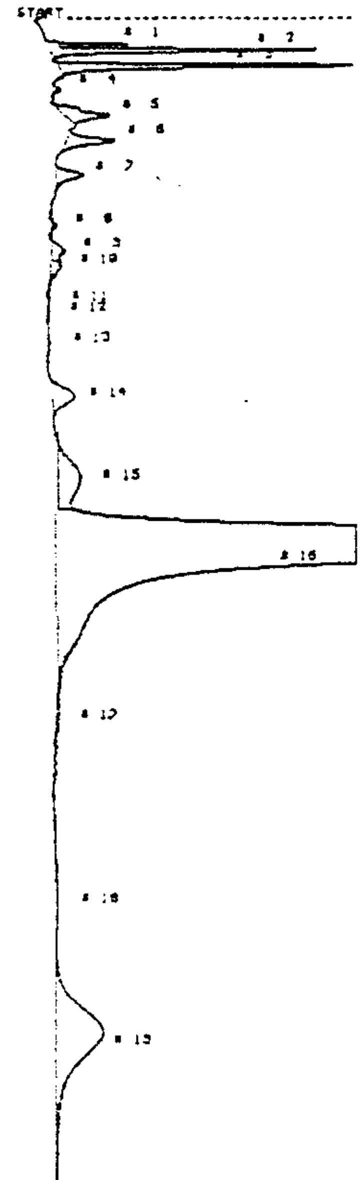


STOP @ 275.0
SAMPLE RUN NOV 22 1988 15:23
ANALYSIS # 18 EG AND G-SUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPB
UNKNOWN	1	73.2	124.0 AVG
UNKNOWN	2	75.7	894.9 AVG
UNKNOWN	3	79.2	1.1 VS
UNKNOWN	5	94.5	152.1 AVG
UNKNOWN	6	97.5	196.7 AVG
UNKNOWN	7	107.2	680.8 AVG
TCE	8	171.1	1,237 PPB
UNKNOWN	10	298.2	272.3 AVG
UNKNOWN	11	350.3	7.2 VS
UNKNOWN	12	[illegible]	[illegible] VS
UNKNOWN	14	[illegible]	[illegible] VS

500µl inj
A-67

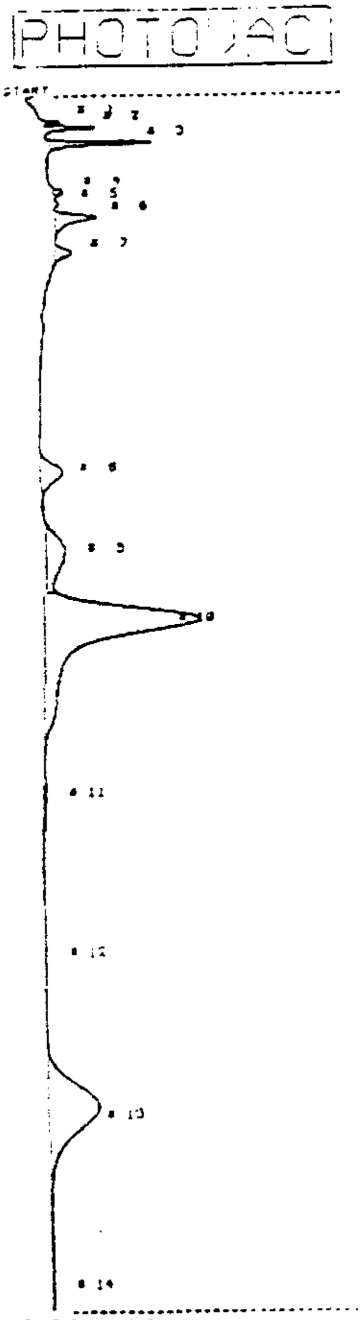
PHOTOVAC



STOP @ 804.4
SAMPLE RUN NOV 22 1988 15:46
ANALYSIS # 13 EG AND G-SUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPB
UNKNOWN	1	52.2	500.4 AVG
UNKNOWN	2	72.3	2.8 VS
UNKNOWN	3	76.5	2.3 VS
UNKNOWN	5	94.7	207.7 AVG
UNKNOWN	6	97.3	272.9 AVG
TCE	7	171.4	1,514 PPB
UNKNOWN	[illegible]	[illegible]	334.7 AVG
UNKNOWN	10	[illegible]	264.4 AVG
UNKNOWN	[illegible]	[illegible]	1.8 VS
UNKNOWN	15	[illegible]	3.2 VS
UNKNOWN	16	[illegible]	232.2 VS
UNKNOWN	18	[illegible]	281.5 AVG
UNKNOWN	[illegible]	279.5	5.5 VS

500µl inj
A-14



STOP @ 316.6
SAMPLE RUN NOV 22 1988 16:[illegible]
ANALYSIS # 20 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	2	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	6	[illegible]	[illegible]
TCE	7	[illegible]	2,2[illegible]
UNKNOWN	8	[illegible]	[illegible] VS
UNKNOWN	9	[illegible]	[illegible] VS
UNKNOWN	10	427.7	13.[illegible] VS
UNKNOWN	13	[illegible]26.5	6.6 VS

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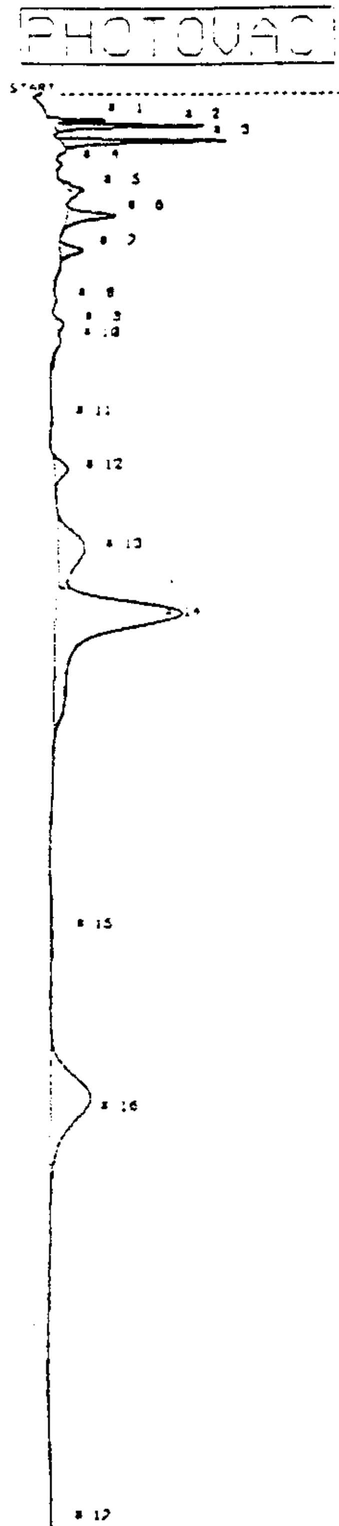
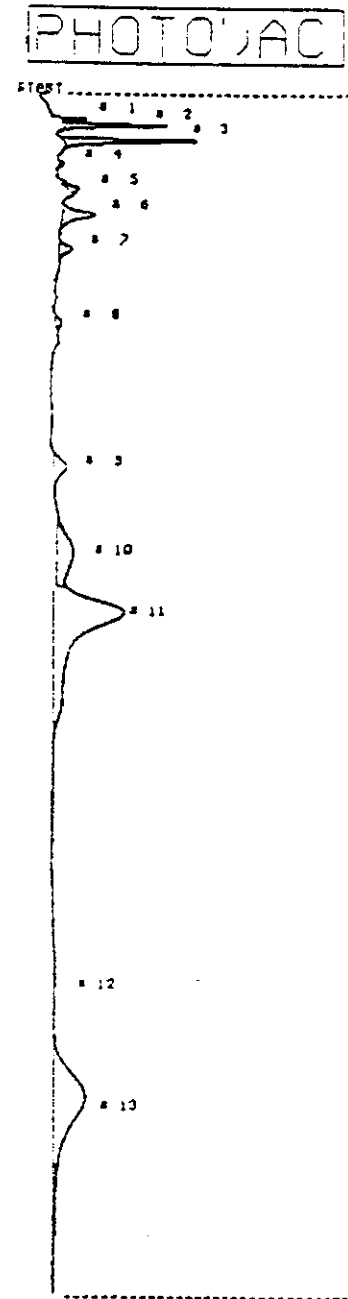
500µl inj
A-20



STOP @ [illegible]
SAMPLE RUN NOV 22 1988 16:22
ANALYSIS # 21 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	22.[illegible]	[illegible]
UNKNOWN	2	25.[illegible]	[illegible] VS
UNKNOWN	3	26.6	[illegible] VS
UNKNOWN	5	24.[illegible]	[illegible]
UNKNOWN	6	27.[illegible]	22[illegible]
TCE	7	130.[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]

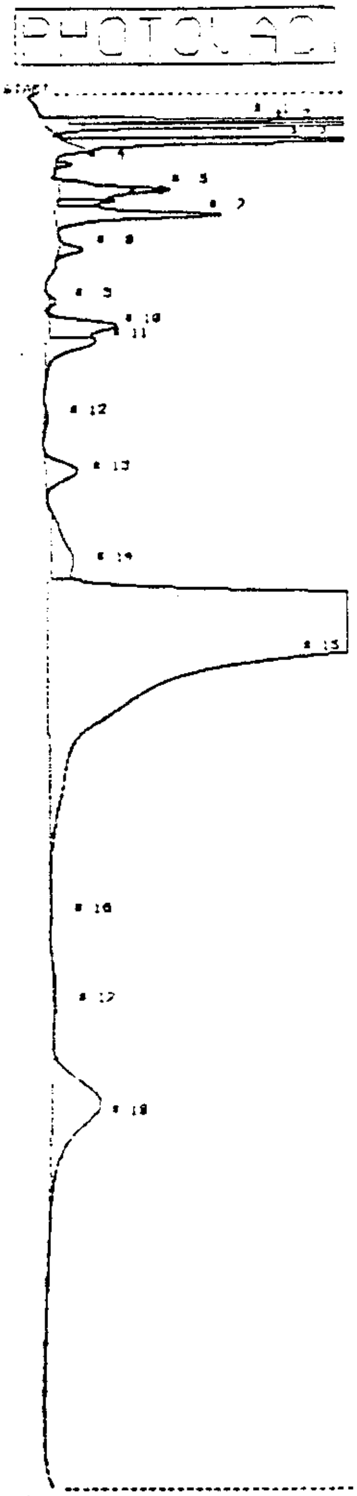
500µl inj
A-19



STOP @ 397.7
SAMPLE RUN NOV 22 1988 16:33
ANALYSIS # 22 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	12.6	136.7 [illegible]
UNKNOWN	2	22.2	[illegible]
UNKNOWN	3	[illegible]	[illegible]
UNKNOWN	5	24.1	13[illegible]
UNKNOWN	6	27.3	923.1 [illegible]
TCE	7	132.2	3,423 [illegible]
UNKNOWN	8	176.2	15[illegible]
UNKNOWN	9	282.7	42[illegible]
UNKNOWN	10	354.1	2.2 VS
UNKNOWN	11	400.8	2.7 VS
UNKNOWN	12	[illegible]	[illegible]
UNKNOWN	13	772.[illegible]	1.2 VS

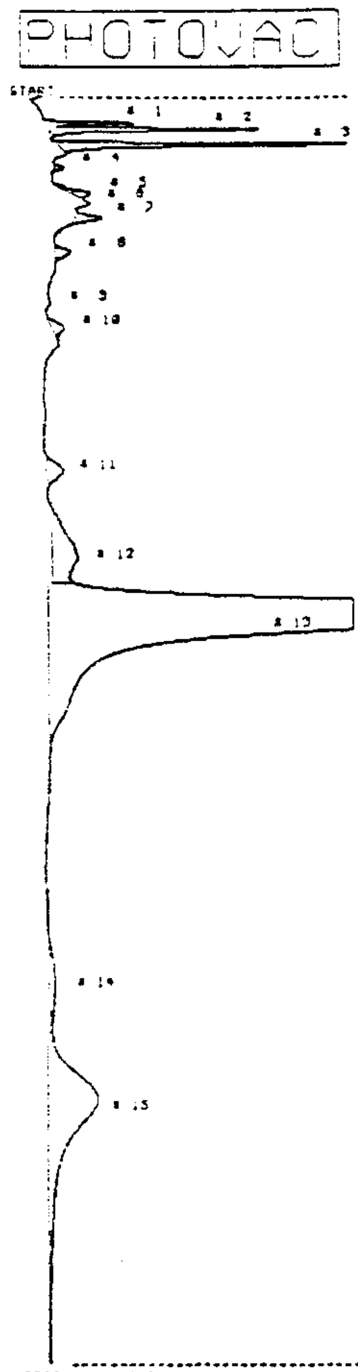
500 µl inj
A-11



STOP @ 1050.8
SAMPLE RUN NOV 22 1988 16:59
ANALYSIS # 23 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPT
UNKNOWN	1	[illegible]	[illegible]
UNKNOWN	2	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	3	[illegible]	[illegible]
UNKNOWN	4	[illegible]	[illegible]
UNKNOWN	7	[illegible]	[illegible]
TCE	6	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

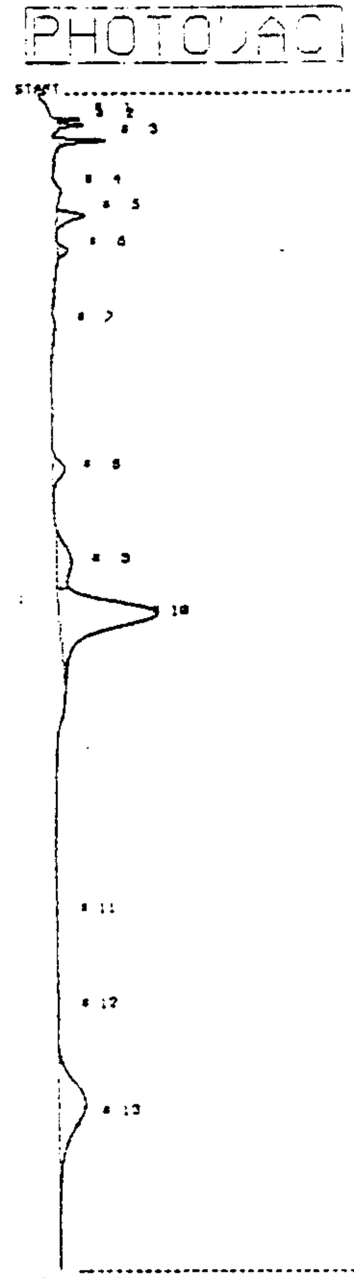
500 µl inj
A-21



STOP @ 355.8
SAMPLE RUN NOV 22 1988 17:15
ANALYSIS # 24 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPT
UNKNOWN	1	[illegible]	[illegible]
UNKNOWN	2	[illegible]	[illegible]
UNKNOWN	3	[illegible]	[illegible]
UNKNOWN	4	[illegible]	[illegible]
UNKNOWN	5	[illegible]	[illegible]
UNKNOWN	7	[illegible]	[illegible]
TCE	8	[illegible]	[illegible]
UNKNOWN	10	[illegible]	[illegible]
UNKNOWN	11	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]

500 µl inj
A-13



STOP @ 896.4
SAMPLE RUN NOV 22 1988 17:31
ANALYSIS # 25 EG AND G-BUP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPT
UNKNOWN	1	[illegible]	[illegible]
UNKNOWN	2	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	5	[illegible]	[illegible]
TCE	6	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]

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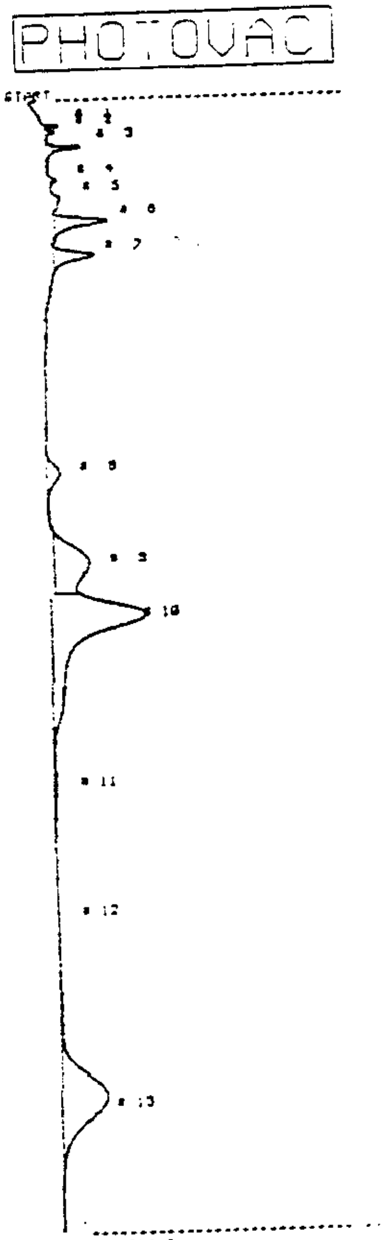
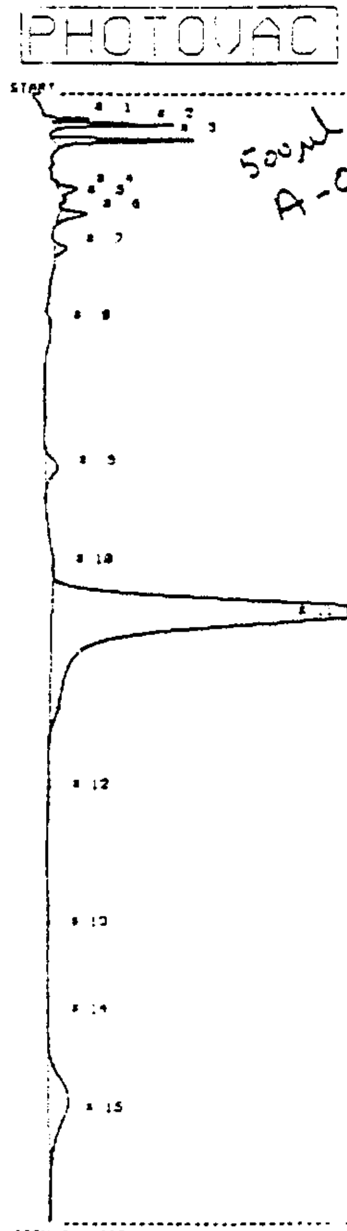
500 ml inj
Trip Blk



STOP # 956.7
SAMPLE RUN NOV 22 1988 17:47
ANALYSIS # 26 EG AND G-BWP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPB
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6	[illegible]	[illegible]
TCE	7	102.2	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	12	[illegible]	[illegible]
[illegible]	13	[illegible]	[illegible]

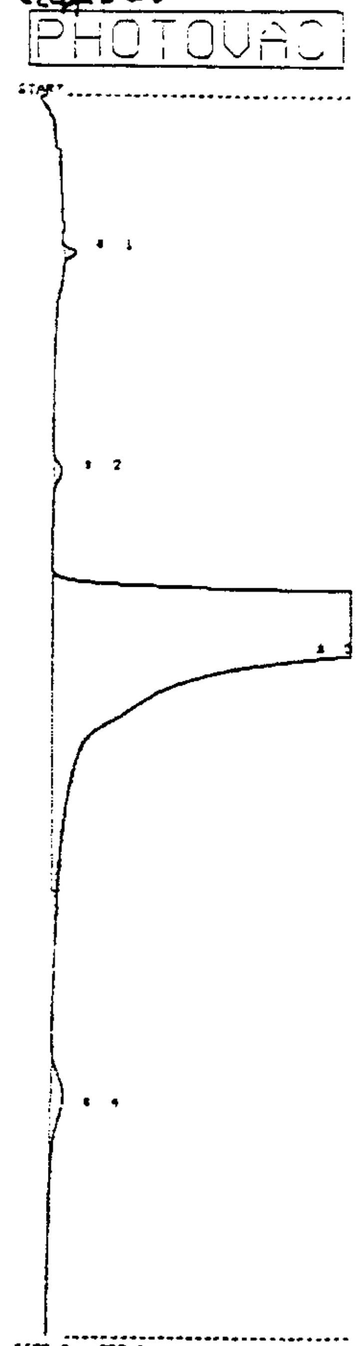
500 ml
A-03



STOP # 952.1
SAMPLE RUN NOV 22 1988 18:2
ANALYSIS # 27 EG AND G-BWP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPB
UNKNOWN	1	23.5	[illegible]
UNKNOWN	2	[illegible]	292.[illegible]
UNKNOWN	3	[illegible]	[illegible]
UNKNOWN	4	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
TCE	7	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]
UNKNOWN	[illegible]	[illegible]	[illegible]

250 µl inj
TCE 182 ng/ml
CARTET 198.5 "
C2Cl4 202.5 "



STOP # 532.3
SAMPLE RUN NOV 22 1988 18:13
ANALYSIS # 28 EG AND G-BWP
TEMPERATURE 23 PAD A
GAIN 100 VOLATILE ORG.

COMPOUND NAME	PEAK	R.T.	AREA/PPB
TCE	1	[illegible]	[illegible]
UNKNOWN	2	[illegible]	[illegible]
UNKNOWN	3	[illegible]	[illegible]
UNKNOWN	4	22[illegible]	[illegible]

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Appendix 13–6

APPENDIX 13-6

PHASE 3 SAMPLE ANALYSIS REPORT

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page 1

File: E. Horton
G. File
W. Schofield

EG&G Idaho

INTEROFFICE CORRESPONDENCE

Date: December 30, 1988

To: C. A. Bloom

From: L. D. Koeppen Don Koeppen

Subject: RADIATION MEASUREMENTS LABORATORY (RML) GAMMA-RAY ANALYSIS OF SOIL SAMPLES FROM RWMC - LDK-70-88

The RML counted/analyzed two soil samples from the RWMC by gamma-ray spectrometry. The "North Pad" sample was counted in a 500 cm^3 squat jar and the "South Pad" sample was counted in a petri-dish geometry due to its small mass. Each sample was counted sixteen hours. The 500 cm^3 sample was rotated on a turntable in front of the detector during the sixteen-hour counting duration to help negate the effects of possible inhomogeneity.

The activity determined on each sample is shown on the attached table (Table 1). Results are background corrected (detector system background only) and also decay corrected to the sample collection dates. The natural ^{40}K and radon/thoron activity levels are not reported, but were typical of soil background levels. The ^{137}Cs background soil activity varies considerably depending on sample location. Offsite surface soil (0 - 5 cm depth) measurements by the Radiological and Environmental Sciences Laboratory (RESL) from 1970-1986 show ^{137}Cs to be approximately 0.8 pCi/gram and ^{241}Am to be approximately 0.004 pCi/gram. This background activity information for ^{137}Cs and ^{241}Am was obtained from DOE/ID-12082(86) report "1986 Environmental Monitoring Program Report for the Idaho National Engineering Laboratory Site".

It is recommended that ^{241}Am activity results from Claude Sill be used for any formal reporting of ^{241}Am, as Claude Sill can better quantify the ^{241}Am with alpha spectrometry.

Table 1 includes the activity with total uncertainty. The total uncertainty includes the statistical uncertainty and the estimates of the uncertainty in the sample geometry (10%) and in the detector efficiency (5%). These uncertainties have been propagated in quadrature and are expressed as one estimated standard deviation.

Attachment:
As Stated

jd

cc: R. J. Gehrke
C. L. Rowsell
Central Files
L. D. Koeppen File

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page 2

Table 1

RWMC Soil Sample Activity

Collection Date	Soil Sample I.D.	RML I.D.	Sample Weight (Grams)	Radionuclide (Gamma)	Activity (pCi/gram)
12/20/88	South Crane Pad	SC122388221	12.6	Natural Only	Note 1
12/21/88	North Pad - A	A2122388038	558.2	^{137}Cs ^{241}Am	$(5.6\pm1.5)E-02$ $(4.0\pm0.6)E-01$

NOTE: 1) Typical ^{40}K natural soil background = 17 pCi/gram. Typical radon/thoron daughter natural soil background = 1.5 pCi/gram.

2) ^{137}Cs surface soil background = 0.8 pCi/gram (reference in letter).

^{241}Am surface soil background = 0.004 pCi/gram (reference in letter).

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page 3

EG&G Idaho

JFG:
here are the thin results from sampling Pad A that Doug requested
Buck

INTEROFFICE CORRESPONDENCE

Date: January 6, 1989

To: C. A. Bloom

From: C. Casey Coreen Casey

Subject: RADIATION MEASUREMENTS LABORATORY (RML) GAMMA-RAY ANALYSIS OF RWMC SOIL SAMPLE - CC-01-89

The RML counted/analyzed a soil sample from the RWMC by gamma-ray spectrometry. The sample was counted in a 500 cm^3 squat jar which rotated on a turntable in front of the detector during the 16-hour counting duration to help negate the effects of possible inhomogeneity.

The activity found in the sample is shown below. Results are corrected for detector background and decay corrected to the sample collection date. The natural ^{40}K and radon/thoron activity levels are not reported, but are typical of soil background levels. ^{137}Cs is the only non-naturally occurring radionuclide detected. Measurements made by the Radiological and Environmental Sciences Laboratory (RESL) reported in DOE/ID-12082 (86), "1986 Environmental Monitoring Program Report for the Idaho National Engineering Laboratory Site," show ^{137}Cs background soil activity to be approximately 0.8 pCi/gram.

The total uncertainty reported below includes statistical uncertainty and the estimates of the uncertainty in the sample geometry (10%) and in the detector efficiency (5%). These uncertainties have been propagated in quadrature and are expressed as one estimated standard deviation.

Collection Date	Sample I.D.	RML I.D.	Sample Weight (grams)	Radionuclide	Activity (pCi/g)
12/22/88	PAD A Soil	A6010489021	418.0	^{137}Cs	$(5.5\pm1.4)E-02$

jd

cc: R. J. Gehrke
L. D. Koeppen
C. L. Rowsell
C. Casey

FYI - G. Fifeton
B. Horton
B. Schofield

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"Providing research and development services to the government"

Appendix 13–7

APPENDIX 13-7

AIR SAMPLE RESULTS

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page 0

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page1

EG&G Idaho, Inc.
Environmental Chemistry
P.O. Box 1625, MS 4123
Idaho Falls, ID 83415

This report of analysis (ROA) presents the analytical results for the analyses you requested. Sample identification, sampling information, and laboratory analysis information are listed in a column for each sample. Analytical results are listed by analytical parameter below the sample identification information. Acronyms and abbreviations used are defined at the end of the report. A letter and/or letter number flag immediately to the right of a parameter, method, PQL and units, result, or any other entry indicates an amplifying comment also provided at the end of the report.

REPORT OF ANALYSIS

Prepared for:

Mel Garcia
Waste Management
EG&G Idaho, Inc.
P.O. Box 1625, MS 9206
Idaho Falls, ID 83415

Report Identification:

ROA Number:	49
Date:	01/24/89
Charge No.:	3X2RWP110
Page:	1

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page 2

		Sampling Site:		PAD A	PAD A
		Sample Type:		25-ml Air	25-ml Air
		Customer Sample ID:		RWMC 2GC	RWMC 1GC
		Sampling Date:		Unknown	Unknown
		Sampling Time:		Unknown	Unknown
		Date Received:		01/09/89	01/09/89
		Lab Sample ID:	Method Blk	9MIA0030	9MIA0029
		Date Extracted:	01/16/89	01/16/89	01/16/89
		Date Analyzed:	01/16/89	01/16/89	01/16/89
		Comments:	Lab Blank	Field Blank	

Parameter	Method	PQL and Units	Result	Result	Result
Volatile Organic Compounds		Comment A1			
Acetone	EPA 624 M2	2.0 mg/m3	8.4 mg/m3	3.4 mg/m3 B	BPQL
		0.33 ppm	3.5 ppm	1.4 ppm B	BPQL
2-Butanone	EPA 624 M2	2.0 mg/m3	8.3 mg/m3	5.8 mg/m3 B	BPQL
		0.67 ppm	2.8 ppm	1.9 ppm B	BPQL
Carbon tetrachloride	EPA 624 M2	1.0 mg/m3	BPQL	BPQL	4.1 mg/m3
		0.16 ppm	BPQL	BPQL	0.64 ppm
p- Dioxane	EPA 624 M2	2.0-4.0 mg/m3 T1	3.3 mg/m3 J,T1	BPQL T1	BPQL T1
		0.5-1.0 ppm T1	0.90 ppm J,T1	BPQL T1	BPQL T1
Methylene chloride	EPA 624 M2	1.0 mg/m3	6.2 mg/m3	6.5 mg/m3 B	6.2 mg/m3 B
		0.23 ppm	1.8 ppm	1.8 ppm B	1.8 ppm B
Tetrachloroethene	EPA 624 M2	1.0 mg/m3	BPQL	BPQL	22.1 mg/m3
		0.14 ppm	BPQL	BPQL	3.2 ppm
Trichloroethene	EPA 624 M2	1.0 mg/m3	BPQL	BPQL	9.8 mg/m3
		0.18 ppm	BPQL	BPQL	1.8 ppm
Trichlorofluoromethane	EPA 624 M2	1.0 mg/m3	BPQL	6.0 mg/m3	5.3 mg/m3
		0.17 ppm	BPQL	1.0 ppm	0.92 ppm
Others-Comment A1	EPA 624 M2	See Table 1	BPQL	BPQL	BPQL

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Legend:

BPQL = Below practical quantitation level. See PQL definition for further explanation of practical quantitation level.

PQL = Practical quantitation level. This is the lowest concentration reliably measurable (i.e., 33% maximum uncertainty in precision and accuracy at the one standard deviation confidence level) for normal samples during routine laboratory operations.

Comments:

A1 Target volatile organic compounds and their practical quantitation levels (PQLs) are provided in Table 1. The instrument was calibrated to quantitatively measure these compounds, therefore compounds reported as below PQL (BPQL) are unlikely to have been present above their PQLs.

B The presence of this compound in the associated laboratory method blank indicates the analyte found in the sample may be partially or completely a result of laboratory contamination.

J Indicates estimated value. The concentration is below the PQL, but the compound was detected in the sample.

M2 A modification of EPA Method 624 was used since the method is designed for water samples. The PQLs listed apply to a volume of 25 mL. The results are reported in units of mg/m3 and ppm. The ppm unit is on a volume compound per volume air basis and is determined by multiplying the weight of compound per volume of air concentration by 24.0 L (volume of 1.0 mole of gas at normal local temperature and pressure) and dividing by the compound's molecular weight (g/mole). Variations in temperature or pressure could introduce up to 25% uncertainty in the values reported in ppm units.

T1 Tentatively identified compounds. These volatile organic compounds are not target compounds, and consequently the instrument is not calibrated to quantitatively measure their abundances. The estimated practical quantitation level for these compounds is 10 to 20 ug/L for water samples and 10 to 20 ug/kg for solid samples.

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Table 1. Method sensitivities for volatile organic compounds by purge and trap GC/MS analysis

	25.0 mL Air Samples	
	Practical Quantitation Level*	
Compound	(mg/m3)	(ppm)
Acetone	2.0	0.83
Benzene	1.0	0.31
Bromodichloromethane	1.0	0.15
Bromoform	1.0	0.094
Bromomethane	2.0	0.51
2-Butanone	2.0	0.67
Carbon disulfide	1.0	0.32
Carbon tetrachloride	1.0	0.16
Chlorobenzene	1.0	0.21
Chloroethane	2.0	0.74
Chloroform	1.0	0.20
Chloromethane	2.0	1.0
Dibromochloromethane	1.0	0.11
1,1-Dichloroethane	1.0	0.24
1,2-Dichloroethane	1.0	0.24
1,1-Dichloroethene	1.0	0.24
1,2-Dichloroethene (total)	1.0	0.24
1,2-Dichloropropane	1.0	0.19
cis-1,3-Dichloropropene	1.0	0.22
trans-1,3-Dichloropropene	1.0	0.22
Ethylbenzene	1.0	0.22
2-Hexanone	2.0	0.48
Methylene chloride	1.0	0.28
4-Methyl-2-pentanone	2.0	0.48
Styrene	1.0	0.23
1,1,2,2-Tetrachloroethane	1.0	0.14
Tetrachloroethene	1.0	0.14
Toluene	1.0	0.26
1,1,1-Trichloroethane	1.0	0.18
1,1,2-Trichloroethane	1.0	0.18
Trichloroethene	1.0	0.18
Vinyl acetate	2.0	0.56
Vinyl chloride	2.0	0.77
Xylenes (total)	1.0	0.077

* Practical quantitation level is the lowest concentration reliably measurable (i.e., 33% maximum uncertainty in precision and accuracy at the one standard deviation confidence level) for normal samples during routine laboratory operations.

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