000062

Appendices B through J

of the RI Report

Nease Chemical Company – Salem, Ohio Site

Volume 3 of 4

B – Seismic Refraction Survey
C – Soils Gas Survey Field Notes and Chromatograph Readings
D – Monitor Well Drilling Descriptions **[Will be submitted when drilling program is completed]**
E – Monitor Well Drilling Logs **[Will be submitted when drilling program is completed]**
F – Off-Site Soil Boring Logs
G – Test Pit Logs
H – On-Site Pond Boring Logs
I – Residential Well Questionnaires
J – Production Well Closure Plan and Supporting Documentation

April 5, 1991

Submitted by

Ruetgers-Nease Chemical Company, Inc.
State College, Pennsylvania

EPA Region 5 Records Ctr.
231138

B: SEISMIC REFRACTION SURVEY

APPENDIX B

SEISMIC REFRACTION SURVEY
PREPARED BY DAVENPORT/HADLEY, LTD.,
OCTOBER 9, 1990

SEISMIC REFRACTION SURVEYS

RUETGERS-NEASE CHEMICAL COMPANY

SALEM, OHIO

Prepared for:

ERM-Midwest, Inc.
450 West Wilson Bridge Road
Worthington, OH 43085

Prepared by:

Davenport/Hadley, Ltd.
821 16th Street
Golden, CO 80401
(303) 278-8158

October 9, 1990

INTRODUCTION

Davenport/Hadley, Ltd. was contracted by ERM-Midwest to conduct seismic refraction surveys in the area east of the Ruetgers-Nease Salem, Ohio site. The site is located approximately 1 mile north of the town of Salem, Ohio along the east side of State Highway 14. The seismic refraction surveys were conducted primarily to define the top of bedrock in the area downgradient from the site. The locations of the seismic profiles are shown on Figure 1.

The seismic refraction work was conducted from April 17 through April 23, 1990. The seismic crew was supervised by a Davenport/Hadley geophysicist and blasting services were provided by Hilltop Energy of Lisbon, Ohio. The work was conducted primarily on private property not controlled by Ruetgers-Nease. Permission to conduct the seismic refraction surveys was obtained by representatives of Ruetgers-Nease.

FIELD PROCEDURES

The seismic refraction work was conducted using industry standard data acquisition procedures. The data were obtained using 28 Hz vertical geophones spaced at 50-foot intervals along the seismic profile. Some lines used geophone spacings of 30 feet to accommodate line lengths. Energy was generated with a shotgun source or with 1/4 to 2 sticks of 80% gelatin dynamite, depending on the amount of energy required. Shots were detonated at each end, offset from each end and at the middle of each 24-geophone set-up.

Due to the geometry of the upper materials, additional shots were not necessary to define the upper layer.

The output of the geophones was recorded on an ABEM Terraloc 24-channel, signal enhancement seismograph. The data were inspected in the field by the geophysicist and recorded once a satisfactory record had been obtained. The data were saved on a 3.5-inch diskette in the field and played back in the evenings to produce a paper record. All records were generated daily to insure that no information had been lost from the field. Preliminary analysis was also conducted on a daily basis to insure that data objectives were being met.

All shots were detonated in a shallow auger hole drilled by hand. In general, the auger hole was drilled to about 3 feet and the charge or shotgun detonated in the bottom of the hole. Surface damage created by the larger explosive charges was repaired to the extent possible.

INTERPRETATION

The data were interpreted using a software program called "RF" based on the Generalized Reciprocal Method (GRM) as outlined by Derecke Palmer (Society of Exploration Geophysicists, 1980). The computer program was written by Richard Markiewicz of the U.S. Bureau of Reclamation and is currently used by their geophysics group for all their seismic refraction interpretation. The program has been thoroughly checked using examples in Palmer's publication. The GRM analysis takes into account the major factors which affect the interpretation of seismic refraction data such as surface topography, velocity variations, dipping layers and bedrock topography.

At the Ruetgers-Nease site, the surface topography is generally subdued. Elevations were estimated in the field and checked against an available topographic map with contour intervals of five feet. Due to the depth to bedrock (generally 50 to 100 feet), calculated depths are only accurate to about +/- five feet. For this reason, it was determined that more rigid topographic control was not necessary.

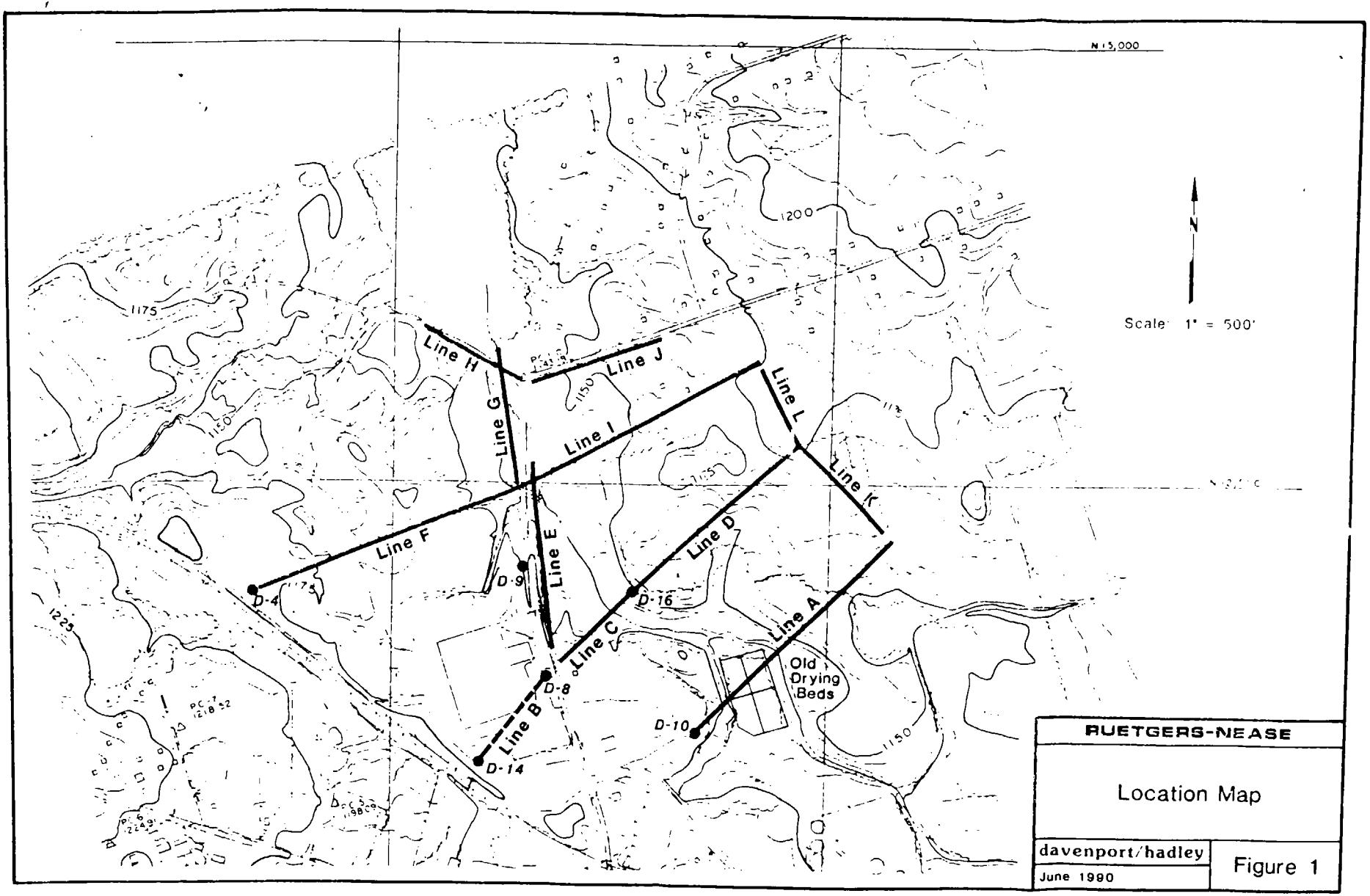
RESULTS

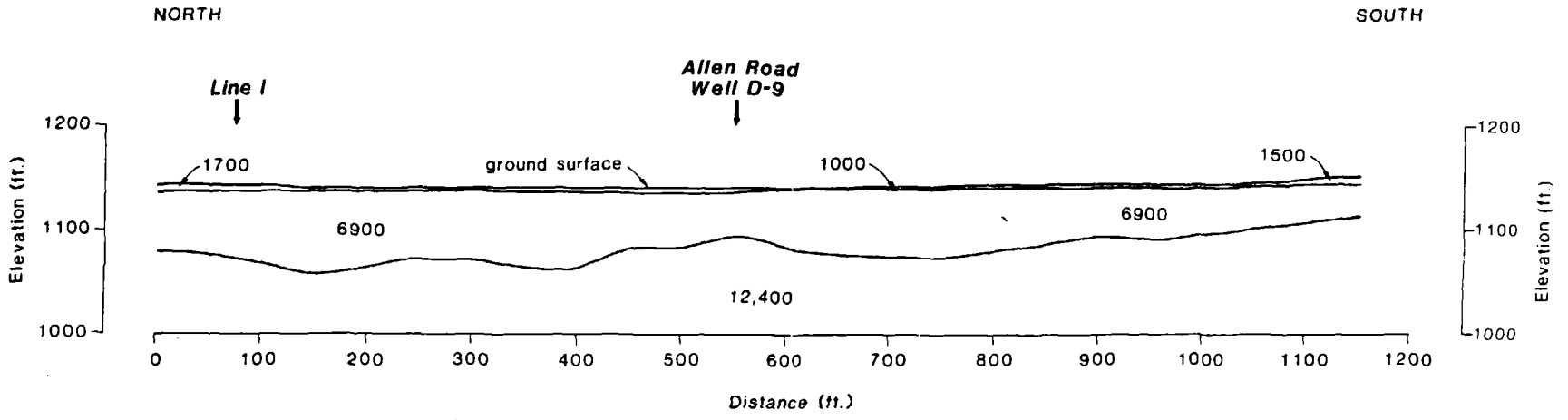
The seismic sections generated from the interpretation are shown on Figures 2 to 9. The seismic lines were designated with alphabetic characters A through L. Line B was not conducted due to a problem with access to the property.

Three layers were encountered in the areas surveyed. The upper layer ranges from near zero to 20 feet thick and exhibits compressional (p) wave velocities from 1,000 to 2,300 feet per second (fps). This material consists of unsaturated, loose to moderately dense surficial soils. The middle layer ranges in thickness from 25 to 140 feet thick and exhibits p-wave velocities from 4,600 to 7,000 fps. This material apparently consists of near-saturated to saturated glacial materials, based on boring logs supplied by ERM-Midwest. The materials with velocities less than 5,000 fps may not be fully saturated. The materials with velocities in excess of 6,500 fps probably consist of very dense and coarse gravels. However, it should be noted that a variation of 500 fps may be due to interpretational error in calculating the slope of the arrival times. It is also important to note that velocities in the range of 4,000 to 7,000 fps can also

be encountered in bedrock materials. However, due to the good correlation with available boring logs, it has been assumed that the middle layer in this area consists of overburden soils.

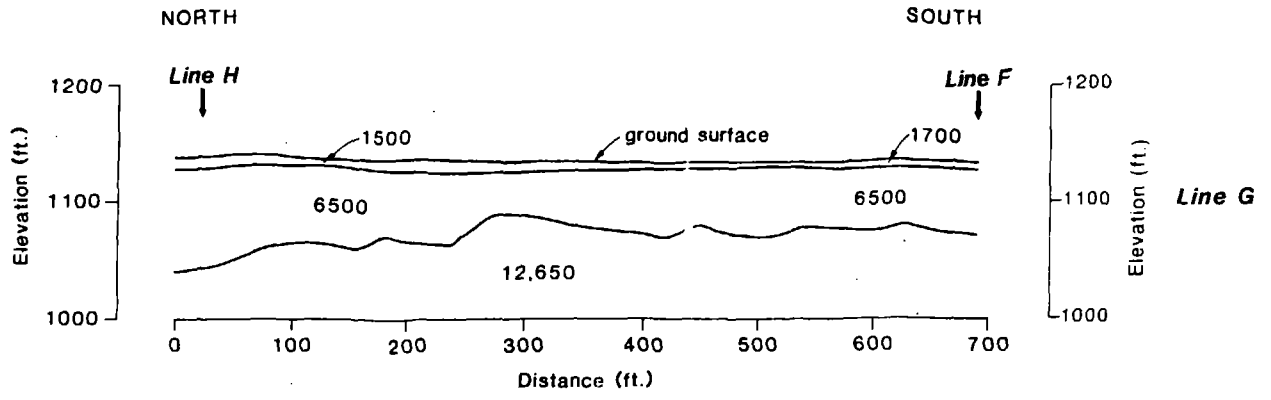
The third layer apparently represents the bedrock surface. This layer ranges in depth from 30 to 155 feet and exhibits velocities in the range of 11,350 to 12,650 fps. In general, the bedrock surface is relatively shallow on the western edge of the area surveyed (i.e. in the vicinity of Allen Road and west towards the Ruetgers-Nease property). The bedrock surface increases in depth towards the east and north with the deepest areas being along Lines J, I, K and L.

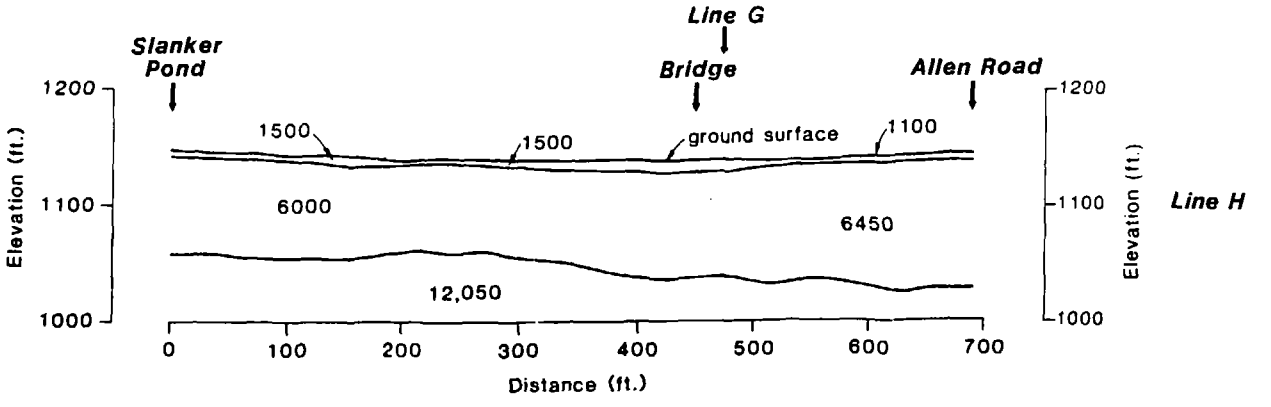

N 15,000
1200
1175
1150
1225
Line H
Line G
Line J
Line I
Line L
Line K
Line F
Line E
Line D
Line C
Line B
Line A
D-4
D-9
D-16
D-8
D-10
D-14
Old Drying Beds
N
Scale: 1" = 500'
RUETGERS-NEASE
Location Map
davenport/hadley
June 1990
Figure 1



NOTE: Seismic velocities in feet per second.

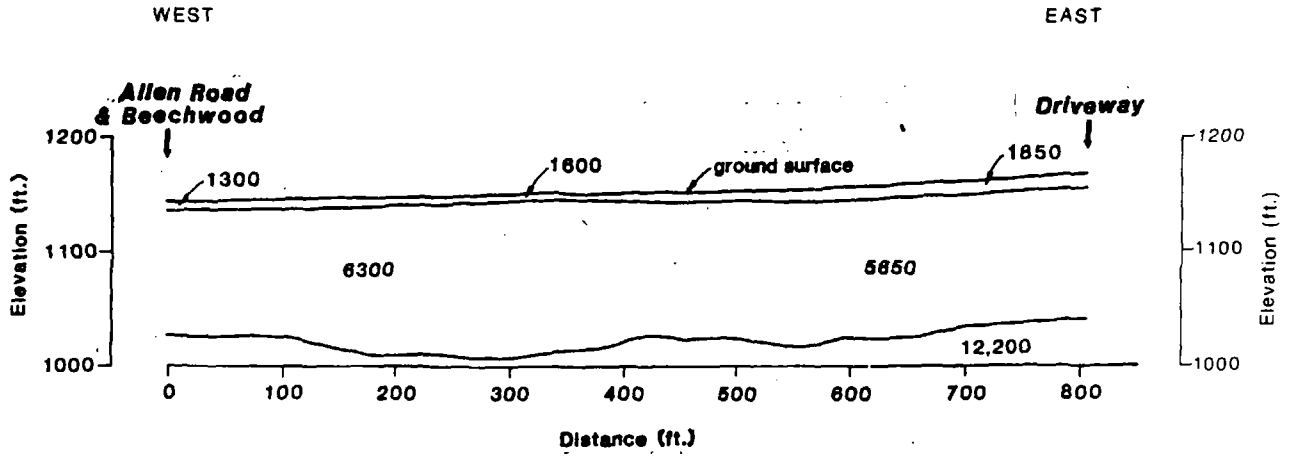
RUETGERS-NEASE	
Seismic Cross-Section Line E	
davenport/hadley June 1990	Figure 4





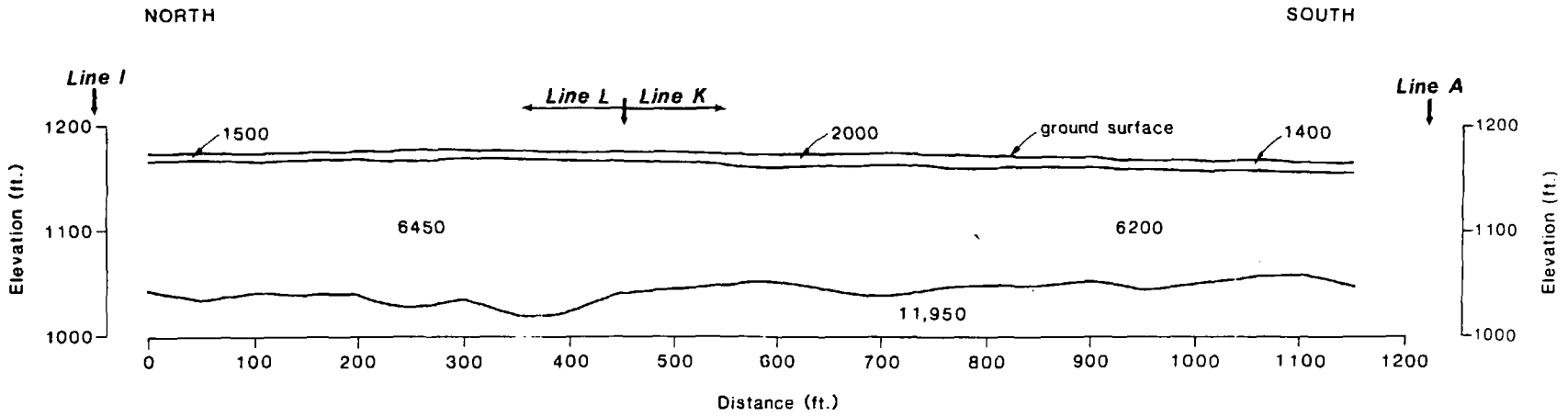
NOTE: Seismic velocities in feet per second.

RUETGERS-NEASE	
Seismic Cross-Section Lines G & H	
davenport/hadley June 1990	Figure 6



NOTE: Seismic velocities in feet per second.

RUETGERS-NEASE	
Seismic Cross-Section Line J	
davenport/hadley June 1990	Figure 8



NOTE: Seismic velocities in feet per second.

RUETGERS-NEASE

Seismic Cross-Section
Lines K & L

davenport/hadley

June 1990

Figure 9

C: SOILS GAS FIELD NOTES AND CHROMOTOGRAPH READINGS

APPENDIX C

FIELD NOTES AND CHROMATOGRAPH READINGS

ERM-Midwest, inc.

450 W. Wilson Bridge Road • Columbus, Ohio 43085 • (614) 433-7900

BY FACSIMILE

June 14, 1990

Amy Blumberg
U.S. EPA Region V (5HS-11)
230 South Dearborn Street
Chicago, Illinois, 60604

Susan J. MacMillan
Ohio EPA - NEDO
Div. of Solid & Hazardous
Waste Management
2110 Aurora Road
Twinsburg, Ohio 44087

Kathy Davidson
Ohio EPA - Corrective Actions
Div. of Solid & Hazardous
Waste Management
P.O. Box 1049
1800 WaterMark Drive
Columbus, Ohio 43266-0149

Re: Ruetgers-Nease
Salem, Ohio RI/FS
Proposed Conrail Track
Test Pit Program

The purpose of this correspondence is to confirm the results of this mornings conference call discussion of the proposed test pit program along the Conrail railroad track at the Ruetgers-Nease site in Salem, Ohio. It is our understanding that the agencies and Ruetgers-Nease have reached agreement on the following scope of railroad track test pit sampling at the site:

Test Pit Locations and Depths

Test pits will be excavated and logged at the following locations (referenced to stations from the soil gas survey performed on April 24-25, 1990 which are depicted on the attached figure):

Stations S-207, S-211, S-222, S-224, S-226, S-231, S-233, S-236, S-242, S-244, and one pit location in the vicinity of stations S-214 - S-218 which will be selected in the field by Mr. Robert Ferree (ERM) and Mr. Martin Chappel (Black and Veatch)

At a minimum, test pits will be excavated to the depth of the 4 inch PVC wastewater line believed to run parallel to the railroad track from the vicinity of station S-211 to S-245. The wastewater line is expected to be buried at a depth of three to four feet below ground surface, and be located 20-25 feet southwest of the southwestern rail of the railroad track. In test pit locations where the wastewater line is not expected to be present (S-207 and possibly S-211), test pits will be excavated to a minimum depth of six feet (unless water is encountered shallower). The maximum

depth of test pits will be the depth at which readings of 10 ppm or less are observed on the OVA, however pits will not be excavated below the first occurrence of groundwater.

Sample Numbers and Depths

At stations S-226, S-231, S-233, S-236, S-242, S-244, one discrete sample will be collected from the one foot interval which exhibits the highest OVA (or Hnu) reading. If organic vapors are not detected on the OVA or Hnu, a discrete sample will be collected from the immediate vicinity of the wastewater line.

At stations S-207, S-211, S-(214-218), S-222, and S-224, at least one, and as many as two discrete samples will be collected based upon joint decision of Mr. Ferree and Mr. Chappel. One discrete sample will be collected from the one foot interval which exhibits the highest OVA (or Hnu) reading. A second discrete sample may be collected if field observations warrant. If organic vapors are not detected in any interval on the OVA or Hnu, a discrete sample will be collected from the immediate vicinity of the wastewater line. If the wastewater line is not encountered and organic vapors are not detected, a single discrete sample will be collected at an interval selected from a depth of 0.5 to 3.5 feet below ground surface.

Analytical Program

All samples will be analyzed for the following parameters:

TCL Organics + 40
Mirex, Photomirex, and Kepone

All sampling and analysis QA/QC protocols outlined in the approved RI/FS Work Plan will apply to this program.

Please call Ken Richards at (614) 433-7900 should you have any questions or comments regarding this program outline. As discussed during our conversation, we plan to initiate this sampling program (with the permission of Conrail) tomorrow morning (June 15).

Sincerely,

Kenneth A. Richards, P.G.
RI Project Manager

cc: Steve Foard - Ruetgers-Nease
Martin Chappel - Black and Veatch
Robert Ferree - ERM-Midwest

The ERM Group

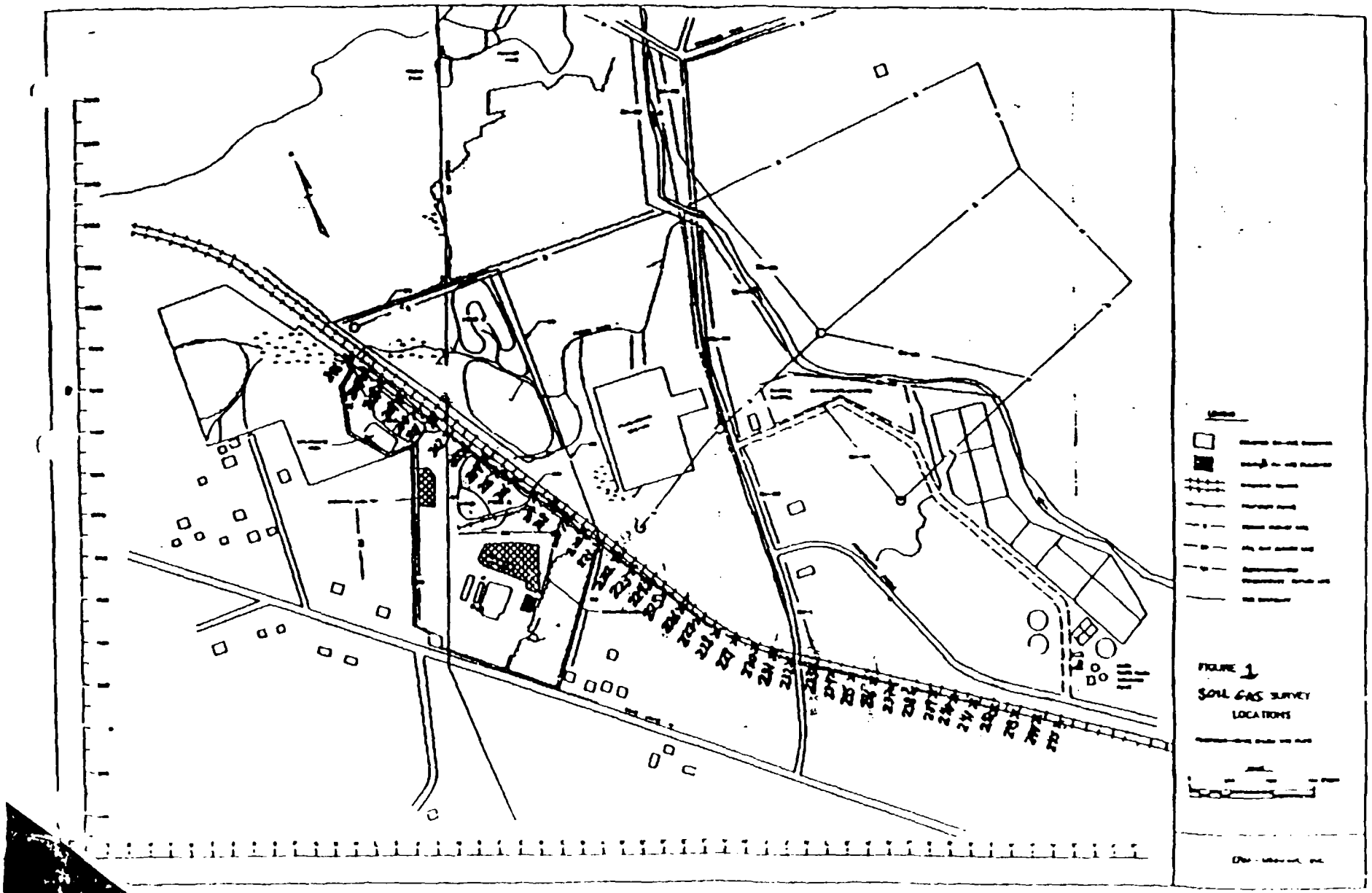


FIGURE 1
SOIL GAS SURVEY
LOCATIONS

FIELD BOOK 1
APRIL 16-21, 1990

FIELD BOOK 1

SITE RECONNAISSANCE MONITORING
SOILS GAS INVESTIGATION
APRIL 16 - 21, 1990

202-01-7

242

Book 1

TELEDYNE

407

FIELD BOOK

202-01-07 242 Book 1

Property of ERM Midwest Inc.

Address 450 West Wilson Bridge Rd
Columbus, Ohio 43085

Telephone 614-433-7900

This Book is manufactured of a High Grade 50% Rag Paper having a Water Resisting Surface, and is sewed with Nylon Waterproof Thread.

INDEX

202-01-07 242

Ruetgers-Nease Salem, Ohio Facility

Site Reconnaissance, monitoring
Soil Gas Investigation
Tim Sainey
Brent Ayer

(1)

4-16-90

Ruetgers-Nease

202-01-07 Function 242.

weather clear 50° 1pm

wind SW 10-15 mph. m

1322 Rob Ferree starts meeting w/ introduction of Steve Ford & Bryan.

Bill Adams sends around check-in sheet.

Steve Ford gives introduction as to Ruetgers-Nease project. n

pm

1400 Brent Ayer & Tim Sainey prepare to run soil gas survey along perimeter of Ruetgers Nease property

* ROCKS FOR STATIONS S-1 THRU S-71 1pm

3' means 3' above ground

1321 Station S-1 Brent Ayer 1pm

OVA @ 0 = 0 HNU @ 0 7ppm

OVA @ 3' = 0 NHU @ 3' 15ppm

weather conditions same for all stations except as noted. m

in

Tim Sainey

(2)

4-16-90 202-01-07

1532 242

S-2

OVA @ surface 0 HNU surface 7.25 ppm

OVA @ 3' 0 HNU @ 3 4.5 ppm

1536

S-3

OVA @ surface 0 HNU surface 7 ppm

OVA @ 3' 0 NHU 3' 3 ppm

1540

S-4

OVA @ surface 0 HNU surface 6 ppm

OVA @ 3' NHU 3' 1.5 ppm

1544

S-5

OVA surface 0 HNU surface 6.5 ppm

OVA @ 3' 0 HNU @ 3' 1.5 ppm

1548

S-6

OVA surface .2 HNU surface 4 ppm

OVA @ 3' 0 NHU @ 3' .5 ppm

[illegible]

(3)

4-16-90 202-01-07

242

1551 S-7

OVA @ surface 0 HNU @ surface 5ppm

OVA @ 3' 0 NHU @ 3' .2 ppm

1555 S-8

OVA surface .4 ~~.2~~ TJD HNU @ surface 6

OVA 3' .2 HNU @ 3' 2.5

1602

S-9

OVA @ surface 0 HNU surface 4ppm

OVA @ 3' 0 HNU @ 3' .1 ppm

1607

S-10

OVA @ surface 0 HNU @ surface 5.4ppm

OVA @ 3' 0 HNU @ 3' 1 ppm

1612

S-11

OVA surface .2 ppm HNU surface 6.5ppm

OVA 3' 0 HNU @ 3' 2.0 ppm

[illegible]

(4)

4-16-90 2021-01-07

242

1617 S-12

OVA @ surface 0 HNU @ surface 4ppm

OVA @ 3' 0 HNU @ 3' 3ppm

1623 S-13 HNU @ surface 3ppm

OVA @ surface 0 HNU @ 3' .2 ppm

OVA @ 3' 0

1627 S-14

OVA @ surface 0 HNU surface 3.5ppm

OVA @ 3' 0 HNU 3' 0 ppm

1630 S-15

OVA @ surface 0 HNU surface 3.5ppm

OVA @ 3' 0 HNU surface 0ppm

1638 S-16

OVA surface HNU surface 2ppm

OVA @ 3' 0 HNU @ 3' .1 ppm

4-16-91

202-01-07
242

1644
S-17
OVA @ surface 0 HNU surface 1.5 ppm
OVA @ 3' 0 HNU @ 3' .1 ppm

1646
S-18
OVA @ surface 0 HNU surface 1.5 ppm
OVA @ 3' 0 HNU @ 3' .1 ppm

1648
S-19
OVA @ surface 0 HNU surface 2.5 ppm
OVA @ 3' 0 HNU @ 3' 0 ppm

1650 S-20
OVA @ surface 0 HNU surface 2.5 ppm
OVA @ 3' 0 HNU @ 3 0 ppm

1653 S-21
OVA @ surface .2 ppm HNU @ surface 3 ppm
OVA @ 3' 0 ppm HNU @ 3' 1 ppm

Terry Sauer

4-16-90

(6)

202-01-07

242

1655 S-22

OVA @ surface 0 HNU surface 6ppm

OVA @ 3' 0 HNU @ 3' 2.1 ppm

1659 S-23

OVA @ surface 0 HNU surface 3.5 ppm

OVA @ 3' 0 HNU @ 3 1 ppm

1700 S-24

OVA @ surface 0 HNU @ surface 3.5 ppm

OVA @ 3' 0 HNU @ 3' 1.2 ppm

1703 S-25

OVA @ surface 0 HNU @ surface 2.5 ppm

OVA @ 3' 0 HNU @ 3' 1 ppm

1707 S-26 HNU @ surface 6 ppm

OVA @ surface 0 HNU @ 3' 2 ppm

OVA @ 3' 0

very bad odor of pesticide

type smell, bad taste.

[illegible]

4-16-90 202-01-07 242

1709 S-27

OVA @ Surface 0 HNU @ Surface 4ppm
OVA @ 3' 0 HNU @ 3' 1.5 ppm

1712 S-28

OVA @ Surface 0 HNU @ Surface 2 ppm
OVA @ 3' 0 HNU @ 3' 1 ppm

1714 S-29

OVA @ Surface 0 HNU @ Surface 3.5 ppm
OVA @ 3' 0 HNU @ 3' –

Bad odor (sweet)

1718 S-30

OVA @ Surface .2 ppm HNU @ Surface 3.5 ppm
OVA @ 3' 0 HNU @ 3 2.0 ppm

1721 S-31

OVA @ Surface .4 ppm HNU @ Surface 6 ppm
OVA @ 3' .2 ppm HNU @ 3' 12.5 ppm

Tony Sanny

4-16-90 202-01-07 242

1725 S-32

OVA @ surface 0 ppm HNU surface 6 ppm

OVA @ 3' 0 ppm HNU @ 3' 3 ppm

1727 S-33

OVA @ surface 0 ppm HNU surface 6 ppm

OVA @ 3' 0 ppm HNU @ 3' 3 ppm

1729 S-34

OVA @ surface 0 ppm HNU surface 5.1 ppm

OVA @ 3' 0 ppm HNU @ 3' 3 ppm

1733 S-35

OVA @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ surface 5.5 ppm

HNU @ 3' 2.5 ppm

1735 S-36

OVA @ surface .1 ppm HNU @ surface 4.0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0 ppm

Tony Sam

4-16-90 202-01-07 242

1740
S-37
OVA @ surface 0 HNU @ surface 5.5 ppm
OVA @ 3' 0 HNU @ 3' 3.0 ppm

1742
S-38
OVA @ surface 0 HNU @ surface 3 ppm
OVA @ 3' 0 HNU @ 3' 2 ppm

1744 S-39
OVA @ surface 0 ppm HNU @ surface 4.5 ppm
OVA @ 3' 0 ppm. HNU @ 3' 2.0 ppm

1747 S-40
OVA @ surface .1 ppm HNU @ surface 5.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 5.0 ppm

1749 S-41
OVA @ surface 0 HNU @ surface 5.5 ppm
OVA @ 3' 0 HNU @ 3' 4.0 ppm

[illegible]

(10)

4-16-90 TS 202-01-07 242

1758
S-42
OVA @ surface 0 ppm HNU surface 5.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 3.0 ppm

1755 S-43
OVA @ surface 0 ppm HNU surface 5.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 3.5 ppm

1757
S-44
OVA @ surface 0 ppm HNU @ surface 4.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 3.0 ppm

1758 S-45
OVA @ surface 0 HNU @ surface 5.1 ppm
OVA @ 3' 0 HNU @ 3' 4.0 ppm

1806 S-46
OVA @ surface 0 ppm HNU @ surface 4.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 2.5 ppm

[illegible]

4-16-90 202-01-07-242

1803

Tie back into S-1

OVA @ surface 0 ppm HNU @ surface 6 ppm

OVA @ 3' 0 ppm HNU @ 3 4.5 ppm

TJS
~~1850~~

1810 Return to trailer, TJS ~~take~~ Setup Two OVA 128 GC + one OVA 128 for charging battery and recharge with hydrogen gas. Leave charges on for the night HNU battery check sufficient so that charging not necessary.

1830 Leave site Rob Ferrice last person out locks gate.

2000 After dinner reconvene for meeting dealing with sampling protocol.

2300 meeting adjourns

Tony Sauer

(12)

4-17-90 202-01-07 242

Ruetgers-Nease Site Salem, Ohio

0800 Soils gas crew on-site (Sainey & Ayer).

Start OVA running for site walk through. Brent & TJS ignites OVA hydrogen flame & calibrates to background reading

0845 TJS speaks with both representatives from Black & Vetch about calibration gas for OVA 128 GC & HNU PI 101. Calibration gases for OVA are 10.5, 93.5 and 787 ppm methane instead of 7-10, 90-100 (which is satisfactory) and 900-1000 ppm. HNU calibration gas is 58 ppm 20-200 range (isobutylene) low range gas 0-20 is not present. Both Black & Vetch representatives agreed that these calibration gases were satisfactory

0900 Prepare to perform reconnaissance

[illegible]

(13)

4-17-90 202-01-07 242

around ponds 1, 2 and 7.

0934 Start at station S-47 Pond 1+2

weather cloudy temperature 35° F.

Winds w NW 10 mph.

unless otherwise noted weather conditions are the same.

OVA @ surface .2 HNU @ surface .2 ppm

OVA @ 3' 0 ppm HNU @ 3' .2 ppm

0938 S-48

OVA @ surface 0 ppm HNU @ surface .2 ppm

OVA @ 3' 0 ppm HNU @ 3' .2 ppm

0940 S-49

OVA @ surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3 0 ppm

[illegible]

4-17-90 202-01-07 242

0943
S-50
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

0945
S-51
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

0947
S-52
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ 3' .1 ppm

0952
S-53
OVA @ surface 0ppm OVA @ surface .1 ppm
OVA @ 3' 0ppm OVA @ 3' .1 ppm

0959 Tie in to S-23 taken yesterday
OVA surface 0ppm HNU surface .1 ppm
OVA @ 3' 0ppm HNU @ 3' 0 ppm

[illegible]

(15)

4/17/90 2021-01-07 242

1007 Tie into S-54 from 4-16-90
OVA @ surface 0ppm HNU surface 0.1 ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

1008 S-53
OVA @ Surface 0ppm HNU @ Surface 0ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

1011 S-54
OVA @ Surface 0ppm OVA @ Surface 0ppm
OVA @ 3' 0ppm OVA @ 3' 0ppm

1012 S-55
OVA @ Surface 0 HNU @ Surface 0.1 ppm
OVA @ 3' 0 HNU @ 3' 0 ppm

1015 S-56
OVA @ Surface 0ppm HNU @ Surface 0.1ppm
OVA @ 3' 0 ppm HNU @ 3' 0ppm

1017 S-57
OVA @ Surface 0ppm HNU @ Surface 0ppm
OVA @ 3' 0 ppm HNU @ Surface 0ppm

(16)

4-17-90 202-01-07 242

1020

S-58

OVA @ surface 0.1 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1023 S-59 Ties to within 34' of

~~S-2~~ TJS S-47

OVA @ surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1030 Go back to trailer to calibrate OVA for

ERM Inc.

* weather clear to varible cloudy

1042 Head back out into field 40° 10 mph N-NW

Location around Pond ~~4~~ TJS 7

1055 S-60

OVA @ surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1058 S-61

OVA @ surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

[signature]

4/17/90 202-01-07 242

1101 Tie into station S-23 from 4-16-90
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ surface 0ppm

1105 S-42

OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm ~~OVA~~ HNU @ 3' 0ppm

1107 S-63
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ ~~S~~ 3' 0ppm

1109 S-64
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

1111 S-65
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm ~~OVA~~ HNU @ 3' 0ppm

Terry Sawyer

(18)

4-17-90) 202-01-07 242

1114

S-66

OVA @ Surface 0.1 ppm HNU @ surface 0 ppm

OVA @ 3' 0.2 ppm HNU @ 3' 1.0 ppm

1116

S-67

OVA @ surface 0.2 ppm HNU @ surface 0 ppm

OVA @ 3' 0.1 ppm HNU @ 3' 0 ppm

1118

S-68

OVA @ Surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0 ppm.

1121

S-69

OVA @ surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1124

S-70

OVA @ surface 0 ppm HNU @ surface 0 ppm

OVA @ 3' 0 ppm HNU @ 3' 0 ppm

[illegible]

4-17-90 EOZ-01-07-242

1126
S-71
OVA @ surface 0.2ppm HNU @ surface 1.0ppm
OVA @ 3' 0ppm HNU @ surface 1.0ppm.

1128
Tie into Station S-19 along back fence. S-19 from 4-16-90

OVA @ surface 0ppm HNU from surface 0ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

1133
Roll 1 Shot 1 looking north on west side of Pond 7 showing marker stations for ~~air~~ TOS recon monitoring

1134 Roll 1 Shot 2 looking east standing at west end Pond 7 showing marker stations for recon monitoring

[signature]

4/17/91 202-01-09 242

1134
Roll 1 Shot 3 looking north along east bank of Pond 7 at marker stations used for return monitoring

1141
Roll 1 Shot 4 looking north towards railroad tracks on west end of Pond 1 & 2 showing marker stations for return monitoring

1142
Roll 1 Shot 5 looking east along railroad spur from south end of Ponds 1 & 2 showing marker stations for return monitoring

1144 Leave zone for trailer

1148 Ayer and Sainey go through bootwash down line
Roll 1 Shot 6 Sainey washing boots in decon line after coming from return monitoring

Terry Sainey

(21)

4/17/90 202-01-07-242

12:20 WE RECALIBRATED HNU 58ppm
ISOBUTYLENE - PRESENT SPAND SETTING
3.82

1400
Ayer + Sainey start return monitor
around Pond 3 + 4. Starting at
eastern-most point of Pond 3 +
Railroad track going counter-
clockwise around Pond 3 + then
Pond 4.

1403
S-72
OVA @ surface 2 HNU @ surface 0.0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1405
S-73
OVA @ surface 0 ppm HNU @ surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

Tim Sainey

4/17/90 202-01-07 242

1408 S-74
OVA @ Surface 0 ppm HNU @ surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1410 S-75
OVA @ Surface 0 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1414 S-76
OVA @ Surface 0 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1416 S-77
OVA @ Surface 0.2 ppm HNU @ Surface 3 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.3 ppm

1419 S-78
OVA @ Surface 0 ppm HNU @ Surface 1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.3 ppm

1422 S-79
OVA @ Surface 0 ppm HNU @ Surface 1 ppm
OVA @ 3' 0 ppm HNU @ 3' 1.2 ppm

Turn Page

4/17/90 202-01-07 242

1425
S-80
OVA @ surface 0 ppm HNU @ surface 2.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 1.0 ppm

1430
S-81
OVA @ surface 0 ppm HNU @ surface 2.0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1432
S-82
OVA @ surface 0 ppm HNU @ surface 2.0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1435 S-83
OVA @ surface 0 ppm HNU @ surface 1.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1439 S-84
OVA @ surface 0 ppm HNU @ surface 1.5 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

[illegible]

4/17/91 202-91-07 242

1442
S-85
OVA @ Surface 0 ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1445
S-86
OVA @ Surface 0 ppm HNU @ Surface 1.0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1449
S-87
OVA @ Surface 0 ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1451
S-88
OVA @ Surface 0 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1453
S-89
OVA @ Surface 0 ppm HNU @ Surface 1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.2 ppm

Tony Fan

4/17/90 202-01-07 242

1457
S-90
OVA @ Surface 0 ppm HNU @ Surface 1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.2 ppm

1459
S-91
OVA @ Surface 0 ppm HNU @ Surface 1.0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1501
S-92
OVA @ Surface ~~0 ppm~~ .2 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1503
S-93
OVA @ Surface 0.2 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1506 S-94
OVA @ Surface 0 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3 0.2 ppm

[illegible] Sauna

4/17/90 202-01-07 242

TS ~~1708~~ 1508 S-95
OVA @ Surface 0ppm HNU @ Surface 1.5 ppm
OVA @ 3' 0ppm HNU @ 3' 0.2 ppm

TS ~~1713~~ 1513 S-96
OVA @ Surface 0ppm HNU @ Surface 1 ppm
OVA @ 3' 0ppm HNU @ 3' 0.1 ppm

TS ~~1715~~ 1515 S-97
OVA @ Surface 0ppm HNU @ Surface 0 ppm
OVA @ 3' 0ppm HNU @ 3 0ppm

TS ~~1717~~ 1517 S-98
OVA @ Surface 0ppm HNU @ Surface 0.2ppm
OVA @ 3' 0ppm HNU @ Surface 0.1 ppm

1521 S-99
OVA @ Surface 0ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0ppm HNU @ 3' 0.1 ppm

1526 S-100
OVA @ Surface 0ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0ppm HNU @ 3' 0ppm

Thing Sr

4/17/00 202-01-07 242

1529 S-101

OVA @ Surface 0 ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1532 S-102

OVA @ Surface 0 ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1535 S-103

OVA @ Surface 0 ppm HNU Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1540 S-104

OVA @ Surface 0 ppm HNU Surface 2.0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1545 S-105

OVA @ Surface 0 ppm HNU Surface 1.0 ppm
OVA @ 3 0 ppm HNU @ 3' 0.1 ppm

1552 S-106

OVA @ Surface 0 ppm HNU Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

Tony Carney

4/17/90 202-01-07 242

1554 S-107
OVA @ Surface 0 ppm HNU @ Surface 0.2 ppm
OVA @ 3' 0 ppm HNU @ 3' 1.0 ppm

1600 S-108
OVA @ Surface 0 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1603 S-109
OVA @ Surface 0 ppm HNU @ Surface 0.2 ppm
OVA @ 3' 0 ppm HNU @ ~~Sur~~ TDS 3 0.1 ppm

1610 S-110
OVA @ Surface 0 ppm HNU @ Surface 0 ppm
OVA @ 3' 0 ppm HNU @ Surface 0.1 ppm

1611 S-111
OVA @ Surface 0 ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1615 S-112
OVA @ Surface 0 ppm HNU @ Surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

(29)

4/17/90 202-01-07 242

1617

S-113

OVA @ surface 0ppm HNU @ surface 0ppm

OVA @ 3' 0ppm HNU @ 3' 0ppm

1620 S-114

OVA @ surface 0ppm HNU @ surface 0ppm

OVA @ 3' 0ppm HNU @ 3' 0ppm

1623 S-115

OVA @ surface 0ppm HNU @ surface 0.1ppm

OVA @ 3' 0ppm HNU @ 3' 0ppm

1626 S-116

OVA @ surface 0ppm HNU @ surface 0ppm

HNU @ 3' 0ppm

1628 Tie back into Station S-72

from 1403 4/17/90

OVA @ surface 0ppm HNU @ surface 0.1ppm

OVA @ 3' 0ppm HNU @ 3' 0ppm

[illegible]

4/17/91 2021-01-07 2:12

1634 - S-117
OVA @ Surface 0ppm HNU @ surface .3 ppm
OVA @ 3' 0ppm HNU @ 3' .1 ppm

1637 S-118
OVA @ surface 0ppm HNU @ surface 0ppm
OVA @ 3' 0ppm HNU @ 3' 0.2 ppm

1638 S-119

OVA @ surface 0 ppm HNU @ surface 0.2ppm
OVA @ 3' 0ppm HNU @ 3' 0 ppm

1639 S-120
OVA @ surface 0ppm HNU @ surface 0.3ppm
OVA @ 3' 0 ppm. HNU @ 3' 0.2ppm

1642 S-121
OVA @ surface 0ppm HNU @ surface 2.0 ppm
OVA @ 3' 0ppm HNU @ 3' 0 ppm

Thomas J. Sawyer

4/17/91 202-01-07-242

1645 S-122
OVA @ surface 0 ppm HNU @ surface 0.2 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1645 S-123
OVA @ surface 0 ppm HNU @ surface 0.2 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

1648
S-124
OVA @ surface 0 ppm HNU @ surface 0.2 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.2 ppm

1650
S-125
OVA @ surface 0 ppm HNU @ surface 0.1 ppm
OVA @ 3' 0 ppm HNU @ 3' 0.1 ppm

1652
S-126
OVA @ surface 0 ppm HNU @ surface 0 ppm
OVA @ 3' 0 ppm HNU @ 3' 0 ppm

[illegible]

4/17/90 202-01-07 242

1654

S-127

OVA @ surface 0ppm HNU @ surface 0ppm

OVA @ 3' 0ppm HNU @ 3' 0ppm

1656

Tie back into station S-97

OVA @ surface 0ppm HNU @ surface 0.2ppm

OVA @ 3' 0ppm HNU @ 3 0.2ppm

1658

Roll 1 Shot 7

on ~~east~~ TJS west end of Pond 4 looking back towards Railroad tracks Station locations for recon monitoring

1659 Roll 1 Shot 8

on ~~east~~ TJS west end of Pond 4 looking Northeast towards Crane-Deming rt station locations for recon monitoring

[illegible]

4/17/90 202-01-09 242

1710 Roll 1 Shot 9 on north side between ~~Lagoon~~ TD Pond 3 and 4 looking north at Station marker for recon monitoring

1715 Ayer + Sainey finish in areas north of Railroad tracks. Lock gate as they enter onto Rustgers-Neoses property.

1720 Talk w/ Rob Ferree + Rick Darr at Pond 7 setting grid for magnetometer survey.
Ayer heads back with equipment while Sainey helps w/ grid

1830 Finish laying out grid for magnetometer survey.

1845 Empty decon pool into wash sump

1912 Changing OVA + HNU + copying field notes

1930 Plan to be off-site

Tony Sainey

4.18.90 202-01.09 242

RUTGERS/NRASE PROJECT

0800 - RECALIBRATED HNU

0838 - RECALIBRATED OVA RANGE: 0-10 ppm

THE CALIBRATION FOR A+B 10.5 ppm/95.5 ppm

+787 ppm - TIME OF CALIBRATION FOR OVA B

0850/A OVA WAS 0838

1048 Sarney + Ayer go to Station

S-1 and start soil gas

next page and following

pages have information pertaining

to each location in form type

Tony Sarney

35

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-1 Date 4/18/90 Time 1052

Weather Conditions, Temp. 40 Skies Clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 Stabilized Reading 0

Flame Ionization Detector

Chromatograph OVA GC 128 A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range x-1

Time of Injection 1100 Start of purge 1110

Max Total Reading — Stabilized Reading —

Identified Compounds - Measured Concentration - Actual

When injecting into OVA flame would go out indicating high moisture or CO_2 Substantiated by HNU 0ppm reading

Mary Sawyer

36

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-2 Date 4/18/90 Time 1135

Weather Conditions, Temp. 40 Skies Clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 Stabilized Reading 0

Flame Ionization Detector

Chromatograph OVA GC128B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 ~~0838~~ 0850

Recorder Scaling Full Range ___

Time of injection 1140 Start of purge ___

Max Total Reading 0 Stabilized Reading 0

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run in GC mode considering no need on OVA.

Mary Sawyer

(37)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-3 Date 4/18/90 Time 1153

Weather Conditions; Temp. 40s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 Stabilized Reading 0

Flame Ionization Detector

Chromatograph OVA GC128 A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range ___

Time of injection 1157 Start of purge 1209

Max Total Reading .5 ppm Stabilized Reading .5 ppm

Identified Compounds - Measured Concentration Actual

Comments:

Terry Sau

(38)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-4 Date 4/18/90 Time 1211

Weather Conditions; Temp. 40s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 Stabilized Reading 0

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0850

Recorder Scaling Full Range ___

Time of injection — Start of purge —

Max Total Reading <0 Stabilized Reading <0

Identified Compounds - Measured Concentration Actual

Comments:

Did not run GC because <0 deflection was being recorded on OVA meter. HNU likewise had 0 reading.

Terry

(39)

~~SOILS GAS~~
Ruetgers-Nease Salem, Ohio

General Data

Station S-5 Date 4/18/90 Time 1233

Weather Conditions, Temp. 40's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 Stabilized Reading 0

Flame Ionization Detector

Chromatograph OVA128GC A Column T-8

Column Temperature 0°E Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range x-1

Time of Injection 1239 Start of purge 1251

Max Total Reading 3 Stabilized Reading ___

Identified Compounds - Measured Concentration - Actual

Comments:
Initial reading on OVA is suspect because HNU did not record & OVA B did not record. Initial reading may have been CH_4. Instrument was drifting while in GC mode.

Mary Sauer

(40)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-6 Date 4/18/90 Time 1419

Weather Conditions, Temp. 50's Skies Clear Wind Calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 Stabilized Reading 0

Flame Ionization Detector

Chromatograph OVA128GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0850

Recorder Scaling Full Range x-1

Time of injection 1425 Start of purge 1437

Max Total Reading 2 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:
~~Photo taken @ S-6 [illegible] Shallow~~ TJS
~~fluid~~ TJS

Mary Sauer

(41)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-7 Date 4/18/90 Time 1444

Weather Conditions, Temp. 50's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 4m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range X-1

Time of injection - Start of purge -

Max Total Reading 0 Stabilized Reading 0

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA did not record any volatile readings. HNU did not record volatiles

Mary S.

(42)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-8 Date 4/18/90 Time 1455

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 4m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/18/90 0850

Recorder Scaling Full Range X-1

Time of injection - Start of purge -

Max Total Reading <0 Stabilized Reading <0

Identified Compounds - Measured Concentration - Actual

Comments: Roll 2 shot 1
Photo taken @ S-8 soils gas survey showing shallow water levels.
Fluid in hole causing OVA pump to strain. Did not run GC because of <0 ppm reading. HNU substantiates 0 ppm reading.

Mary S.

SOILS GAS FORM

(43)

RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-9 Date 4/18/90 Time 1523

Weather Conditions, Temp. 50's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA GC 128 A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range X-1

Time of injection ___ Start of purge ___

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

GC was not run because OVA pull water into line. Broke connection before OVA came in contact w/ water. HNU also registered 0 ppm

Terry Sauer

SOILS GAS FORM

(44)

RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-10 Date 4/18/90 Time 1538

Weather Conditions, Temp. 50's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml.

Time and date of last calibration 4/18/90 0850

Recorder Scaling Full X-1

Time of injection 1540 Start of purge 1554

Max Total Reading 4 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Initial kick on OVA may have been methane. HNU did not record.

Terry Sauer

(45)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-11 Date 4/18/90 Time 1547

Weather Conditions, Temp. 55s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range X-1

Time of injection — Start of purge ___

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA had reading of 0 ppm. HNU likewise had reading of 0 ppm

Mary Sam

(46)

SOILS GAS

RUETGERS-NEASE Salem OHIO

General Data

Station S-12 Date 4/18/90 Time 1604

Weather Conditions, Temp. 50s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0900

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0838

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

GC was not run because OVA recorded 0 ppm. HNU also recorded 0 ppm

Mary Sam

(47)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-13 Date 4/18/90 Time 1610

Weather Conditions, Temp. ____ Skies ____ Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed TJS 4/18/90 0830

Time and date of last calibration 4/18/90 0839

Recorder Scaling Full Range X-1

Time of Injection 1619 Start of purge 1631

Max Total Reading 0.2 ppm Stabilized Reading 0.2 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

minor peak on chromatograph

Terry Sauer

(48)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-14 Date 4/18/90 Time 1629

Weather Conditions, Temp. 50s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 TJS Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/18/90 0850

Recorder Scaling Full Scale Range X-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA reads 0 ppm. HNU also reads 0 ppm.

Terry Sauer

(49)

SOIL GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-15 Date 4/18/90 Time 1645

Weather Conditions, Temp. 50's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0850

Recorder Scaling Full Scale Range X-1

Time of injection – Start of purge –

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

GC was not run because OVA recorded <0 ppm when purging soil gas tube. HNU also recorded 0 ppm.

Terry Sauer

(50)

SOIL GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-16 Date 4/18/90 Time 1703

Weather Conditions, Temp. 60 Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/18/90 0850

Recorder Scaling Full Scale Range X-1

Time of injection – Start of purge –

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

GC was not run because OVA recorded <0 ppm when purging the soil gas tube. HNU recorded 0 ppm.

Terry Sauer

(51)

SOILS GAS FORM
for
[illegible] DRUGGERS-HEASE SALEM, OHIO SITE

General Data

Station S-17 Date 4/18/90 Time 1717

Weather Conditions, Temp LD Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 ev 11.7 ev ✓

Time and date of last calibration 4/18/90 0800

Range 0-20 ppm

Max Total Reading 0 ppm stabilized Reading 0 ppm

Flame Ionization [illegible]

Chromatograph OVA GC 128 B Column T-8

Column Temperature 0°C Carrier Flow 2 [illegible] 4/100

Injection Volume 2.5 ml. Chart Spec.

Time and date of last [illegible] 4/18/90 0850

Recorder Scaling Full Scale x-1

Time of injection - Time of purge -

Max Total Reading 4 ppm Stabilized Reading -

Identified Compounds - Measured Concentration - Actual

Comments:

4 ppm was a deflection caused by OVA pump pulling hard. Put OVA 128 GC A on same line and it pulled water. Therefore 4 ppm not a valid reading. HNU also recorded 0 ppm

[illegible] Sammy

(52)

AT 630 PM CALIBRATED OVA EQUIPT. A + B/ ALSO HNU WAS CALIBRATED 1900 - OFF SITE

[illegible]

This page blank

Ruetgers: Nease Salem, Ohio Site
202-01-07 242
Soils Gas Survey
April 19, 1991

0730 Sainey + Ayer check in to trailer
start calibrating instruments
Calibrate ERM Inc HNU 101
Calibrate ERM Midwest HNU 101
@ 0741

0750 Ayer + Sainey calibrate OVA
A + C machine B having
pump problems.

0920 Arrive at Pad 4. Following
pages have specific information
concerning each soil gas location.

(55)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-104 Date 4/19/90 Time 0928

Weather Conditions, Temp. 40's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 ... ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA GC 128 C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full x-1

Time of injection - -

Max Total Reading 0 ppm 0ppm

Identified Compounds Measured Concentration Actual

Comments:

At Railroad Tracks + west end of Port 4. Did not run GC because of 0ppm ready on OVA while purging. HNU did not record any volatiles.

Mary Sarney

(56)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-102 Date 4/19/90 Time 0940

Weather Conditions, Temp. 40's Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 ... ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full x-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hand drilling - Did not run GC mode because OVA recorded 0ppm while purging soil gas probe. HNU also recorded 0ppm.

Mary Sarney

(57)

SOIL GAS FORM
for
BURGERS-NEASE SALEM, OHIO SITE

General Data

Station S-101 Date 4/19/90 Time 0958

Weather Conditions, Temp. 40s Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-B

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hard drilling - Did not run GC because OVA recorded < 0ppm while purging soil gas probe. HNU also recorded 0 ppm.

M. J. Sami

(58)

SOIL GAS FORM
for
BURGERS-NEASE SALEM, OHIO SITE

General Data

Station D-100 Date 4/19/90 Time 1009

Weather Conditions, Temp. 40s Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-B

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Extremely hard drilling. Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also recorded 0 ppm.

M. J. S

59

SOILS GAS FORM
for
[illegible]-NEASE SALEM, OHIO SITE

General Data

Station S-99 Date 4/19/90 Time 1026

Weather Conditions, Temp. 40S Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

moderately hard drilling - Did not run GC because OVA recorded 0ppm while purging the soil gas probe. HNU also recorded 0 ppm

[illegible] Sam

60

SOILS GAS FORM
for
[illegible]-NEASE SALEM, OHIO SITE

General Data

Station S-98 Date 4/19/90 Time 1040

Weather Conditions, Temp. 40S Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1049 Start of purge 1106

Max Total Reading 7.5 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hard Drilling has to make second hole. Large show on OVA probably mostly methane. However small long sloping peak midway through chromatograph HNU did not pick up anything. ∴ mostly methane.

[illegible] Sam

(61)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-9C Date 4/19/90 Time 1058

Weather Conditions, Temp. 40's Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 0750 4/19/90

Recorder Scaling Full Range X-1

Time of injection 1010 Start of purge 1025

Max Total Reading 2ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hard drilling met resistance @ 2' took reading from there. Changed ice slug in GC. HNU recorded 0 ppm.

Mary Same.

(62)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-94 Date 4/19/90 Time 1117

Weather Conditions, Temp. 40's Skies Variable Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow ___

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hard drilling met resistance @ 2' took reading from there. Changed ice slug in GC. Did not run GC because OVA recorded 0 ppm during purging of the soils gas probe. HNU recorded 0 ppm.

Mary [illegible]

(63)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-92 Date 4/19/90 Time 1141

Weather Conditions, Temp. 40's Skies variable Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hard to moderately hard drilling. Location north of S-92 which is on bank. This location in flat land. Did not run GC because OVA recorded 0 ppm during purging of the soils gas probe. HNU also recorded 0 ppm.

Tim J. Sanders

(64)

Comments: This page upside down

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-90 Date 4/19/90 Time 1150

Weather Conditions, Temp. 40s Skies variable Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading <0ppm Stabilized Reading <0ppm

Identified Compounds - Measured Concentration - Actual

Did not run GC because OVA recorded 0 ppm on OVA while purging the soils gas probe. HNU also recorded 0 ppm

Tim J. Sanders

(65)

1215 Ayer / Sainey break for lunch.

1315 Ayer / Sainey return from lunch.

Restock necessary supplies and head back for soils gas survey northeast side of Ponds 3 + 4.

Mary Sainey

(66)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Stud [illegible] S-93 Date 4/19/90 Time 1400

Weather [illegible] ions, Temp. 50's Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

OVA 128 GC C Column T-B

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1405 Start of purge 1420

Max Total Reading 3 ppm Stabilized 1 ppm

Identified Compounds — Measured Concent.

Comments:

While Ayers gets gasoline for generator Sainey lays out additional line. Good chromatograph.

Mary Sainey

(67)

SOILS GAS PORT
for
[illegible] SALEM, OHIO SITE

General Data

Station S-86 Date 4/19/90 Time 1411

Weather Conditions, Temp. 50's Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 eV ___ 10.2 eV ___ 11.7 eV ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0.3 ppm Stabilized R... 0.3 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1446 Start of purge 1500

Max Total Reading 1 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Fair chromatograph

Mary Sauer

(68)

SOILS GAS PORT
for
[illegible] SALEM, OHIO SITE

General Data

Station S-84 Date 4/19/90 Time 1456

Weather Conditions, Temp. 60's Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 eV ___ 10.2 eV ___ 11.7 eV ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA GC 128 C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1502 Start of purge 1515

Max Total Reading 1 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Change ice slug for thermal pack

Mary Sauer

(69)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-BE Date 4/19/90 Time 1510

Weather Conditions, Temp. 60s Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range x-1

Time of injection 1522 Start of purge 1536

Max Total Reading 1 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

change ice in thermal pack.

TJS

(8) (70)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-80 Date 4/19/90 Time 1541

Weather Conditions, Temp. 60s Skies clear Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also recorded 0 ppm.

(71)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-78 Date 4/19/90 Time 1558

Weather Conditions, Temp. 60's Skies varied Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0° C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1602 Start of purge [illegible]

Max Total Reading 1 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

3' east of monitor well

(72)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-76 Date 4/19/90 Time 1610

Weather Conditions, Temp. 60's Skies varied Wind E

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/19/90 0741

Range 0-20 ppm

Max Total Reading 0.2 ppm Stabilized Reading 0.2 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0° C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1632 Start of purge 1646

Max Total Reading 2 ppm Stabilized Reading 2 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Injections kept having hydrogen flame out
finally got good injection. Can see something
is there from background curve

(73)

SOILS GAS FORM

RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-128 Date 4/19/90 Time 1640

Weather Conditions, Temp. 60s Skies variable Wind E

Sampling Device

Photoionization Detector

Type _____ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration _____

Range _____

Max Total Reading 4 ppm Stabilized Reading 4 ppm

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1704 Start of purge 1720

Max Total Reading 4 ppm Stabilized Reading 4 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Fair chromatograph, OVA seemed to be reading higher than what was indicated on graph. However OVA is total volatile & GC separates volatiles ∴ The total GC scan probably was equ. Mings

(74)

1750 Ayer / Sainen make it back to base. Very difficult terrain to traverse plus railroad tracks.

Ayers is calibrating HNU 101. Trouble with fan motor, may be shorted have to tear apart.

Mun 7. Sa

(75)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/19/90 Time 1803

Weather Conditions, Temp. 60's Skies cloudy Wind E

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration

Range

Max Total Reading _____ Stabilized Reading

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1803 Start of purge 1815

Max Total Reading 0 Stabilized Reading 0

Identified Compounds - Measured Concentration - Actual

Comments:

(76)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/19/90 Time

Weather Conditions, Temp. 60's Skies cloudy Wind E

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration

Range

Max Total Reading _____ Stabilized Reading

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/19/90 0750

Recorder Scaling Full Range X-1

Time of injection 1815 Start of purge 1827

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

(77)

1840 Calibrate OVA 128 GC machine A + C to calibration gas 10.5 ppm, 95.3 ppm + 787 ppm.

1900 Leave site

Tu J. Sainey

(78)

Ruetgers-Nease Salem, Ohio
Soils Gas Survey.
April 20, 1990
weather rain, 50's wind southwest

0740 Ayer and Sainey check in
" start daily calibrations.

0800 Calibrate OVA 128 GC machine A + C with calibration gas. 10.5 ppm, 95.3 ppm + 787 ppm.

0820 calibrate HNU 101 with 58 ppm isobutylene gas 11.7 ev bulb

0845 go to Allen Road to run soils gas. Drive along line to scope out conditions. Survey should be accomplished with minimal problems as far as access. All locations along road berm. Following pages contain information concerning each soils gas location.

Tu J. S

(79)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-129 Date 4/20/90 Time 0930

Weather Conditions, Temp. 60s Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 0820 4/20/90

Range 0-20 ppm

Max Total Reading 0.1 ppm Stabilized Reading 0.1 ppm

Flame Ionization Detector

Chromatograph OVA 128GC G Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0ppm while purging soils gas probe. HNU also recorded 0ppm.

[signature]

(80)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-130 Date 4/20/90 Time 0948

Weather Conditions, Temp. 60s Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 ~~0800~~ 0820 TJS

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC G Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range x-1

Time of injection 0952 Start of purge 1020

Max Total Reading 0.2 ppm Stabilized Reading 0.2 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Slight show on OVA may be drift

(81)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-131 Date 4/20/90 Time 1007

Weather Conditions, Temp. 60s Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 0820

Range 0-20ppm

Max Total Reading 0.4ppm Stabilized Reading 0.4ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0° C Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/ /90 0800

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading <0ppm Stabilized Reading <0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hard drilling. Only got 2' of penetration before meeting resistance. OVA reading <0ppm therefore did not run GC. HNU reading suspect in rainy weather.

Terry Sauer

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-132 Date 4/20/90 Time 1020

Weather Conditions, Temp. 60s Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 0820

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0° C Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading <0ppm Stabilized Reading <0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA reading <0 ppm while purging soil gas probe.

Terry Sauer

(82)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-133 Date 4/20/90 Time 1031

Weather Conditions, Temp. 50's Skies Cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 0820

Range 0-20ppm

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed _____

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds	Measured Concentration	Actual

Comments

Did not run GC because OVA recorded 0 ppm while purging soils gas probe.
1205 actual time of soils gas ready because of break down explained on following page.

[signature]

(83)

4/20/90
1031 DRILL HAMMER WENT DOWN ON SITE/GONE TO HARDWARE TO PICK UP SLEDGE HAMMER UNTIL THE DRILL IS REPAIRED

[signature]

1050 Ayers calibrates new HNU 101 w/cal gas
1200 Arrive back at site of soils gas test along Allen Road. Hammer drill inoperative, purchase small sledge hammer. Drive probe by hand. Remainder of pages show results of soils gas locations

[signature]

(84)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-134 Date 4/20/90 Time 1215

Weather Conditions, Temp 50s Skies Cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration ~~4/20/90~~ 4/20/90 1650

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm 135 1050

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC, OVA recorded 0 ppm while purging soil gas probe. HNU also records 0 ppm.

(85)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-135 Date 4/20/90 Time 1224

Weather Conditions, Temp 50s Skies cloud Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also records 0 ppm.

Tu 7.5

(86)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-136 Date 4/20/90 Time 1231

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1030

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling FULL Range X-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging ∅ TK soil gas probe. HNU recorded 0 ppm.

[signature]

(31)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-137 Date 4/20/90 Time 1240

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90

Recorder Scaling FULL Range X-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also recorded 0 ppm.

[signature]

(98)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-138 Date 4/20/90 Time 1254

Weather Conditions, Temp. 50's Skies cloudy rain Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Initial Reading 0.1 ppm Stabilized Reading 0.1 ppm

Flame Ionization Detector

Chromatograph OVA GC 128 C Column T-8

Column Temperature 0° C Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/20/90 0810

Recorder Scaling Full Range N-1

Time of Injection — Start of purge —

Max Initial Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA records 0 ppm while purging soils gas probe HNU records 0 ppm

Mary J. Sain

(99)

1300 Ayer & Sainey go back to R-N site

1500 return to Allen Road for soils gas

Following pages show results of soils gas survey

Mary J. Sain

(90)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-139 Date 4/20/90 Time 1506

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading ~~0 ppm~~ 4.0 ppm Stabilized Reading ~~0 ppm~~ 4.0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC ~~C~~ A TIS Column T-8

Column Temperature 0° C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0300

Recorder Scaling Full Range x-1

Time of injection 1519 Start of purge 1533

Max Total Reading 80 ppm Stabilized Reading ~~20 ppm~~ 3.0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Good response on GC.
Switched from OVA C to OVA A. Reexamined hole with HNU

Mary Sawyer

(91)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-140 Date 4/20/90 Time 1531

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 1.0 ppm Stabilized Reading <1.0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0° C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90

Recorder Scaling Full Range x-1

Time of injection 1535 Start of purge 1549

Max Total Reading 5 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Fair chromatograph. Trouble keeping flame ignited during ignition

Mary Sawyer

(72)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-141 Date 4/20/90 Time 1546

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 0.2 ppm Stabilized Reading 0.2 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection 1559 Start of purge 1613

Max Total Reading >10 Stabilized Reading 4 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Initial big kick may have been methane
Changed ice slug in thermal
pack

Terry Sauer

(73)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-142 Date 4/20/90 Time 1610

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 0.2 ppm Stabilized Reading 0.2 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow ___

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Changed ice slug in thermal pack
Did not run GC because OVA registered
0 ppm while purging soil gas probe

Terry Sauer

(94)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-143 Date 4/20/90 Time 1625

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2.4 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection 1630 Start of purge 1643

Max Total Reading 4ppm Stabilized Reading 3ppm

Identified Compounds - Measured Concentration - Actual

Comments:

move flag ~~down~~ off to berm down over
bin to be more representative.
Show on OVA may have been methane
nothing else show on chromatograph

(95)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-144 Date 4/20/90 Time 1639

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2.4 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded
0ppm while purging soils gas probe.
HNU recorded 0ppm also.

(96)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-145 Date 4/20/90 Time 1715

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20ppm

Max Total Reading 1.2ppm Stabilized Reading 1.2ppm

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2.1m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC OVA recorded 0 ppm while purging soil gas probe.

(97)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-146 Date 4/20/90 Time 1730

Weather Conditions, Temp. 50's Skies Cloudy, rainy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2.1m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also records 0 ppm.

Mary Sam

(98)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data TSS

Station ~~S-149~~ S-148 Date 4/20/90 Time 1745

Weather Conditions, Temp. 50s Skies cloudy rain Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also recorded 0 ppm

Mug. Saini

(99)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data S-149

Station ~~S-148~~ Date 4/20/90 Time 1755

Weather Conditions, Temp. 50s Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading ~~0 ppm~~ 15 ppm Stabilized Reading ~~0 ppm~~ rising

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU recorded 15 ppm & was rising. Put both OVA A & C back on hole did not record. HNU having moisture interference

Mug. Saini

(106)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station ~~S-149~~ S-150 TJS Date 4/20/90 Time 1806

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 1050

Range 0-20 ppm

Max Total Reading — Stabilized Reading —

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 4/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

HNU unstable could not zero. Did not run GC because OVA recorded 0ppm while purging soils gas probe.

[signature]

(107)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/20/90 Time 1828

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

Photoionization Detector Not Applicable

Type ___ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration ___

Range ___

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-9

Column Temperature 0°C Carrier Flow 2 4/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of injection 1828 Start of purge ___

Max Total Reading ___ Stabilized Reading ___

Identified Compounds - Measured Concentration - Actual

Comments:

[signature]

SOIL GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station Eric Brook Date 4/20/90 Time 1845

Weather Conditions, Temp. 50's Skies cloudy Wind SW

Sampling Device

~~Photoionization Detector~~ Not Applicable

~~Type _____ Bulb 11.5 ev ____ 10.2 ev ____ 11.7 ev ____~~

~~Time and date of last calibration _____~~

~~Range _____~~

~~Max Total Reading _____ Stabilized Reading _____~~

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 4m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/20/90

Recorder Scaling Full Range X-1

Time of Injection 1845 Start of purge _____

Max Total Reading _____ Stabilized Reading _____

Identified Compounds - Measured Concentration - Actual

Comments:

Thomas Sawyer

1815 - Leave Allen Road soil gas site
come back to site

1830 Myers calibrating HNU 101.

1910 Calibrate OVA 128 GC machine
A-C to calibration gases
10.5 ppm, 95.3 ppm + 797 ppm.

1920 Leave Site

Thomas Sawyer

This page Blank

Ruetgers-Nease Salem, Ohio
202-01-07 242
April 21, 1990
Soils Gas Survey

0715 Sainey / Ayer arrive on site
Ayer starts calibrating HNUs
~~0717 555~~
0718 calibrate ERM midwest
HNU w/ 58 ppm isobutylene
gas
0720 calibrate ERM Inc.
HNU w/ 58 ppm isobutylene
Start OVAs running. Decided to
shoot air blanks to see if columns
showing contamination.
Next two pages show information
on Air Blanks.

Weather today a.m. cloudy
rainy, 50s slight NE wind

Mary Sainey

(106)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/21/90 Time 0733

Weather Conditions, Temp. 50 Skies Cloudy Wind NE

~~Sampling Device~~ Not Applicable

~~Photoionization Detector~~

~~Type _____ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___~~

~~Time and date of last calibration _____~~

~~Range _____~~

~~Max Total Reading _____ Stabilized Reading _____~~

Flame Ionization Detector

Chromatograph OVA GC RBC Column T-B

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/20/90 0800

Recorder Scaling Full Range X-1

Time of Injection 0733 Start of purge 0750

Max Total Reading _____ Stabilized Reading _____

Identified Compounds - Measured Concentration - Actual

Comments:

Air Blank was run to verify any residual column contamination. Column appears clean.

Terry Sam

(107)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/21/90 Time 0754

Weather Conditions, Temp. 50's Skies Cloudy Wind NE

Sampling Device Not Applicable

Photoionization Detector

Type _____ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA RBC GC Column T-B

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration _____

Recorder Scaling Full Range X-1

Time of Injection 0754 Start of purge 0809

Max Total Reading _____ Stabilized Reading _____

Identified Compounds - Measured Concentration - Actual

Comments:

Air Blank was run to verify any residual column contamination. Column appears clean. Positive deflections are CB communications

Terry Sam

108

0810 - Start gas calibration
calibrate TJS OVA 128 GC machine
A+C with calibration gases
10.5 ppm, 95.3 ppm + 787 ppm
gases.

0850 change OVA 128 GC machine
with hydrogen fuel.

0850 Ayer + Sainey head to
field plan to work both sides
of creek along Allen Road.
Following pages report on
soils gas.

Tim J. Sainey

109

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-150 Date 4/21/90 Time 0930

Weather Conditions, Temp. 50s Skies cloudy rainy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.2 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-B

Column Temperature 0° C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:
Did not run GC because OVA recorded
0 ppm while purging soils gas probe.
HNU also recorded 0 ppm

(110)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-151 Date 4/21/90 Time 0942

Weather Conditions, Temp. 50s Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA CC 128 A Column T-8

Column Temperature 0° C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA records <0 ppm while purging Soil gas probe. HNU records <0 ppm. Because of moisture HNU readings very inaccurate

Terry Sauer

(111)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-152 Date 4/21/90 Time 0949

Weather Conditions, Temp 50s Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 C Column T-8

Column Temperature 0° C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA records 0 ppm while ~~charging~~ TJS purging the soil gas probe. HNU also records <0 (moisture)

Terry Sauer

(112)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-153 Date 4/21/90 Time 1000

Weather Conditions, Temp. 50's Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded <0 ppm while purging soil gas probe. HNU recorded <0 ppm (moisture)

Tim J. Sauer

(113)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-154 Date 4/21/90 Time 1009

Weather Conditions, Temp. 50's Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-9

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded <0 ppm while purging soil gas probe. HNU recorded ~~<10~~ <0 ppm (moisture).

Tim J. Sauer

(114)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-155 Date 4/21/90 Time 1018

Weather Conditions, Temp. 50's Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 ml/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded <0 ppm while purging soils gas probe, HNU recorded <0 ppm (moisture hit)

Terry Sawyer

(115)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-156 Date 4/21/90 Time 1030

Weather Conditions, Temp. 50's Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range x-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU recorded <0 ppm (high moisture interference)

Terry Sawyer

(116)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-157 Date 4/21/90 Time 1036

Weather Conditions, Temp. 60s Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range x-1

Time of injection — Start of purge

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded <0 ppm while purging soils gas probe. HNU recorded <0 ppm (problems w/ High moisture)

Terry Sauer

(117)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-158 Date 4/21/90 Time ~~1045~~ 1100 TS

Weather Conditions, Temp. 60s Skies ___ Wind ___

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range x-1

Time of injection Start of purge

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

1045 call from Rick Dort emergency
Did not record GC because OVA recorded <0 ppm while purging soil gas probe. HNU still read. less than 0 ppm

Terry S

(118)

1045 Rick Dair calls for assistance
has an injury cut knee with
brush cutter saw. Saine and
Ayer respond. Put tourniquet (SP)
above injury and put handkerchief
compress on wound. Wrapped
compress w/ another handkerchief
and helped carry Rick to Allen
TD Road. Brian + Rob there
to transport Rick to hospital.

1100 Return to soils gas.

(119)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-159 Date 4/20/90 Time 1119

Weather Conditions, Temp. 60's Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC-A Column T-8

Column Temperature 0° C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded
<0 ppm on OVA while purging
soils gas probe. HNU recorded
<0 ppm still high moisture content.

[signature]

(120)

SOILS GAS FORM
for
RUTGERS-MEASE SALEM, OHIO SITE

General Data

Station S-160 Date 4/21/90 Time 1138

Weather Conditions, Temp. 60s Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/ /90 0812

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU recorded less than 0 ppm (Still plagued with high moisture).

Terry Sauer

(121)

SOILS GAS FORM
for
RUTGERS-MEASE SALEM, OHIO SITE

General Data

Station S-161 Date 4/21/90 Time 1150

Weather Conditions, Temp. 60s Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0812

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded < ~~10~~ 0 TSS ppm on OVA. HNU recorded < 0 ppm

Terry Sauer

(122)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-162 Date 4/21/90 Time 1159

Weather Conditions, Temp. 50 Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/ /90

Recorder Scaling Full Range X-1

Time of injection — Start of purge

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU also recorded <0 ppm. (moisture still probl for HNU)

Terry Sauer

(123)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-163 Date 4/21/90 Time 1208

Weather Conditions, Temp. 60's Skies variable Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU also recorded <0 ppm (moisture still probl for HNU)

Terry Sauer

(124)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-164 Date 4/21/90 Time 1216

Weather Conditions, Temp. 60's Skies cloudy Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 - 0715

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0800

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0ppm while purging soils gas probe. HNU also recorded 0ppm.

[signature]

(125)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-186 Date 4/21/90 Time 1505

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection ___ Start of purge ___

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

S-186 along creek off. Allen Road heading towards landfill.

Did not run GC because OVA recorded 0ppm while purging soils gas probe. OVA started sucking water. HNU reading < 0ppm

[signature]

(126)

See last two pages of book

Time between 1216 + 1505.
1-hour lunch + visit to hospital
2-hour walking soil gas line along creek

~~GAS FORM~~

for

RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-187 Date 4/21/90 Time 1513

Weather Conditions, Temp. 72 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bull., 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0915

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of Injection ___ Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments: Did not run GC because OVA recorded 0 ppm while pushing soil gas probe. HNU also recorded 0 ppm.

Tony Sam

INDEX OF CURVE AND REDUCTION TABLES

Table I—SLOPE STAKE

Table II—STADIA CORRECTION AND HORIZONTAL DISTANCES

Table III—TRIGONOMETRIC FORMULAE

Table IV—NATURAL TRIGONOMETRICAL FUNCTIONS

CURVE FORMULAE

Table V—TANGENTS AND EXTERNALS TO A 1° CURVE

USEFUL RELATIONS

Table VI—INCHES TO DECIMALS OF A FOOT

Table VII—MINUTES IN DECIMALS OF A DEGREE

Table VIII—MIDDLE ORDINATES OF RAILS

Table IX—SHORT RADIUS CURVES

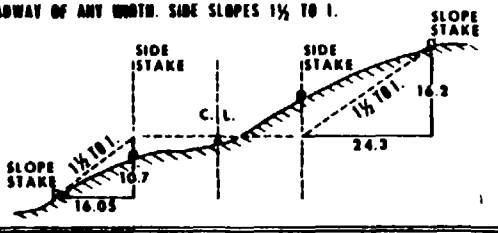
Table X—RODS IN FEET, 10THS AND 100THS OF FEET

Table XI—LINKS IN FEET, 10THS AND 100THS OF FEET

TABLE I. SLOPE STAKE

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

ROADWAY OF ANY WIDTH. SIDE SLOPES 1½ TO 1.



Cut or Fill	Distance out from Side or Shoulder Stake.										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.00	1.15	1.30	1.45	1.60	1.75	1.90	2.05	2.20	2.35	1
2	2.00	2.15	2.30	2.45	2.60	2.75	2.90	3.05	3.20	3.35	2
3	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	3
4	4.00	4.15	4.30	4.45	4.60	4.75	4.90	5.05	5.20	5.35	4
5	5.00	5.15	5.30	5.45	5.60	5.75	5.90	6.05	6.20	6.35	5
6	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	6
7	7.00	7.15	7.30	7.45	7.60	7.75	7.90	8.05	8.20	8.35	7
8	8.00	8.15	8.30	8.45	8.60	8.75	8.90	9.05	9.20	9.35	8
9	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	9
10	10.00	10.15	10.30	10.45	10.60	10.75	10.90	11.05	11.20	11.35	10
11	11.00	11.15	11.30	11.45	11.60	11.75	11.90	12.05	12.20	12.35	11
12	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	12
13	13.00	13.15	13.30	13.45	13.60	13.75	13.90	14.05	14.20	14.35	13
14	14.00	14.15	14.30	14.45	14.60	14.75	14.90	15.05	15.20	15.35	14
15	15.00	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	15
16	16.00	16.15	16.30	16.45	16.60	16.75	16.90	17.05	17.20	17.35	16
17	17.00	17.15	17.30	17.45	17.60	17.75	17.90	18.05	18.20	18.35	17
18	18.00	18.15	18.30	18.45	18.60	18.75	18.90	19.05	19.20	19.35	18
19	19.00	19.15	19.30	19.45	19.60	19.75	19.90	20.05	20.20	20.35	19
20	20.00	20.15	20.30	20.45	20.60	20.75	20.90	21.05	21.20	21.35	20
21	21.00	21.15	21.30	21.45	21.60	21.75	21.90	22.05	22.20	22.35	21
22	22.00	22.15	22.30	22.45	22.60	22.75	22.90	23.05	23.20	23.35	22
23	23.00	23.15	23.30	23.45	23.60	23.75	23.90	24.05	24.20	24.35	23
24	24.00	24.15	24.30	24.45	24.60	24.75	24.90	25.05	25.20	25.35	24
25	25.00	25.15	25.30	25.45	25.60	25.75	25.90	26.05	26.20	26.35	25
26	26.00	26.15	26.30	26.45	26.60	26.75	26.90	27.05	27.20	27.35	26
27	27.00	27.15	27.30	27.45	27.60	27.75	27.90	28.05	28.20	28.35	27
28	28.00	28.15	28.30	28.45	28.60	28.75	28.90	29.05	29.20	29.35	28
29	29.00	29.15	29.30	29.45	29.60	29.75	29.90	30.05	30.20	30.35	29
30	30.00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	30
31	31.00	31.15	31.30	31.45	31.60	31.75	31.90	32.05	32.20	32.35	31
32	32.00	32.15	32.30	32.45	32.60	32.75	32.90	33.05	33.20	33.35	32
33	33.00	33.15	33.30	33.45	33.60	33.75	33.90	34.05	34.20	34.35	33
34	34.00	34.15	34.30	34.45	34.60	34.75	34.90	35.05	35.20	35.35	34
35	35.00	35.15	35.30	35.45	35.60	35.75	35.90	36.05	36.20	36.35	35
36	36.00	36.15	36.30	36.45	36.60	36.75	36.90	37.05	37.20	37.35	36
37	37.00	37.15	37.30	37.45	37.60	37.75	37.90	38.05	38.20	38.35	37
38	38.00	38.15	38.30	38.45	38.60	38.75	38.90	39.05	39.20	39.35	38
39	39.00	39.15	39.30	39.45	39.60	39.75	39.90	40.05	40.20	40.35	39
40	40.00	40.15	40.30	40.45	40.60	40.75	40.90	41.05	41.20	41.35	40

TABLE II. STADIA CORRECTION AND HORIZONTAL DISTANCES

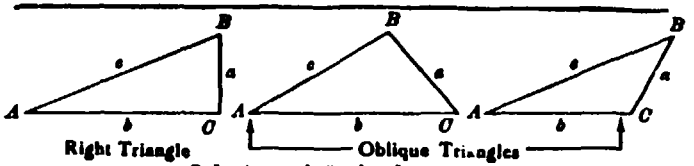
STADIA REDUCTIONS FOR READING 100

Vertical Angle	Horizontal Correction	Difference in Elevation	Vertical Angle	Horizontal Correction	Difference in Elevation
2°–00′	0.1	3.5	18°–30′	10.1	30.1
3°–00′	0.3	5.3	19°–00′	10.6	30.8
4°–00′	0.5	7.0	19°–30′	11.2	31.5
5°–00′	0.8	8.7	20°–00′	11.7	32.1
6°–00′	1.1	10.4	20°–30′	12.3	32.8
7°–00′	1.5	12.1	21°–00′	12.8	33.5
8°–00′	1.9	13.8	21°–30′	13.4	34.1
9°–00′	2.5	15.5	22°–00′	14.0	34.7
10°–00′	3.0	17.10	22°–30′	14.7	35.4
10°–30′	3.3	17.9	23°–00′	15.3	36.0
11°–00′	3.6	18.7	23°–30′	15.9	36.6
11°–30′	4.0	19.5	24°–00′	16.5	37.2
12°–00′	4.3	20.3	24°–30′	17.2	37.7
12°–30′	4.7	21.1	25°–00′	17.9	38.3
13°–00′	5.1	21.9	25°–30′	18.6	39.0
13°–30′	5.5	22.7	26°–00′	19.2	39.4
14°–00′	5.9	23.4	26°–30′	19.9	39.9
14°–30′	6.3	24.2	27°–00′	20.6	40.5
15°–00′	6.7	25.0	27°–30′	21.3	41.0
15°–30′	7.2	25.8	28°–00′	22.0	42.0
16°–00′	7.6	26.5	28°–30′	22.8	41.9
16°–30′	8.1	27.2	29°–00′	23.5	42.4
17°–00′	8.5	28.0	29°–30′	24.3	42.9
17°–30′	9.0	28.7	30°–00′	25.0	43.3
18°–00′	9.5	29.4			

Chains to Feet	
1	66
2	132
3	198
4	264
5	330
6	396
7	462
8	528
9	594
10	660

Feet to Chains	
100	1.515
200	3.030
300	4.545
400	6.060
500	7.575
600	9.090
700	10.606
800	12.121
900	13.636
1,000	15.151

TABLE III. TRIGONOMETRIC FORMULAE



Solution of Right Triangles

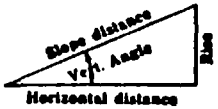
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B,\ c = \sqrt{a^2+b^2} = a\sqrt{1+\frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B,\ b = \sqrt{(c+a)(c-a)} = c\sqrt{1-\frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}.$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}.$
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A.$

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C,\ \tan \frac{1}{2}(A-B) = \frac{(a-b)\tan\frac{1}{2}(A+B)}{a+b}.$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2},\ \sin\frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}.$ $\sin\frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}},\ C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2},\ \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 318.4 ft. Vert. angle = 5° 10′. From Table, IV, cos 5° 10′ = .9960. Horizontal distance = 318.4 × .9960 = 317.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 − cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9960. 1 − .9960 = .0041. 318.4 × .0041 = 1.31. 318.4 − 1.31 = 317.09 ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 16 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{16 \times 16}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

TABLE IV. NATURAL TRIGONOMETRICAL FUNCTIONS

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.		Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′								° ′							
0	0	0	1.	∞	∞	1.	90	8	.1392	1.403	1.0098	7.185	7.115	.99027	82
10	.0029	.0029		343.8	343.8	1	50	10	.1421	1.435	1.0102	7.040	6.968	.98986	50
20	.0058	.0058		171.9	171.9	.99998	40	20	.1449	1.465	1.0107	6.900	6.827	.98944	40
30	.0087	.0087		114.6	114.6	.99996	30	30	.1478	1.495	1.0111	6.766	6.691	.98902	30
40	.0116	.0116	1.0001	85.94	85.94	.99993	20	40	.1507	1.524	1.0115	6.636	6.561	.98858	20
50	.0145	.0145	1.0001	68.76	68.75	.99989	10	50	.1536	1.554	1.0120	6.512	6.435	.98814	10
1	.0175	.0175	1.0002	57.30	57.29	.99985	89	9	.1564	1.584	1.0125	6.394	6.314	.98769	81
10	.0204	.0204	1.0002	49.11	49.10	.99979	50	10	.1593	1.614	1.0129	6.277	6.197	.98723	50
20	.0233	.0233	1.0003	42.98	42.96	.99973	40	20	.1622	1.644	1.0134	6.166	6.084	.98676	40
30	.0262	.0262	1.0003	38.20	38.19	.99966	30	30	.1650	1.673	1.0139	6.059	5.976	.98629	30
40	.0291	.0291	1.0004	34.38	34.37	.99958	20	40	.1679	1.703	1.0144	5.955	5.871	.98580	20
50	.0320	.0320	1.0005	31.26	31.24	.99949	10	50	.1708	1.733	1.0149	5.855	5.769	.98531	10
2	.0349	.0349	1.0006	28.65	28.64	.99939	88	10	.1736	1.763	1.0154	5.759	5.671	.98481	80
10	.0378	.0378	1.0007	26.45	26.43	.99929	50	10	.1765	.1793	1.0160	5.665	5.576	.98430	50
20	.0407	.0407	1.0008	24.56	24.54	.99917	40	20	.1794	1.823	1.0165	5.575	5.485	.98378	40
30	.0436	.0437	1.0010	22.93	22.90	.99905	30	30	.1822	1.853	1.0170	5.488	5.396	.98325	30
40	.0465	.0466	1.0011	21.49	21.47	.99892	20	40	.1851	1.883	1.0176	5.403	5.309	.98272	20
50	.0494	.0495	1.0012	20.23	20.21	.99878	10	50	.1880	1.914	1.0181	5.320	5.226	.98218	10
3	.0523	.0524	1.0014	19.11	19.08	.99863	87	11	.1908	1.944	1.0187	5.241	5.145	.98163	79
10	.0552	.0553	1.0015	18.10	18.07	.99847	50	10	.1937	1.974	1.0193	5.164	5.066	.98107	50
20	.0581	.0582	1.0017	17.20	17.17	.99831	40	20	.1965	2.004	1.0199	5.089	4.989	.98050	40
30	.0610	.0612	1.0019	16.38	16.35	.99813	30	30	.1994	2.035	1.0205	5.016	4.915	.97992	30
40	.0640	.0641	1.0020	15.64	15.60	.99795	20	40	.2022	2.065	1.0211	4.945	4.843	.97934	20
50	.0669	.0670	1.0022	14.96	14.92	.99776	10	50	.2051	2.095	1.0217	4.877	4.773	.97875	10
4	.0698	.0699	1.0024	14.34	14.30	.99756	86	12	.2079	2.126	1.0223	4.810	4.705	.97815	78
10	.0727	.0729	1.0027	13.76	13.73	.99736	50	10	.2108	2.156	1.0230	4.745	4.638	.97754	50
20	.0756	.0758	1.0029	13.23	13.20	.99714	40	20	.2136	2.186	1.0236	4.682	4.574	.97692	40
30	.0785	.0787	1.0031	12.75	12.71	.99692	30	30	.2164	2.217	1.0243	4.620	4.511	.97630	30
40	.0814	.0816	1.0033	12.29	12.25	.99668	20	40	.2193	2.247	1.0249	4.560	4.449	.97566	20
50	.0843	.0846	1.0036	11.87	11.83	.99644	10	50	.2221	2.278	1.0256	4.502	4.390	.97502	10
5	.0872	.0875	1.0038	11.47	11.43	.99619	85	13	.2250	2.309	1.0263	4.445	4.331	.97437	77
10	.0901	.0904	1.0041	11.10	11.06	.99594	50	10	.2278	2.339	1.0270	4.390	4.275	.97371	50
20	.0929	.0934	1.0043	10.76	10.71	.99567	40	20	.2306	2.370	1.0277	4.336	4.219	.97304	40
30	.0958	.0963	1.0046	10.43	10.39	.99540	30	30	.2334	2.401	1.0284	4.284	4.165	.97237	30
40	.0987	.0992	1.0049	10.13	10.08	.99511	20	40	.2363	2.432	1.0291	4.232	4.113	.97169	20
50	.1016	.1022	1.0052	9.839	9.788	.99482	10	50	.2391	2.462	1.0299	4.182	4.061	.97100	10
6	.1045	.1051	1.0055	9.567	9.514	.99452	84	14	.2419	2.493	1.0306	4.133	4.011	.97030	76
10	.1074	.1080	1.0058	9.309	9.255	.99421	50	10	.2447	2.524	1.0314	4.086	3.962	.96959	50
20	.1103	.1110	1.0061	9.065	9.010	.99390	40	20	.2476	2.555	1.0321	4.039	3.914	.96887	40
30	.1132	.1139	1.0065	8.834	8.777	.99357	30	30	.2504	2.586	1.0329	3.994	3.867	.96815	30
40	.1161	.1169	1.0068	8.614	8.556	.99324	20	40	.2532	2.617	1.0337	3.949	3.821	.96742	20
50	.1190	.1198	1.0072	8.405	8.345	.99290	10	50	.2560	2.648	1.0345	3.906	3.776	.96667	10
7	.1219	.1228	1.0075	8.206	8.144	.99253	83	15	.2588	2.679	1.0353	3.864	3.732	.96593	75
10	.1248	.1257	1.0079	8.016	7.953	.99219	50	10	.2616	2.711	1.0361	3.822	3.689	.96517	50
20	.1276	.1287	1.0082	7.834	7.770	.99182	40	20	.2644	2.742	1.0369	3.782	3.647	.96440	40
30	.1305	.1317	1.0086	7.661	7.596	.99144	30	30	.2672	2.773	1.0377	3.742	3.606	.96363	30
40	.1334	.1346	1.0090	7.496	7.429	.99106	20	40	.2700	2.805	1.0386	3.703	3.566	.96285	20
50	.1363	.1376	1.0094	7.337	7.269	.99067	10	50	.2728	2.836	1.0394	3.665	3.526	.96206	10
							82								74
							° ′								° ′
	Cosin	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle		Cosin	Cotg.	Cosec.	Sec.	Tan.	Sin	Angle

TABLE IV CONTD. NATURAL TRIGONOMETRICAL FUNCTIONS

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.		Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′								° ′							
16	.2756	.2867	1.0403	3.628	3.487	.96126	74	24	.4067	.4452	1.0946	2.459	2.246	.91355	66
10	.2784	.2899	1.0412	3.592	3.450	.96046	50	10	.4094	.4487	1.0961	2.443	2.229	.91236	50
20	.2812	.2931	1.0423	3.556	3.412	.95964	40	20	.4120	.4522	1.0975	2.427	2.211	.91116	40
30	.2840	.2962	1.0429	3.521	3.376	.95882	30	30	.4147	.4557	1.0989	2.411	2.194	.90996	30
40	.2868	.2994	1.0438	3.487	3.340	.95799	20	40	.4173	.4592	1.1004	2.396	2.177	.90875	20
50	.2896	.3026	1.0448	3.453	3.305	.95715	10	50	.4200	.4628	1.1019	2.381	2.161	.90753	10
17	.2924	.3057	1.0457	3.420	3.271	.95630	73	25	.4226	.4663	1.1034	2.366	2.145	.90631	65
10	.2952	.3089	1.0466	3.388	3.237	.95545	50	10	.4253	.4699	1.1049	2.351	2.128	.90507	50
20	.2979	.3121	1.0476	3.357	3.204	.95459	40	20	.4279	.4734	1.1064	2.337	2.112	.90383	40
30	.3007	.3153	1.0485	3.326	3.172	.95372	30	30	.4305	.4770	1.1079	2.323	2.097	.90259	30
40	.3035	.3185	1.0495	3.295	3.140	.95284	20	40	.4331	.4806	1.1095	2.309	2.081	.90133	20
50	.3062	.3217	1.0505	3.265	3.108	.95195	10	50	.4358	.4841	1.1110	2.295	2.066	.90007	10
18	.3090	.3249	1.0515	3.236	3.078	.95106	72	26	.4384	.4877	1.1126	2.281	2.050	.89879	64
10	.3118	.3281	1.0525	3.207	3.048	.95015	50	10	.4410	.4913	1.1142	2.268	2.035	.89752	50
20	.3145	.3314	1.0535	3.179	3.018	.94924	40	20	.4436	.4950	1.1158	2.254	2.020	.89623	40
30	.3173	.3346	1.0545	3.152	2.989	.94832	30	30	.4462	.4986	1.1174	2.241	2.006	.89493	30
40	.3201	.3378	1.0555	3.124	2.960	.94740	20	40	.4488	.5022	1.1190	2.228	1.991	.89363	20
50	.3228	.3411	1.0566	3.098	2.932	.94646	10	50	.4514	.5059	1.1207	2.215	1.977	.89232	10
19	.3256	.3443	1.0576	3.072	2.904	.94552	71	27	.4540	.5095	1.1223	2.203	1.963	.89101	63
10	.3283	.3476	1.0587	3.046	2.877	.94457	50	10	.4566	.5132	1.1240	2.190	1.949	.88968	50
20	.3311	.3508	1.0598	3.020	2.850	.94361	40	20	.4592	.5169	1.1257	2.178	1.935	.88835	40
30	.3338	.3541	1.0608	2.996	2.824	.94264	30	30	.4617	.5206	1.1274	2.166	1.921	.88701	30
40	.3365	.3574	1.0619	2.971	2.798	.94167	20	40	.4643	.5243	1.1291	2.154	1.907	.88566	20
50	.3393	.3607	1.0631	2.947	2.773	.94068	10	50	.4669	.5280	1.1308	2.142	1.894	.88431	10
20	.3420	.3640	1.0642	2.924	2.747	.93969	70	28	.4695	.5317	1.1326	2.130	1.881	.88295	62
10	.3448	.3673	1.0653	2.900	2.723	.93869	50	10	.4720	.5354	1.1343	2.119	1.868	.88158	50
20	.3475	.3706	1.0665	2.878	2.699	.93769	40	20	.4746	.5392	1.1361	2.107	1.855	.88020	40
30	.3502	.3739	1.0676	2.856	2.675	.93667	30	30	.4772	.5430	1.1379	2.096	1.842	.87882	30
40	.3529	.3772	1.0688	2.833	2.651	.93565	20	40	.4797	.5467	1.1397	2.085	1.829	.87743	20
50	.3557	.3805	1.0700	2.811	2.628	.93462	10	50	.4823	.5505	1.1415	2.073	1.816	.87603	10
21	.3584	.3839	1.0711	2.790	2.605	.93358	69	29	.4848	.5543	1.1434	2.063	1.804	.87462	61
10	.3611	.3872	1.0723	2.769	2.583	.93253	50	10	.4874	.5581	1.1452	2.052	1.792	.87321	50
20	.3638	.3906	1.0736	2.749	2.560	.93148	40	20	.4899	.5619	1.1471	2.041	1.780	.87178	40
30	.3665	.3939	1.0748	2.729	2.539	.93042	30	30	.4924	.5658	1.1490	2.031	1.767	.87036	30
40	.3692	.3973	1.0760	2.709	2.517	.92935	20	40	.4950	.5696	1.1509	2.020	1.756	.86892	20
50	.3719	.4006	1.0773	2.689	2.496	.92827	10	50	.4975	.5735	1.1528	2.010	1.744	.86748	10
22	.3746	.4040	1.0785	2.670	2.475	.92718	68	30	.5000	.5774	1.1547	2.000	1.732	.86603	60
10	.3773	.4074	1.0798	2.650	2.455	.92609	50	10	.5025	.5812	1.1566	1.990	1.720	.86457	50
20	.3800	.4108	1.0811	2.632	2.434	.92499	40	20	.5050	.5851	1.1586	1.980	1.709	.86310	40
30	.3827	.4142	1.0824	2.613	2.414	.92388	30	30	.5075	.5890	1.1606	1.970	1.698	.86163	30
40	.3854	.4176	1.0837	2.595	2.394	.92276	20	40	.5100	.5930	1.1626	1.961	1.686	.86015	20
50	.3881	.4210	1.0850	2.577	2.375	.92164	10	50	.5125	.5969	1.1646	1.951	1.675	.85866	10
23	.3907	.4245	1.0864	2.559	2.356	.92050	67	31	.5150	.6009	1.1666	1.924	1.664	.85717	59
10	.3934	.4279	1.0877	2.542	2.337	.91936	50	10	.5175	.6048	1.1687	1.932	1.653	.85567	50
20	.3961	.4314	1.0891	2.525	2.318	.91822	40	20	.5200	.6088	1.1707	1.923	1.643	.85416	40
30	.3987	.4348	1.0904	2.508	2.300	.91706	30	30	.5225	.6128	1.1728	1.914	1.632	.85264	30
40	.4014	.4383	1.0918	2.491	2.282	.91590	20	40	.5250	.6168	1.1749	1.905	1.621	.85112	20
50	.4041	.4417	1.0932	2.475	2.264	.91472	10	50	.5275	.6208	1.1770	1.896	1.611	.84959	10
							66 ° ′								58 ° ′
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle		Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

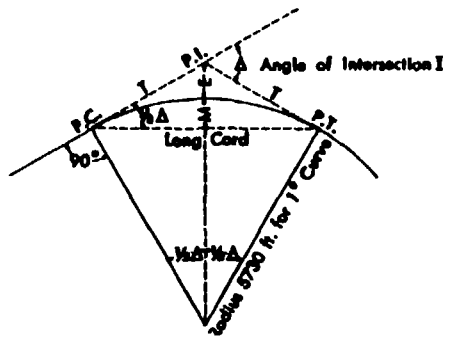
TABLE IV CONTD. NATURAL TRIGONOMETRICAL FUNCTIONS

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.		Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′								° ′							
32	.5299	.6249	1.1792	1.887	1.600	.84805	58	39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.5324	.6289	1.1813	1.878	1.590	.84650	50	10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40	20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30	30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20	40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10	50	.6406	.8342	1.3022	1.561	1.199	.76791	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57	40	.6428	.8391	1.3054	1.556	1.192	.76604	50
10	.5471	.6536	1.1946	1.828	1.530	.83708	50	10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40	20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30	30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20	40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10	50	.6539	.8642	1.3217	1.529	1.157	.75661	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56	41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.5616	.6787	1.2086	1.781	1.473	.82741	50	10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40	20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30	30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20	40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10	50	.6670	.8952	1.3421	1.499	1.117	.74509	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55	42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.5760	.7046	1.2233	1.736	1.419	.81748	50	10	.6713	.9057	1.3492	1.490	1.104	.74120	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40	20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30	30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20	40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10	50	.6799	.9271	1.3636	1.471	1.079	.73333	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54	43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.5901	.7310	1.2387	1.695	1.368	.80730	50	10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40	20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30	30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20	40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10	50	.6926	.9601	1.3863	1.444	1.042	.72136	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53	44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6041	.7581	1.2549	1.655	1.319	.79688	50	10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40	20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.6088	.7673	1.2605	1.643	1.303	.79335	30	30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20	40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10	50	.7050	.9942	1.4101	1.418	1.006	.70916	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52		.7071	1.	1.414	1.414	1.	.70711	45
10	.6180	.7860	1.2719	1.618	1.272	.78622	50								
20	.6202	.7907	1.2748	1.612	1.265	.78442	40								
30	.6225	.7954	1.2778	1.606	1.257	.78261	30								
40	.6248	.8002	1.2808	1.601	1.250	.78079	20								
50	.6271	.8050	1.2838	1.595	1.242	.77897	10								
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle		Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

CURVE FORMULAE

CURVE TABLE

Table of Tangent and External to a 1° Curve



To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I by given tangent, (or external).

The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

CURVE FORMULAS

Radius: $R = \dfrac{50}{\sin \frac{1}{2} D}$

Length of Curve: $L = 100 \dfrac{\Delta}{D}$

also $L = .0174533 \times \Delta \times R$

Degree of Curve: $D = 100 \dfrac{\Delta}{L}$

Tangent: $T = R \tan \frac{1}{2} \Delta$

Long Cord: $LC = 2R \sin \frac{1}{2} \Delta$

Middle Ordinate: $M = R\ (1 - \cos \frac{1}{2} \Delta)$

External: $E = T \tan \frac{1}{4} \Delta$

TABLE V. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10'	58.34	.297	5° C.	10'	560.11	27.313	5° C.	10'	1070.6	99.155	5° C.
20'	66.67	.388	T	20'	568.53	28.137	T	20'	1079.2	100.75	T
30'	75.01	.491	.03	30'	576.96	28.974	.06	30'	1087.8	102.35	.10
40'	83.34	.606	E	40'	585.36	29.824	E	40'	1096.4	103.97	E
50'	91.68	.733	.001	50'	593.79	30.686	006	50'	1105.1	105.60	013
2°	100.01	.873		12°	602.21	31.561		22°	1113.7	107.24	
10'	108.35	1.024		10'	610.64	32.447		10'	1122.4	108.90	
20'	116.68	1.188		20'	619.07	33.347		20'	1131.0	110.57	
30'	125.02	1.364		30'	627.50	34.259		30'	1139.7	112.25	
40'	133.36	1.552		40'	635.93	35.183		40'	1148.4	113.95	
50'	141.70	1.752		50'	644.37	36.120		50'	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10'	158.38	2.188	T	10'	661.25	38.031	T	10'	1174.4	119.12	T
20'	166.72	2.425	.06	20'	669.70	39.006	.13	20'	1183.1	120.87	.19
30'	175.06	2.674	E	30'	678.15	39.993	E	30'	1191.8	122.63	E
40'	183.40	2.934	.003	40'	686.60	40.992	.011	40'	1200.5	124.41	.025
50'	191.74	3.207		50'	695.06	42.004		50'	1209.2	126.20	
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10'	208.43	3.790		10'	711.97	44.066		10'	1226.6	129.82	
20'	216.77	4.099		20'	720.44	45.116		20'	1235.3	131.65	
30'	225.12	4.421		30'	728.90	46.178		30'	1244.0	133.50	
40'	233.47	4.755		40'	737.37	47.253		40'	1252.8	135.35	
50'	241.81	5.100	15° C.	50'	745.85	48.341	15° C	50'	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10'	258.51	5.829	.09	10'	762.80	50.554	.19	10'	1279.0	141.01	29
20'	266.86	6.211	E	20'	771.29	51.679	E	20'	1287.7	142.93	E
30'	275.21	6.606	.004	30'	779.77	52.818	.017	30'	1296.5	144.85	038
40'	283.57	7.013		40'	788.26	53.969		40'	1305.3	146.79	
50'	291.92	7.432		50'	796.75	55.132		50'	1314.0	148.75	
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10'	308.64	8.307		10'	813.75	57.498		10'	1331.6	152.69	
20'	316.99	8.762		20'	822.25	58.699		20'	1340.4	154.69	
30'	325.35	9.230		30'	830.76	59.914		30'	1349.2	156.70	
40'	333.71	9.710	20° C.	40'	839.27	61.141	20° C.	40'	1358.0	158.72	20° C.
50'	342.08	10.202	T	50'	847.78	62.381	T	50'	1366.8	160.76	T
7°	350.44	10.707	.13	17°	856.30	63.634	.26	27°	1375.6	162.81	.39
10'	358.81	11.224	E	10'	864.82	64.900	E	10'	1384.4	164.86	E
20'	367.17	11.753	.006	20'	873.35	66.178	.022	20'	1393.2	166.95	051
30'	375.54	12.294		30'	881.88	67.470		30'	1402.0	169.04	
40'	383.91	12.847		40'	890.41	68.774		40'	1410.9	171.15	
50'	392.28	13.413		50'	898.95	70.091		50'	1419.7	173.27	
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10'	409.03	14.582		10'	916.03	72.764		10'	1437.4	177.55	
20'	417.41	15.184	25° C.	20'	924.58	74.119	25° C	20'	1446.3	179.72	25° C
30'	425.79	15.799	T	30'	933.13	75.488	T	30'	1455.1	181.89	T
40'	434.17	16.426	.16	40'	941.69	76.869	.32	40'	1464.0	184.08	49
50'	442.55	17.065	E	50'	950.25	78.264	E	50'	1472.9	186.29	E
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	065
10'	459.32	18.381		10'	967.38	81.092		10'	1490.7	190.74	
20'	467.71	19.058		20'	975.96	82.525		20'	1499.6	192.99	
30'	476.10	19.746		30'	984.53	83.972		30'	1508.5	195.25	
40'	484.49	20.447		40'	993.12	85.431		40'	1517.4	197.53	
50'	492.88	21.161		50'	1001.7	86.904		50'	1526.3	199.82	
10°	501.28	21.887	30° C	20°	1010.3	88.389	30° C	30°	1535.3	202.12	30° C
10'	509.68	22.624	T	10'	1018.9	89.888	T	10'	1544.2	204.44	T
20'	518.08	23.375	19	20'	1027.5	91.399	39	20'	1553.1	206.77	.59
30'	526.48	24.138	E	30	1036.1	92.924	E	30'	1562.1	209.12	E
40'	534.89	24.913	.008	40'	1044.7	94.462	034	40'	1571.0	211.48	078
50'	543.29	25.700		50'	1053.3	96.013		50'	1580.0	213.86	

$T = R \tan \frac{1}{2} I$ $E = R \operatorname{exsec} \frac{1}{2} I$

TABLE V CONTD. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=40°	I	T	E	I=50°	I	T	E	I=60°
31°	1589.0	216.3	+	41°	2142.2	387.4	+	51°	2732.9	618.4	+
10'	1598.0	218.7	5° C.	10'	2151.7	390.7	5° C	10'	2743.1	622.8	5° C.
20'	1606.9	221.1	T	20'	2161.2	394.1	T	20'	2753.4	627.2	T
30'	1615.9	223.5	.13	30'	2170.8	397.4	.17	30'	2763.7	631.7	.21
40'	1624.9	226.0	E	40'	2180.3	400.8	E	40'	2773.9	636.2	E
50'	1633.9	228.4	023	50'	2189.9	404.2	.037	50'	2784.2	640.7	.056
32°	1643.0	230.9		42°	2199.4	407.6		52°	2794.5	645.2	
10'	1652.0	233.4		10'	2209.0	411.1		10'	2804.9	649.7	
20'	1661.0	235.9		20'	2218.6	414.5		20'	2815.2	654.3	
30'	1670.0	238.4		30'	2228.1	418.0		30'	2825.6	658.8	
40'	1679.1	241.0		40'	2237.7	421.4		40'	2835.9	663.4	
50'	1688.1	243.6		50'	2247.3	425.0		50'	2846.3	668.0	
33°	1697.2	246.1	10° C.	43°	2257.0	428.5	10° C.	53°	2856.7	672.7	10° C.
10'	1706.3	248.7	T	10'	2266.6	432.0	T	10'	2867.1	677.3	T
20'	1715.3	251.3	.26	20'	2276.2	435.6	.34	20'	2877.5	682.0	.42
30'	1724.4	253.9	E	30'	2285.9	439.2	E	30'	2888.0	686.7	E
40'	1733.5	256.5	.046	40'	2295.6	442.8	075	40'	2898.4	691.4	.112
50'	1742.6	259.1		50'	2305.2	446.4		50'	2908.9	696.1	
34°	1751.7	261.8		44°	2314.9	450.0		54°	2919.4	700.9	
10'	1760.8	264.5		10'	2324.6	453.6		10'	2929.9	705.7	
20'	1770.0	267.2		20'	2334.3	457.3		20'	2940.4	710.5	
30'	1779.1	269.9		30'	2344.1	461.0		30'	2951.0	715.3	
40'	1788.2	272.6		40'	2353.8	464.6		40'	2961.5	720.1	
50'	1797.4	275.3	15° C.	50'	2363.5	468.4	15° C	50'	2972.1	725.0	15° C.
35°	1806.6	278.1	T	45°	2373.3	472.1	T	55°	2982.7	729.9	T
10'	1815.7	280.8	.40	10'	2383.1	475.8	.51	10'	2993.3	734.8	.63
20'	1824.9	283.6	E	20'	2392.8	479.6	E	[illegible]	3003.9	739.7	E
30'	1834.1	286.4	.070	30'	2402.6	483.4	.116	[illegible]	3014.5	744.6	.168
40'	1843.3	289.2		40'	2412.4	487.2		[illegible]	3025.2	749.6	
50'	1852.5	292.0		50'	2422.3	491.0		5[illegible]	3035.8	754.6	
36°	1861.7	294.9		46°	2432.1	494.8		56°	3046.5	759.6	
10'	1870.9	297.7		10'	2441.9	498.7		10'	3057.2	764.6	
20'	1880.1	300.6		20'	2451.8	502.5		20'	3067.9	769.7	
30'	1889.4	303.5		30'	2461.7	506.4		30'	3078.7	774.7	
40'	1898.6	306.4	20° C.	40'	2471.5	510.3	20° C.	40'	3089.4	779.8	20° C.
50'	1907.9	309.3	T	50'	2481.4	514.3	T	50'	3100.2	784.9	T
37°	1917.1	312.2	.53	47°	2491.3	518.2	.68	57°	3110.9	790.1	.84
10'	1926.4	315.2	E	10'	2501.2	522.2	E	10'	3121.7	795.2	E
20'	1935.7	318.1	093	20'	2511.2	526.1	151	20'	3132.6	800.4	.225
30'	1945.0	321.1		30'	2521.1	530.1		30'	3143.4	805.6	
40'	1954.3	324.1		40'	2531.1	534.2		40'	3154.2	810.9	
50'	1963.6	327.1		50'	2541.0	538.2		50'	3165.1	816.1	
38°	1972.9	330.2		48°	2551.0	542.2		58°	3176.0	821.4	
10'	1982.2	333.2		10'	2561.0	546.3		10'	3186.9	826.7	
20'	1991.5	336.3	25° C.	20'	2571.0	550.4	25° C.	20'	3197.8	832.0	25° C.
30'	2000.9	339.3	T	30'	2581.0	554.5	T	30'	3208.8	837.3	T
40'	2010.2	342.4	67	40'	2591.0	558.6	.85	40'	3219.7	842.7	1.05
50'	2019.6	345.5	E	50'	2601.1	562.8	E	50'	3230.7	848.1	E
39°	2029.0	348.6	117	49°	2611.2	566.9	.189	59°	3241.7	853.5	.283
10'	2038.4	351.8		10'	2621.2	571.1		10'	3252.7	858.9	
20'	2047.8	354.9		20'	2631.3	575.2		20'	3263.7	864.3	
30'	2057.2	358.1		30'	2641.4	579.5		30'	3274.8	869.8	
40'	2066.6	361.3		40'	2651.5	583.8		40'	3285.8	875.3	
50'	2076.0	364.5		50'	2661.6	588.0		50'	3296.9	880.8	
40°	2085.4	367.7	30° C	50°	2671.8	592.3	30° C	60°	3308.0	886.4	30 C.
10'	2094.9	371.0	T	10'	2681.9	596.6	T	10'	3319.1	892.0	T
20'	2104.3	374.2	80	20'	2692.1	600.9	1.02	20'	3330.3	897.5	1.27
30'	2113.8	377.5	E	30'	2702.3	605.3	E	30'	3341.4	903.2	E
40'	2123.3	380.8	.141	40'	2712.5	609.6	227	40'	3352.6	908.8	.340
50'	2132.7	384.1		50'	2722.7	614.0		50'	3363.8	914.5	

T = R tan ½I E = R exsec ½I

TABLE V CONTD. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=70°	I	T	E	I=80°	I	T	E	I=90°
61°	3375.0	920.2	+	71°	4086.9	1308.2	+	81°	4893.6	1805.3	+
10'	3386.3	925.9	5° C.	10'	4099.5	1315.6	5° C	10'	4908.0	1814.7	5° C
20'	3397.5	931.6	T	20'	4112.1	1322.9	T	20'	4922.5	1824.1	T
30'	3408.8	937.3	25	30'	4124.8	1330.3	.30	30'	4937.0	1833.6	36
40'	3420.1	943.1	E	40'	4137.4	1337.7	E	40'	4951.5	1843.1	E
50'	3431.4	948.9	.080	50'	4150.1	1345.1	.110	50'	4966.1	1852.6	149
62°	3442.7	954.8		72°	4162.8	1352.6		82°	4980.7	1862.2	
10'	3454.1	960.6		10'	4175.6	1360.1		10'	4995.4	1871.8	
20'	3465.4	966.5		20'	4188.5	1367.6		20'	5010.0	1881.5	
30'	3476.8	972.4		30'	4201.2	1375.2		30'	5024.8	1891.2	
40'	3488.3	978.3		40'	4214.0	1382.8		40'	5039.5	1900.9	
50'	3499.7	984.3		50'	4226.8	1390.4		50'	5054.3	1910.7	
63°	3511.1	990.2	10° C.	73°	4239.7	1398.0	10° C	83°	5069.2	1920.5	10° C
10'	3522.6	996.2	T	10'	4252.6	1405.7	T	10'	5084.0	1930.4	T
20'	3534.1	1002.3	.51	20'	4265.6	1413.5	.61	20'	5099.0	1940.3	.72
30'	3545.6	1008.3	E	30'	4278.5	1421.2	E	30'	5113.9	1950.3	E
40'	3557.2	1014.4	.159	40'	4291.5	1429.0	.220	40'	5128.9	1960.2	299
50'	3568.7	1020.5		50'	4304.6	1436.8		50'	5143.9	1970.3	
64°	3580.3	1026.6		74°	4317.6	1444.6		84°	5159.0	1980.4	
10'	3591.9	1032.8		10'	4330.7	1452.5		10'	5174.1	1990.5	
20'	3603.5	1039.0		20'	4343.8	1460.4		20'	5189.3	2000.6	
30'	3615.1	1045.2		30'	4356.9	1468.4		30'	5204.4	2010.8	
40'	3626.8	1051.4		40'	4370.1	1476.4		40'	5219.7	2021.1	
50'	3638.5	1057.7	15° C.	50'	4383.3	1484.4	15° C	50'	5234.9	2031.4	15° C
65°	3650.2	1063.9	T	75°	4396.5	1492.4	T	85°	5250.3	2041.7	T
10'	3661.9	1070.2	.76	10'	4409.8	1500.5	.91	10'	5265.6	2052.1	1.09
20'	3673.7	1076.6	E	20'	4423.1	1508.6	E	20'	5281.0	2062.5	E
30'	3685.4	1082.9	.240	30'	4436.4	1516.7	.332	30'	5296.4	2073.0	450
40'	3697.2	1089.3		40'	4449.7	1524.9		40'	5311.9	2083.5	
50'	3709.0	1095.7		50'	4463.1	1533.1		50'	5327.4	2094.1	
66°	3720.9	1102.2		76°	4476.5	1541.4		86°	5343.0	2104.7	
10'	3732.7	1108.6		10'	4489.9	1549.7		10'	5358.6	2115.3	
20'	3744.6	1115.1		20'	4503.4	1558.0		20'	5374.2	2126.0	
30'	3756.5	1121.7	20° C.	30'	4516.9	1566.3		30'	5389.9	2136.7	
40'	3768.5	1128.2	T	40'	4530.4	1574.7	20° C	40'	5405.6	2147.5	20° C
50'	3780.4	1134.8	1.02	50'	4544.0	1583.1	T	50'	5421.4	2158.4	T
67°	3792.4	1141.4	E	77°	4557.6	1591.6	1.22	87°	5437.2	2169.2	1.45
10'	3804.4	1148.0	.321	10'	4571.2	1600.1	E	10'	5453.1	2180.2	E
20'	3816.4	1154.7		20'	4584.8	1608.6	.445	20'	5469.0	2191.1	603
30'	3828.4	1161.3		30'	4598.5	1617.1		30'	5484.9	2202.2	
40'	3840.5	1168.1		40'	4612.2	1625.7		40'	5500.9	2213.2	
50'	3852.6	1174.8		50'	4626.0	1634.4		50'	5517.0	2224.3	
68°	3864.7	1181.6		78°	4639.8	1643.0		88°	5533.1	2235.5	
10'	3876.8	1188.4		10'	4653.6	1651.7		10'	5549.2	2246.7	
20'	3889.0	1195.2	25° C.	20'	4667.4	1660.5	25° C	20'	5565.4	2258.0	25° C
30'	3901.2	1202.0	T	30'	4681.3	1669.2	T	30'	5581.6	2269.3	T
40'	3913.4	1208.9	1.28	40'	4695.2	1678.1	1.53	40'	5597.8	2280.6	1.83
50'	3925.6	1215.8	E	50'	4709.2	1686.9	E	50'	5614.2	2292.0	E
69°	3937.9	1222.7	.403	79°	4723.2	1695.8	.558	89°	5630.5	2303.5	756
10'	3950.2	1229.7		10'	4737.2	1704.7		10'	5646.9	2315.0	
20'	3962.5	1236.7		20'	4751.2	1713.7		20'	5663.4	2326.6	
30'	3974.8	1243.7		30'	4765.3	1722.7		30'	5679.9	2338.2	
40'	3987.2	1250.8		40'	4779.4	1731.7		40'	5696.4	2349.8	
50'	3999.5	1257.9		50'	4793.6	1740.8		50'	5713.0	2361.5	
70°	4011.9	1265.0	30° C.	80°	4807.7	1749.9	30° C	90°	5729.7	2373.3	30° C
10'	4024.4	1272.1	T	10'	4822.0	1759.0	T	10'	5746.3	2385.1	T
20'	4036.8	1279.3	1.54	20'	4836.2	1768.2	1.84	20'	5763.1	2397.0	2.20
30'	4049.3	1286.5	E	30'	4850.5	1777.4	E	30'	5779.9	2408.9	E
40'	4061.8	1293.6	.485	40'	4864.8	1786.7	.671	40'	5796.7	2420.9	910
50'	4074.4	1300.9		50'	4879.2	1796.0		50'	5813.6	2432.9	

T = R tan ½I E = R exsec ½I

TABLE V CONTD. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10′	5847.5	2457.1	5° C	10′	6971.3	3294.1	5° C.	10′	8362.7	4407.6	5° C.
20′	5864.6	2469.3	T	20′	6992.0	3310.1	T	20′	8388.9	4429.2	T
30′	5881.7	2481.5	.43	30′	7012.7	3326.1	.51	30′	8415.1	4450.9	.62
40′	5898.8	2493.8	E	40′	7033.6	3342.3	E	40′	8441.5	4472.7	E
50′	5916.0	2506.1	.200	50′	7054.5	3358.5	.268	50′	8468.0	4494.6	.360
92°	5933.2	2518.5		102°	7075.5	3374.9		112°	8494.6	4516.6	
10′	5950.5	2531.0		10′	7096.6	3391.2		10′	8521.3	4538.8	
20′	5967.9	2543.5		20′	7117.8	3407.7		20′	8548.1	4561.1	
30′	5985.3	2556.0		30′	7139.0	3424.3		30′	8575.0	4583.4	
40′	6002.7	2568.6		40′	7160.3	3440.9		40′	8602.1	4606.0	
50′	6020.2	2581.3		50′	7181.7	3457.6		50′	8629.3	4628.6	
93°	6037.8	2594.0	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10′	6055.4	2606.8	T	10′	7224.7	3491.3	T	10′	8684.0	4674.2	T
20′	6073.1	2619.7	.86	20′	7246.3	3508.2	.103	20′	8711.5	4697.2	1.25
30′	6090.8	2632.6	E	30′	7268.0	3525.2	E	30′	8739.2	4720.3	E
40′	6108.6	2645.5	.401	40′	7289.8	3542.4	.536	40′	8767.0	4743.6	.721
50′	6126.4	2658.5		50′	7311.7	3559.6		50′	8794.9	4766.9	
94°	6144.3	2671.6		104°	7333.6	3576.8		114°	8822.9	4790.4	
10′	6162.2	2684.7		10′	7355.6	3594.2		10′	8851.0	4814.1	
20′	6180.2	2697.9		20′	7377.8	3611.7		20′	8879.3	4837.8	
30′	6198.3	2711.2		30′	7399.9	3629.2		30′	8907.7	4861.7	
40′	6216.4	2724.5		40′	7422.2	3646.8		40′	8936.3	4885.7	
50′	6234.6	2737.9	15° C.	50′	7444.6	3664.5	15° C.	50′	8965.0	4909.9	15° C.
95°	6252.8	2751.3	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10′	6271.1	2764.8	1.30	10′	7489.6	3700.2	1.56	10′	9022.7	4958.6	1.93
20′	6289.4	2778.3	E	20′	7512.2	3718.2	E	20′	9051.7	4983.1	E
30′	6307.9	2792.0	.604	30′	7534.9	3736.2	.806	30′	9080.9	5007.8	1.09
40′	6326.3	2805.6		40′	7557.7	3754.4		40′	9110.3	5032.6	
50′	6344.8	2819.4		50′	7580.5	3772.6		50′	9139.8	5057.6	
96°	6363.4	2833.2		106°	7603.5	3791.0		116°	9169.4	5082.7	
10′	6382.1	2847.0		10′	7626.6	3809.4		10′	9199.1	5107.9	
20′	6400.8	2861.0		20′	7649.7	3827.9		20′	9229.0	5133.3	
30′	6419.5	2875.0		30′	7672.9	3846.5		30′	9259.0	5158.8	
40′	6438.4	2889.0	20° C.	40′	7696.3	3865.2	20° C.	40′	9289.2	5184.5	20° C.
50′	6457.3	2903.1	T	50′	7719.7	3884.0	T	50′	9319.5	5210.3	T
97°	6476.2	2917.3	1.74	107°	7743.2	3902.9	2.08	117°	9349.9	5236.2	2.52
10′	6495.2	2931.6	E	10′	7766.8	3921.9	E	10′	9380.5	5262.3	E
20′	6514.3	2945.9	.809	20′	7790.5	3940.9	1.08	20′	9411.3	5288.6	1.46
30′	6533.4	2960.3		30′	7814.3	3960.1		30′	9442.2	5315.0	
40′	6552.6	2974.7		40′	7838.1	3979.4		40′	9473.2	5341.5	
50′	6571.9	2989.2		50′	7862.1	3998.7		50′	9504.4	5368.2	
98°	6591.2	3003.8		108°	7886.2	4018.2		118°	9535.7	5395.1	
10′	6610.6	3018.4		10′	7910.4	4037.8		10′	9567.2	5422.1	
20′	6630.1	3033.1	25° C	20′	7934.6	4057.4	25° C	20′	9598.9	5449.2	25° C.
30′	6649.6	3047.9	T	30′	7959.0	4077.2	T	30′	9630.7	5476.5	T
40′	6669.2	3062.8	2.18	40′	7983.5	4097.1	2.61	40′	9662.6	5504.0	3.16
50′	6688.8	3077.7	E	50′	8008.0	4117.0	E	50′	9694.7	5531.7	E
99°	6708.6	3092.7	1.02	109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	1.83
10′	6728.4	3107.7		10′	8057.4	4157.3		10′	9759.4	5587.4	
20′	6748.2	3122.9		20′	8082.3	4177.5		20′	9792.0	5615.5	
30′	6768.1	3138.1		30′	8107.3	4197.9		30′	9824.8	5643.8	
40′	6788.1	3153.3		40′	8132.3	4218.4		40′	9857.7	5672.3	
50′	6808.2	3168.7		50′	8157.5	4239.0		50′	9890.8	5700.9	
100°	6828.3	3184.1	30° C	110°	8182.8	4259.7	30° C.	120°	9924.0	5729.7	30° C.
10′	6848.5	3199.6	T	10′	8208.2	4280.5	T	10′	9957.5	5758.6	T
20′	6868.8	3215.1	2.62	20′	8233.7	4301.4	3.14	20′	9991.0	5787.7	3.81
30′	6889.2	3230.8	E	30′	8259.3	4322.4	E	30′	10025.0	5817.0	E
40′	6909.6	3246.5	1.22	40′	8285.0	4343.6	1.63	40′	10059.0	5846.5	2.20
50′	6930.1	3262.3		50′	8310.8	4364.8		50′	10093.0	5876.1	

T = R tan ½I E = R exsec ½I

USEFUL RELATIONS

Lineal feet	×.00019	=	miles
Lineal yards	×.0006	=	miles
Square inches	×.007	=	square feet
Square feet	×.111	=	square yards
Square yards	×.0002067	=	acres
Acres	×4840	=	square yards
Cubic inches	×.00058	=	cubic feet
Cubic feet	×.03704	=	cubic yards
Links	×.22	=	yards
Links	×.66	=	feet
Feet	×1.5	=	links

360° = 21600′ = 1296000″

Radius = arc of 57.2957790°

Arc of 1° (radius = 1) = .017453292

Arc of 1′ (radius = 1) = .000290888

Arc of 1″ (radius = 1) = .000004848

Curvature of Earth's surface = about 0.7 feet in 1 mile

Curvature in feet = 0.667 (Dist. in miles)²

Difference between arc and chord length, 0.05 feet in 11½ miles

Probable error of a single observation = $0.6754\sqrt{\frac{\Sigma v^2}{n-1}}$

Error in chaining of 0.01 feet in 100 feet:

Due to—

1. Length of tape error of 0.01 feet
2. Alignment. One end 1.4 feet out of line
3. Sag of tape at center of 0.61 feet.
4. Temperature difference of 15°
5. Difference of pull of 15 lbs.

SQUARE MEASURE

144 sq. inches = 1 sq. ft.
9 sq. ft. = 1 sq. yard
30¼ sq. yds. = 1 sq. rd.
40 sq. rds. = 1 rood.
4 roods = 1 acre
640 acres = 1 sq. mile.

SURVEYORS' MEASURE

7.92 inches = 1 link.
25 links = 1 rod.
4 rds. = 1 chain.
10 sq. chains or 160 sq. rods = 1 acre.
640 acres = 1 sq. mile.
36 sq. miles (6 miles sq.) = 1 township.

TABLE VI. INCHES TO DECIMALS OF A FOOT

In.	0	1	2	3	4	5	6	7	8	9	10	11	In.
0	Foot.	[illegible]	.1667	[illegible]	[illegible]	.4167	.5000	.5833	.6667	.7500	[illegible]	.9167	0
1-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1-32
1-16	[illegible]	[illegible]	.1719	[illegible]	[illegible]	.4219	[illegible]	[illegible]	.6719	[illegible]	[illegible]	.9219	1-16
3-32	.0078	.0911	.1745	.2578	.3411	[illegible]	.5078	.5911	.6745	.7578	.8411	[illegible]	3-32
1-8	.0104	[illegible]	.1771	[illegible]	[illegible]	.4271	.5104	[illegible]	.6771	.7604	[illegible]	.9271	1-8
5-32	[illegible]	[illegible]	.1797	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5-32
3-16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3-16
7-32	[illegible]	.1016	.1849	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7-32
1-4	[illegible]	.1042	.1875	.2708	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1-4
9-32	[illegible]	[illegible]	.1901	.2734	[illegible]	.4401	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.9401	9-32
5-16	[illegible]	.1094	.1927	.2760	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5-16
11-32	[illegible]	.1120	.1953	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11-32
3-8	[illegible]	.1146	.1979	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3-8
13-32	[illegible]	.1172	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13-32
7-16	[illegible]	.1198	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7-16
15-32	[illegible]	.1224	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15-32
1-2	.0417	.1250	[illegible]	[illegible]	[illegible]	[illegible]	.5417	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1-2
17-32	[illegible]	.1276	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17-32
9-16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9-16
19-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19-32
5-8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5-8
21-32	.0547	.1380	.2214	.3047	[illegible]	.4714	.5547	[illegible]	.7214	.8047	[illegible]	.9714	21-32
11-16	.0573	[illegible]	[illegible]	.3073	[illegible]	[illegible]	.5573	[illegible]	[illegible]	.8073	[illegible]	[illegible]	11-16
23-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	23-32
3-4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3-4
25-32	.0651	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	25-32
13-16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13-16
27-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27-32
7-8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7-8
29-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	29-32
15-16	.0781	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15-16
31-32	.0807	.1641	.2474	.3307	.4141	.4974	.5807	.6641	.7474	.8307	.9141	.9974	31-32
	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE VII. MINUTES IN DECIMALS OF A DEGREE

0° 30′	.00833	10° 30′	.17500	20° 30′	.34167	30° 30′	.50833	40° 30′	.67500	50° 30′	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.500000	40 00	.66667	50 00	.83333	60 00	1.00000

TABLE VIII. MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

C ° ′	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C °	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.96
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.08
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE IX. SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

TABLE X. RODS IN FEET, 10THS AND 100THS OF FEET

Rods	Feet	Rods	Feet	Rods	Feet	Rods	Feet	Rods	Feet
1	16.50	21	346.50	41	676.50	61	1006.50	81	1336.50
2	33.00	22	363.00	42	693.00	62	1023.00	82	1353.00
3	49.50	23	379.50	43	709.50	63	1039.50	83	1369.50
4	66.00	24	396.00	44	726.00	64	1056.00	84	1386.00
5	82.50	25	412.50	45	742.50	65	1072.50	85	1402.50
6	99.00	26	429.00	46	759.00	66	1089.00	86	1419.00
7	115.50	27	445.50	47	775.50	67	1105.50	87	1435.50
8	132.00	28	462.00	48	792.00	68	1122.00	88	1452.00
9	148.50	29	478.50	49	808.50	69	1138.50	89	1468.50
10	165.00	30	495.00	50	825.00	70	1155.00	90	1485.00
11	181.50	31	511.50	51	841.50	71	1171.50	91	1501.50
12	198.00	32	528.00	52	858.00	72	1188.00	92	1518.00
13	214.50	33	544.50	53	874.50	73	1204.50	93	1534.50
14	231.00	34	561.00	54	891.00	74	1221.00	94	1551.00
15	247.50	35	577.50	55	907.50	75	1237.50	95	1567.50
16	264.00	36	594.00	56	924.00	76	1254.00	96	1584.00
17	280.50	37	610.50	57	940.50	77	1270.50	97	1600.50
18	297.00	38	627.00	58	957.00	78	1287.00	98	1617.00
19	313.50	39	643.50	59	973.50	79	1303.50	99	1633.50
20	330.00	40	660.00	60	990.00	80	1320.00	100	1650.00

TABLE XI. LINKS IN FEET, 10THS AND 100THS OF FEET

Links	Feet	Links	Feet	Links	Feet	Links	Feet	Links	Feet	Links	Feet
1	0.66	18	11.88	35	23.10	52	34.32	69	45.54	86	56.76
2	1.32	19	12.54	36	23.76	53	34.98	70	46.20	87	57.42
3	1.98	20	13.20	37	24.42	54	35.64	71	46.86	88	58.08
4	2.64	21	13.86	38	25.08	55	36.30	72	47.52	89	58.74
5	3.30	22	14.52	39	25.74	56	36.96	73	48.18	90	59.40
6	3.96	23	15.18	40	26.40	57	37.62	74	48.84	91	60.06
7	4.62	24	15.84	41	27.06	58	38.28	75	49.50	92	60.72
8	5.28	25	16.50	42	27.72	59	38.94	76	50.16	93	61.38
9	5.94	26	17.16	43	28.38	60	39.60	77	50.82	94	62.04
10	6.60	27	17.82	44	29.04	61	40.26	78	51.48	95	62.70
11	7.26	28	18.48	45	29.70	62	40.92	79	52.14	96	63.36
12	7.92	29	19.14	46	30.36	63	41.58	80	52.80	97	64.02
13	8.58	30	19.80	47	31.02	64	42.24	81	53.46	98	64.68
14	9.24	31	20.46	48	31.68	65	42.90	82	54.12	99	65.34
15	9.90	32	21.12	49	32.34	66	43.56	83	54.78	100	66.00
16	10.56	33	21.78	50	33.00	67	44.22	84	55.44	101	66.66
17	11.22	34	22.44	51	33.66	68	44.88	85	56.10	102	67.32

(127)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-148 Date 4/21/90 Time 1521

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm TS while purging soils gas column. HNU recorded 0 ppm also.

Mary J. Sauer

128

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-189 Date 4/21/90 Time [illegible]

Weather Conditions, Temp. 70 Skies clear Wind [illegible]

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph 0 Column T-8

Column Temperature 0°C Carrier Flow 3.7 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling FULL Range X-1

Time of injection ___ Sample purge ___

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while pumping soils gas probe. HNU also recorded 0 ppm. Last entry for this book. [illegible]

SOILS GAS ELUTION TIMES
for
RUETGERS-NEASE SALEM, OHIO SITE

OVA 128 GC with T-8 column with column temperature of 0° C

Compound	Rentention Time	PEL
1,1-Dichloroethane (Vinylidene Chloride)	:22	100 ppm
1,2-Dichloroethene	:31	200 ppm
1,1,1-Trichlorethane	:47	350 ppm
Trichloroethylene	1:24	100 ppm
Benzene	1:43	1 ppm
Chloroform	2:00	50 ppm
1,1,2,2-Tetrachloroethene	2:10	100 ppm
1,2-Dichloropropane	2:56	75 ppm
1,2-Dichloroethane	3:50	50 ppm
1,3-Dichloropropene	4:24	NA
Toluene	4:30	200 ppm
Ethylbenzene	7:44	100 ppm
p-xylene	8:23	100 ppm
m-xylene	8:31	100 ppm
o-xylene	8:40	100 ppm
Chlorobenzene	11:20	75 ppm

FIELD BOOK 2
APRIL21-MAY 1,
1990

FIELD BOOK 2

SOILS GAS SURVEY
APRIL 21 - MAY 1, 1990

TABLE X. RODS IN FEET, 10THS AND 100THS OF FEET

Rods	Feet	Rods	Feet	Rods	Feet	Rods	Feet	Rods	Feet
1	16.50	21	346.50	41	676.50	61	1006.50	81	1336.50
2	33.00	22	363.00	42	693.00	62	1023.00	82	1353.00
3	49.50	23	379.50	43	709.50	63	1039.50	83	1369.50
4	66.00	24	396.00	44	726.00	64	1056.00	84	1386.00
5	82.50	25	412.50	45	742.50	65	1072.50	85	1402.50
6	99.00	26	429.00	46	759.00	66	1089.00	86	1419.00
7	115.50	27	445.50	47	775.50	67	1105.50	87	1435.50
8	132.00	28	462.00	48	792.00	68	1122.00	88	1452.00
9	148.50	29	478.50	49	808.50	69	1138.50	89	1468.50
10	165.00	30	495.00	50	825.00	70	1155.00	90	1485.00
11	181.50	31	511.50	51	841.50	71	1171.50	91	1501.50
12	198.00	32	528.00	52	858.00	72	1188.00	92	1518.00
13	214.50	33	544.50	53	874.50	73	1204.50	93	1534.50
14	231.00	34	561.00	54	891.00	74	1221.00	94	1551.00
15	247.50	35	577.50	55	907.50	75	1237.50	95	1567.50
16	264.00	36	594.00	56	924.00	76	1254.00	96	1584.00
17	280.50	37	610.50	57	940.50	77	1270.50	97	1600.50
18	297.00	38	627.00	58	957.00	78	1287.00	98	1617.00
19	313.50	39	643.50	59	973.50	79	1303.50	99	1633.50
20	330.00	40	660.00	60	990.00	80	1320.00	100	1650.00

TABLE XI. LINKS IN FEET, 10THS AND 100THS OF FEET

Links	Feet	Links	Feet	Links	Feet	Links	Feet	Links	Feet	Links	Feet
1	0.66	18	11.88	35	23.10	52	34.32	69	45.54	86	56.76
2	1.32	19	12.54	36	23.76	53	34.98	70	46.20	87	57.42
3	1.98	20	13.20	37	24.42	54	35.64	71	46.86	88	58.08
4	2.64	21	13.86	38	25.08	55	36.30	72	47.52	89	58.74
5	3.30	22	14.52	39	25.74	56	36.96	73	48.18	90	59.40
6	3.96	23	15.18	40	26.40	57	37.62	74	48.84	91	60.06
7	4.62	24	15.84	41	27.06	58	38.28	75	49.50	92	60.72
8	5.28	25	16.50	42	27.72	59	38.94	76	50.16	93	61.38
9	5.94	26	17.16	43	28.38	60	39.60	77	50.82	94	62.04
10	6.60	27	17.82	44	29.04	61	40.26	78	51.48	95	62.70
11	7.26	28	18.48	45	29.70	62	40.92	79	52.14	96	63.36
12	7.92	29	19.14	46	30.36	63	41.58	80	52.80	97	64.02
13	8.58	30	19.80	47	31.02	64	42.24	81	53.46	98	64.68
14	9.24	31	20.46	48	31.68	65	42.90	82	54.12	99	65.34
15	9.90	32	21.12	49	32.34	66	43.56	83	54.78	100	66.00
16	10.56	33	21.78	50	33.00	67	44.22	84	55.44	101	66.66
17	11.22	34	22.44	51	33.66	68	44.88	85	56.10	102	67.32

TABLE VI. INCHES TO DECIMALS OF A FOOT

In.	0	1	2	3	4	5	6	7	8	9	10	11	In.
0	Foot	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	0
1-32	.0026	.0859	.1693	.2526	.3359	.4193	.5026	.5859	.6693	.7526	.8359	.9193	1-32
1-16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	1-16
3-32	.0078	.0911	.1745	.2578	.3411	.4245	.5078	.5911	.6745	.7578	.8411	.9245	3-32
1-8	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	1-8
5-32	.0130	.0964	.1797	.2630	.3464	.4297	.5130	.5964	.6797	.7630	.8464	.9297	5-32
3-16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3-16
7-32	.0182	.1016	.1849	.2682	.3516	.4349	.5182	.6016	.6849	.7682	.8516	.9349	7-32
1-4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1-4
9-32	.0234	.1068	.1901	.2734	.3568	.4401	.5234	.6068	.6901	.7734	.8568	.9401	9-32
5-16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5-16
11-32	.0286	.1120	.1953	.2786	.3620	.4453	.5286	.6120	.6953	.7786	.8620	.9453	11-32
3-8	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	3-8
13-32	.0339	.1172	.2005	.2839	.3672	.4505	.5339	.6172	.7005	.7839	.8672	.9505	13-32
7-16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7-16
15-32	.0391	.1224	.2057	.2891	.3724	.4557	.5391	.6224	.7057	.7891	.8724	.9557	15-32
1-2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1-2
17-32	.0443	.1276	.2109	.2943	.3776	.4609	.5443	.6276	.7109	.7943	.8776	.9609	17-32
9-16	.0469	.1302	.2135	.2969	.3802	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9-16
19-32	.0495	.1328	.2161	.2995	.3828	.4661	.5495	.6328	.7161	.7995	.8828	.9661	19-32
5-8	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	5-8
21-32	.0547	.1380	.2214	.3047	.3880	.4714	.5547	.6380	.7214	.8047	.8880	.9714	21-32
11-16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11-16
23-32	.0599	.1432	.2266	.3099	.3932	.4766	.5599	.6432	.7266	.8099	.8932	.9766	23-32
3-4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3-4
25-32	.0651	.1484	.2318	.3151	.3984	.4818	.5651	.6484	.7318	.8151	.8984	.9818	25-32
13-16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13-16
27-32	.0703	.1536	.2370	.3203	.4036	.4870	.5703	.6536	.7370	.8203	.9036	.9870	27-32
7-8	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	7-8
29-32	.0755	.1589	.2422	.3255	.4089	.4922	.5755	.6589	.7422	.8255	.9089	.9922	29-32
15-16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15-16
31-32	.0807	.1641	.2474	.3307	.4141	.4974	.5807	.6641	.7474	.8307	.9141	.9974	31-32
	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE VII. MINUTES IN DECIMALS OF A DEGREE

0° 30′	.00833	10° 30′	.17500	20° 30′	.34167	30° 30′	.50833	40° 30′	.67500	50° 30′	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000

TABLE VIII. MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

C ° ′	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C °	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.8	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE IX. SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

TABLE V CONTD. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10'	5847.5	2457.1	5° C	10'	6971.3	3294.1	5° C.	10'	8362.7	4407.6	5° C.
20'	5864.6	2469.3	T	20'	6992.0	3310.1	T	20'	8388.9	4429.2	T
30'	5881.7	2481.5	.43	30'	7012.7	3326.1	.51	30'	8415.1	4450.9	.62
40'	5898.8	2493.8	E	40'	7033.6	3342.3	E	40'	8441.5	4472.7	E
50'	5916.0	2506.1	200	50'	7054.5	3358.5	.268	50'	8468.0	4494.6	360
92°	5933.2	2518.5		102°	7075.5	3374.9		112°	8494.6	4516.6	
10'	5950.5	2531.0		10'	7096.6	3391.2		10'	8521.3	4538.8	
20'	5967.9	2543.5		20'	7117.8	3407.7		20'	8548.1	4561.1	
30'	5985.3	2556.0		30'	7139.0	3424.3		30'	8575.0	4583.4	
40'	6002.7	2568.6		40'	7160.3	3440.9		40'	8602.1	4606.0	
50'	6020.2	2581.3		50'	7181.7	3457.6		50'	8629.3	4628.6	
93°	6037.8	2594.0	10° C	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10'	6055.4	2606.8	T	10'	7224.7	3491.3	T	10'	8684.0	4674.2	T
20'	6073.1	2619.7	.86	20'	7246.3	3508.2	103	20'	8711.5	4697.2	1.25
30'	6090.8	2632.6	E	30'	7268.0	3525.2	E	30'	8739.2	4720.3	E
40'	6108.6	2645.5	401	40'	7289.8	3542.4	536	40'	8767.0	4743.6	.721
50'	6126.4	2658.5		50'	7311.7	3559.6		50'	8794.9	4766.9	
94°	6144.3	2671.6		104°	7333.6	3576.8		114°	8822.9	4790.4	
10'	6162.2	2684.7		10'	7355.6	3594.2		10'	8851.0	4814.1	
20'	6180.2	2697.9		20'	7377.8	3611.7		20'	8879.3	4837.8	
30'	6198.3	2711.2		30'	7399.9	3629.2		30'	8907.7	4861.7	
40'	6216.4	2724.5		40'	7422.2	3646.8		40'	8936.3	4885.7	
50'	6234.6	2737.9	15° C	50'	7444.6	3664.5	15° C	50'	8965.0	4909.9	15° C
95°	6252.8	2751.3	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10'	6271.1	2764.8	1.30	10'	7489.6	3700.2	1.56	10'	9022.7	4958.6	1.93
20'	6289.4	2778.3	E	20'	7512.2	3718.2	E	20'	9051.7	4983.1	E
30'	6307.9	2792.0	.604	30'	7534.9	3736.2	.806	30'	9080.9	5007.8	1.09
40'	6326.3	2805.6		40'	7557.7	3754.4		40'	9110.3	5032.6	
50'	6344.8	2819.4		50'	7580.5	3772.6		50'	9139.8	5057.6	
96°	6363.4	2833.2		106°	7603.5	3791.0		116°	9169.4	5082.7	
10'	6382.1	2847.0		10'	7626.6	3809.4		10'	9199.1	5107.9	
20'	6400.8	2861.0		20'	7649.7	3827.9		20'	9229.0	5133.3	
30'	6419.5	2875.0		30'	7672.9	3846.5		30'	9259.0	5158.8	
40'	6438.4	2889.0	20° C	40'	7696.3	3865.2	20° C	40'	9289.2	5184.5	20° C.
50'	6457.3	2903.1	T	50'	7719.7	3884.0	T	50'	9319.5	5210.3	T
97°	6476.2	2917.3	1.74	107°	7743.2	3902.9	2.08	117°	9349.9	5236.2	2.52
10'	6495.2	2931.6	E	10'	7766.8	3921.9	E	10'	9380.5	5262.3	E
20'	6514.3	2945.9	.809	20'	7790.5	3940.9	1.08	20'	9411.3	5288.6	1.46
30'	6533.4	2960.3		30'	7814.3	3960.1		30'	9442.7	5315.0	
40'	6552.6	2974.7		40'	7838.1	3979.4		40'	9473.2	5341.5	
50'	6571.9	2989.2		50'	7862.1	3998.7		50'	9504.4	5368.2	
98°	6591.2	3003.8		108°	7886.2	4018.2		118°	9535.7	5395.1	
10'	6610.6	3018.4		10'	7910.4	4037.8		10'	9567.2	5422.1	
20'	6630.1	3033.1	25° C	20'	7934.6	4057.4	25° C	20'	9598.9	5449.2	25° C.
30'	6649.6	3047.9	T	30'	7959.0	4077.2	T	30'	9630.7	5476.5	T
40'	6669.2	3062.8	2.18	40'	7983.5	4097.1	2.61	40'	9662.6	5504.0	3.16
50'	6688.8	3077.7	E	50'	8008.0	4117.0	E	50'	9694.7	5531.7	E
99°	6708.6	3092.7	1.02	109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	1.83
10'	6728.4	3107.7		10'	8057.4	4157.3		10'	9759.4	5587.4	
20'	6748.2	3122.9		20'	8082.3	4177.5		20'	9792.0	5615.5	
30'	6768.1	3138.1		30'	8107.3	4197.9		30'	9824.8	5643.8	
40'	6788.1	3153.3		40'	8132.3	4218.4		40'	9857.7	5672.3	
50'	6808.2	3168.7		50'	8157.5	4239.0		50'	9890.8	5700.9	
100°	6828.3	3184.1	30° C	110°	8182.8	4259.7	30° C	120°	9924.0	5729.7	30° C.
10'	6848.5	3199.6	T	10'	8208.2	4280.5	T	10'	9957.5	5758.6	T
20'	6868.8	3215.1	2.62	20'	8233.7	4301.4	3.14	20'	9991.0	5787.7	3.81
30'	6889.2	3230.8	E	30'	8259.3	4322.4	E	30'	10025.0	5817.0	E
40'	6909.6	3246.5	1.22	40'	8285.0	4343.6	1.63	40'	10059.0	5846.5	2.20
50'	6930.1	3262.3		50'	8310.8	4364.8		50'	10093.0	5876.1	

T = R tan ½I E = R versec ½I

USEFUL RELATIONS

Lineal feet	×.00019	=	miles
Lineal yards	×.0006	=	miles
Square inches	×.007	=	square feet
Square feet	×.111	=	square yards
Square yards	×.0002067	=	acres
Acres	×4840	=	square yards
Cubic inches	×.00058	=	cubic feet
Cubic feet	×.03704	=	cubic yards
Links	×.22	=	yards
Links	×.66	=	feet
Feet	×1.5	=	links

360° = 21600′ = 1296000″

Radius = arc of 57.2957790°

Arc of 1° (radius = 1) = .017453292

Arc of 1′ (radius = 1) = .000290888

Arc of 1″ (radius = 1) = .000004848

Curvature of Earth's surface = about 0.7 feet in 1 mile

Curvature in feet = 0.667 (Dist. in miles)²

Difference between arc and chord length, 0.05 feet in 11½ miles

Probable error of a single observation = $\pm 0.6754 \sqrt{\frac{\Sigma v^2}{n-1}}$

Error in chaining of 0.01 feet in 100 feet:

Due to—

1. Length of tape error of 0.01 feet
2. Alignment. One end 1.4 feet out of line
3. Sag of tape at center of 0.61 feet.
4. Temperature difference of 15°
5. Difference of pull of 15 lbs.

SQUARE MEASURE

144 sq. inches = 1 sq. ft.
9 sq. ft. = 1 sq. yard
30¼ sq. yds. = 1 sq. rd.
40 sq. rds. = 1 rood.
4 roods = 1 acre
640 acres = 1 sq. mile.

SURVEYORS' MEASURE

7.92 inches = 1 link.
25 links = 1 rod.
4 rds. = 1 chain.
10 sq. chains or 160 sq. rods = 1 acre.
640 acres = 1 sq. mile.
36 sq. miles (6 miles sq.) = 1 township.

TABLE V CONTD. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=30°
31°	1589.0	216.3	+
10'	1598.0	218.7	5° C
20'	1606.9	221.1	T
30'	1615.9	223.5	13
40'	1624.9	226.0	E
50'	1633.9	228.4	023
32°	1643.0	230.9	
10'	1652.0	233.4	
20'	1661.0	235.9	
30'	1670.0	238.4	
40'	1679.1	241.0	
50'	1688.1	243.5	
33°	1697.2	246.1	10° C
10'	1706.3	248.7	T
20'	1715.3	251.3	26
30'	1724.4	253.9	E
40'	1733.5	256.5	046
50'	1742.6	259.1	
34°	1751.7	261.8	
10'	1760.8	264.5	
20'	1770.0	267.2	
30'	1779.1	269.9	
40'	1788.2	272.6	
50'	1797.4	275.3	15° C
35°	1806.6	278.1	T
10'	1815.7	280.8	40
20'	1824.9	283.6	E
30'	1834.1	286.4	070
40'	1843.3	289.2	
50'	1852.5	292.0	
36°	1861.7	294.9	
10'	1870.9	297.7	
20'	1880.1	300.6	
30'	1889.4	303.5	
40'	1898.6	306.4	20° C
50'	1907.9	309.3	T
37°	1917.1	312.2	53
10'	1926.4	315.2	E
20'	1935.7	318.1	093
30'	1945.0	321.1	
40'	1954.3	324.1	
50'	1963.6	327.1	
38°	1972.9	330.2	
10'	1982.2	333.2	
20'	1991.5	336.3	25° C
30'	2000.9	339.3	T
40'	2010.2	342.4	67
50'	2019.6	345.5	E
39°	2029.0	348.6	117
10'	2038.4	351.8	
20'	2047.8	354.9	
30'	2057.2	358.1	
40'	2066.6	361.3	
50'	2076.0	364.5	
40°	2085.4	367.7	30° C
10'	2094.9	371.0	T
20'	2104.3	374.2	80
30'	2113.8	377.5	E
40'	2123.3	380.8	
50'	2132.7	384.1	141

I	T	E	I=35°
41°	2142.2	387.4	+
10'	2151.7	390.7	5° C
20'	2161.2	394.1	T
30'	2170.8	397.4	.17
40'	2180.3	400.8	E
50'	2189.9	404.2	037
42°	2199.4	407.6	
10'	2209.0	411.1	
20'	2218.6	414.5	
30'	2228.1	418.0	
40'	2237.7	421.4	
50'	2247.3	425.0	
43°	2257.0	428.5	10° C
10'	2266.6	432.0	T
20'	2276.2	435.6	34
30'	2285.9	439.2	E
40'	2295.6	442.8	075
50'	2305.2	446.4	
44°	2314.9	450.0	
10'	2324.6	453.6	
20'	2334.3	457.3	
30'	2344.1	461.0	
40'	2353.8	464.6	
50'	2363.5	468.4	15° C
45°	2373.3	472.1	T
10'	2383.1	475.8	51
20'	2392.8	479.6	E
30'	2402.6	483.4	.116
40'	2412.4	487.2	
50'	2422.3	491.0	
46°	2432.1	494.8	
10'	2441.9	498.7	
20'	2451.8	502.5	
30'	2461.7	506.4	
40'	2471.5	510.3	20° C
50'	2481.4	514.3	T
47°	2491.3	518.2	68
10'	2501.2	522.2	E
20'	2511.2	526.1	151
30'	2521.1	530.1	
40'	2531.1	534.2	
50'	2541.0	538.2	
48°	2551.0	542.2	
10'	2561.0	546.3	
20'	2571.0	550.4	25° C
30'	2581.0	554.5	T
40'	2591.0	558.6	85
50'	2601.1	562.8	E
49°	2611.2	566.9	189
10'	2621.2	571.1	
20'	2631.3	575.3	
30'	2641.4	579.5	
40'	2651.5	583.8	
50'	2661.6	588.0	
50°	2671.8	592.3	30° C
10'	2681.9	596.6	T
20'	2692.1	600.9	1.02
30'	2702.3	605.3	E
40'	2712.5	609.6	227
50'	2722.7	614.0	

I	T	E	I=40°
51°	2732.9	618.4	+
10'	2743.1	622.8	5° C
20'	2753.4	627.2	T
30'	2763.7	631.7	.21
40'	2773.9	636.2	E
50'	2784.2	640.7	056
52°	2794.5	645.2	
10'	2804.9	649.7	
20'	2815.2	654.3	
30'	2825.6	658.8	
40'	2835.9	663.4	
50'	2846.3	668.0	
53°	2856.7	672.7	10° C
10'	2867.1	677.3	T
20'	2877.5	682.0	.42
30'	2888.0	686.7	E
40'	2898.4	691.4	112
50'	2908.9	696.1	
54°	2919.4	700.9	
10'	2929.9	705.7	
20'	2940.4	710.5	
30'	2951.0	715.3	
40'	2961.5	720.1	
50'	2972.1	725.0	15° C
55°	2982.7	729.9	T
10'	2993.3	734.8	63
20'	3003.9	739.7	E
30'	3014.5	744.6	.168
40'	3025.2	749.6	
50'	3035.8	754.6	
56°	3046.5	759.6	
10'	3057.2	764.6	
20'	3067.9	769.7	
30'	3078.7	774.7	20° C
40'	3089.4	779.8	T
50'	3100.2	784.9	84
57°	3110.9	790.1	E
10'	3121.7	795.2	225
20'	3132.6	800.4	
30'	3143.4	805.6	
40'	3154.2	810.9	
50'	3165.1	816.1	
58°	3176.0	821.4	
10'	3186.9	826.7	
20'	3197.8	832.0	25° C
30'	3208.8	837.3	T
40'	3219.7	842.7	1.05
50'	3230.7	848.1	E
59°	3241.7	853.5	283
10'	3252.7	858.9	
20'	3263.7	864.3	
30'	3274.8	869.8	
40'	3285.8	875.3	
50'	3296.9	880.8	
60°	3308.0	886.4	30° C
10'	3319.1	892.0	T
20'	3330.3	897.5	1.27
30'	3341.4	903.2	E
40'	3352.6	908.8	
50'	3363.8	914.5	340

T = R tan ½I E = R exsec ½I

TABLE V CONTD. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=70°
61°	3375.0	920.2	+
10'	3386.3	925.9	5° C
20'	3397.5	931.6	T
30'	3408.8	937.3	.25
40'	3420.1	943.1	E
50'	3431.4	948.9	080
62°	3442.7	954.8	
10'	3454.1	960.6	
20'	3465.4	966.5	
30'	3476.8	972.4	
40'	3488.3	978.3	
50'	3499.7	984.3	
63°	3511.1	990.2	10° C
10'	3522.6	996.2	T
20'	3534.1	1002.3	51
30'	3545.6	1008.3	E
40'	3557.2	1014.4	.159
50'	3568.[illegible]	1020.5	
64°	3580.3	1026.6	
10	3591.5	1032.8	
20'	3603.5	1039.0	
30'	3615.1	1045.2	
40'	3626.9	1051.4	
50'	3638.[illegible]	1057.7	15° C
65°	.65[illegible]	1063.9	T
10'	3661.[illegible]	1070.2	.76
20'	3673.7	1076.6	E
30'	3685.4	1082.9	.240
40'	3697.2	1089.3	
50'	3709.0	1095.7	
66°	3720.9	1102.2	
10'	3732.7	1108.6	
20'	3744.6	1115.1	
30'	3756.5	1121.7	20° C
40'	3768.5	1128.2	T
50'	3780.4	1134.8	1.02
67°	3792.4	1141.4	E
10'	3804.4	1148.0	321
20'	3816.4	1154.7	
30'	3828.4	1161.3	
40'	3840.5	1168.1	
50'	3852.6	1174.8	
68°	3864.7	1181.6	
10'	3876.8	1188.4	
20'	3889.0	1195.2	25° C
30'	3901.2	1202.0	T
40'	3913.4	1208.9	1.28
50'	3925.6	1215.8	E
69°	3937.9	1222.7	403
10'	3950.2	1229.7	
20'	3962.5	1236.7	
30'	3974.8	1243.7	
40'	3987.2	1250.8	
50'	3999.5	1257.9	
70°	4011.9	1265.0	30° C
10	4024.4	1272.1	T
20'	4036.8	1279.3	1.54
30'	4049.3	1286.5	E
40'	4061.8	1293.6	485
50'	4074.4	1300.9	

I	T	E	I=80°
71°	4086.9	1308.2	+
10	4099.5	1315.6	5° C
20'	4112.1	1322.9	T
30'	4124.8	1330.3	30
40'	4137.4	1337.7	E
50'	4150.1	1345.1	.110
72°	4162.8	1352.6	
10'	4175.6	1360.1	
20'	4188.5	1367.6	
30'	4201.2	1375.2	
40'	4214.0	1382.8	
50'	4226.8	1390.4	
73°	4239.7	1398.0	10° C
10'	4252.6	1405.7	T
20'	4265.6	1413.5	61
30'	4278.5	1421.2	E
40'	4291.5	1429.0	220
50'	4304.6	1436.8	
74°	4317.6	1444.6	
10'	4330.7	1452.5	
20'	4343.8	1460.4	
30'	4356.9	1468.4	
40'	4370.1	1476.4	
50	4383.3	1484.4	15° C
75°	4396.5	1492.4	T
10'	4409.8	1500.5	91
20'	4423.1	1508.6	E
30'	4436.4	1516.7	.332
40'	4449.7	1524.9	
50'	4463.1	1533.1	
76°	4476.5	1541.4	
10'	4489.9	1549.7	
20'	4503.4	1558.0	
30'	4516.9	1566.3	20° C
40	4530.4	1574.7	T
50'	4544.0	1583.1	1.22
77°	4557.6	1591.6	E
10'	4571.2	1600.1	.445
20'	4584.8	1608.6	
30'	4598.5	1617.1	
40'	4612.2	1625.7	
50'	4626.0	1634.4	
78°	4639.8	1643.0	
10'	4653.6	1651.7	
20'	4667.4	1660.5	25° C
30'	4681.3	1669.2	T
40'	4695.2	1678.1	1.53
50'	4709.2	1686.9	E
79°	4723.2	1695.8	558
10'	4737.2	1704.7	
20'	4751.2	1713.7	
30'	4765.3	1722.7	
40'	4779.4	1731.7	
50'	4793.6	1740.8	
80°	4807.7	1749.9	30° C
10'	4822.0	1759.0	T
20'	4836.2	1768.2	1.84
30'	4850.5	1777.4	E
40'	4864.8	1786.7	671
50'	4879.2	1796.0	

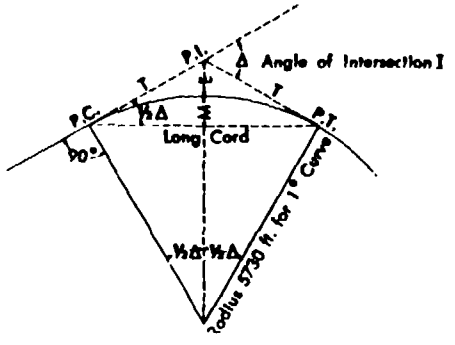
I	T	E	I=90°
81°	4893.6	1805.3	+
10	4908.0	1814.7	5° C
20	4922.5	1824.1	T
30'	4937.0	1833.6	.36
40'	4951.5	1843.1	E
50'	4966.1	1852.6	149
82°	4980.7	1862.2	
10'	4995.4	1871.8	
20'	5010.0	1881.5	
30'	5024.8	1891.2	
40'	5039.5	1900.9	
50'	5054.3	1910.7	
83°	5069.2	1920.5	10° C
10'	5084.0	1930.4	T
20'	5099.0	1940.3	.72
30'	5113.9	1950.3	E
40'	5128.9	1960.2	299
50'	5143.9	1970.3	
84°	5159.0	1980.4	
10'	5174.1	1990.5	
20'	5189.3	2000.6	
30'	5204.4	2010.8	
40'	5219.7	2021.1	
50	5234.9	2031.4	15° C
85°	5250.3	2041.7	T
10'	5265.6	2052.1	1.09
20'	5281.0	2062.5	E
30'	5296.4	2073.0	450
40'	5311.9	2083.5	
50'	5327.4	2094.1	
86°	5343.0	2104.7	
10'	5358.6	2115.3	
20'	5374.2	2126.0	
30'	5389.9	2136.7	20° C
40'	5405.6	2147.5	T
50'	5421.4	2158.4	1.45
87°	5437.2	2169.2	E
10'	5453.1	2180.2	603
20'	5469.0	2191.1	
30'	5484.9	2202.2	
40'	5500.9	2213.2	
50'	5517.0	2224.3	
88°	5533.1	2235.5	
10'	5549.2	2246.7	
20'	5565.4	2258.0	25° C
30'	5581.6	2269.3	T
40'	5597.8	2280.6	1.83
50'	5614.2	2292.0	E
89°	5630.5	2303.5	756
10'	5646.9	2315.0	
20'	5663.4	2326.6	
30'	5679.9	2338.2	
40'	5696.4	2349.8	
50	5713.0	2361.5	
90°	5729.7	2373.3	30° C
10'	5746.3	2385.1	T
20'	5763.1	2397.0	2.20
30'	5779.9	2408.9	E
40'	5796.7	2420.9	
50'	5813.6	2432.9	910

T = R tan ½I E = R exsec ½I

CURVE FORMULAE

CURVE TABLE

Table of Tangent and External to a 1° Curve



To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I by given tangent, (or external).

The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

CURVE FORMULAS

Radius: $R = \dfrac{50}{\sin \frac{1}{2} D}$

Length of Curve: $L = 100 \dfrac{\Delta}{D}$

also $L = .0174533 \times \Delta \times R$

Degree of Curve: $D = 100 \dfrac{\Delta}{L}$

Tangent: $T = R \tan \frac{1}{2} \Delta$

Long Cord: $LC = 2R \sin \frac{1}{2} \Delta$

Middle Ordinate: $M = R\ (1 - \cos \frac{1}{2} \Delta)$

External: $E = T \tan \frac{1}{4} \Delta$

TABLE V. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26 500	+	21°	1061 9	97 577	+
10'	58.34	.297	5° C	10'	560 11	27 313	5° C	10'	1070 6	99 155	5° C
20'	66 67	.388	T	20'	568 53	28 137	T	20'	1079 2	100 75	T
30'	75 01	.491	03	30'	576 95	28 974	06	30'	1087 8	102 35	.10
40'	83 34	.606	E	40'	585 36	29 824	E	40'	1096 4	103 97	E
50'	91 68	.733	.001	50'	593 79	30 686	006	50'	1105 1	105 60	013
2°	100.01	.873		12°	602 21	31 561		22°	1113 7	107 24	
10'	108.35	1.024		10'	610 64	32 447		10'	1122 4	108 90	
20'	116 68	1.188		20'	619 07	33 347		20'	1131 0	110 57	
30'	125 02	1.364		30'	627 50	34 259		30'	1139 7	112 25	
40'	133 36	1 552		40'	635 93	35 183		40'	1148 4	113 95	
50'	141.70	1.752		50'	644 37	36 120		50'	1157 0	115 66	
3°	150 04	1.964	10° C	13°	652 81	37 070	10° C	23°	1165 7	117 38	10° C.
10'	158 38	2.188	T	10'	661 25	38 031	T	10'	1174 4	119 12	T
20'	166 72	2.425	.06	20'	669 70	39.006	.13	20'	1183 1	120 87	19
30'	175 06	2 674	E	30'	678 15	39 993	E	30'	1191 8	122 63	E
40'	183 40	2 934	.003	40'	686 60	40 992	011	40'	1200 5	124 41	.025
50'	191 74	3.207		50'	695 06	42 004		50'	1209 2	126 20	
4°	200 08	3.492		14°	703 51	43 029		24°	1217 9	128.00	
10'	208 43	3 790		10'	711 97	44 066		10'	1226 6	129 82	
20'	216 77	4 099		20'	720 44	45 116		20'	1235 3	131 65	
30'	225 12	4 421		30'	728 90	46 178		30'	1244 0	133 50	
40'	233 47	4 755		40'	737 37	47 253		40'	1252 8	135 35	
50'	241 81	5 100	15° C	50'	745 85	48 341	15° C	50'	1261 5	137 23	15° C.
5°	250 16	5.459	T	15°	754 32	49 441	T	25°	1270 2	139 11	T
10'	258 51	5.829	.09	10'	762 80	50 554	19	10'	1279 0	141 01	29
20'	266.86	6 211	E	20'	771 29	51 679	E	20'	1287 7	142 93	E
30'	275 21	6.606	004	30'	779 77	52 818	017	30'	1296 5	144 85	038
40'	283 57	7 013		40'	788 26	53 969		40'	1305 3	146 79	
50'	291 92	7 432		50'	796 75	55.132		50'	1314.0	148 75	
6°	300.28	7.863		16°	805 25	56 309		26°	1322 8	150 71	
10'	308.64	8 307		10'	813 75	57 498		10'	1331 6	152 69	
20'	316.99	8.762		20'	822.25	58 699		20'	1340 4	154 69	
30'	325 35	9.230		30'	830 76	59 914		30'	1349 2	156 70	
40'	333 71	9 710	20° C.	40'	839.27	61 141	20° C	40'	1358 0	158 72	20° C.
50'	342.08	10 202	T	50'	847 78	62 381	T	50'	1366 8	160 76	T
7°	350 44	10.707	.13	17°	856 30	63 634	.26	27°	1375 6	162 81	39
10'	358 81	11.224	E	10'	864 82	64 900	E	10'	1384 4	164 86	E
20'	367 17	11.753	.006	20'	873 35	66 178	.022	20'	1393 2	166 95	051
30'	375 54	12 294		30'	881 88	67 470		30'	1402 0	169 04	
40'	383 91	12 847		40'	890 41	68 774		40'	1410 9	171 15	
50'	392 28	13 413		50'	898 95	70 091		50'	1419 7	173 27	
8°	400 66	13.991		18°	907.49	71 421		28°	1428 6	175 41	
10'	409 03	14 582		10'	916 03	72 764		10'	1437 4	177 55	
20	417 41	15 184	25° C	20'	924 58	74 119	25° C	20'	1446 3	179 72	25° C
30'	425.79	15 799	T	30'	933 13	75 488	T	30'	1455 1	181 89	T
40'	434.17	16 426	.16	40'	941 69	76 869	.32	40'	1464 0	184 08	49
50'	442 55	17.065	E	50'	950 25	78 264	E	50'	1472 9	186 29	E
9°	450 93	17.717	007	19°	958.81	79.671	.028	29°	1481 8	188 51	065
10'	459 32	18 381		10'	967 38	81 092		10'	1490 7	190 74	
20'	467 71	19 058		20'	975 96	82 525		20'	1499 6	192 99	
30'	476 10	19 746		30'	984 53	83 972		30'	1508 5	195 25	
40'	484.49	20 447		40'	993 12	85 431		40'	1517 4	197 53	
50'	492 88	21 161		50'	1001 7	86 904		50'	1526 3	199 82	
10°	501 28	21 887	30° C	20°	1010 3	88 389	30° C	30°	1535 3	202 12	30° C.
10'	509 68	22 624	T	10'	1018 9	89 888	T	10'	1544 2	204 44	T
20'	518 08	23 375	.19	20'	1027 5	91 399	39	20'	1553 1	206 77	59
30'	526 48	24 138	E	30	1036 1	92 924	E	30'	1562 1	209 12	E
40'	534 89	24 913	008	40'	1044 7	94 462	034	40'	1571 0	211 48	078
50	543 29	25 700		50'	1053 3	96 013		50'	1580 0	213 86	

$T = R \tan \frac{1}{2} I$ $E = R \operatorname{exsec} \frac{1}{2} I$

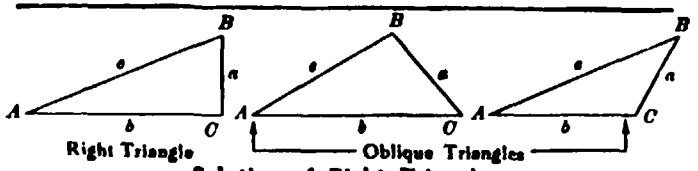
TABLE IV CONTD. NATURAL TRIGONOMETRICAL FUNCTIONS

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.		Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′								° ′							
16	2756	2867	1.0403	3.628	3.487	.96126	74	24	.4067	.4452	1.0946	2.459	2.246	.91355	66
10	2784	2899	1.0412	3.592	3.450	.96046	50	10	.4094	.4487	1.0961	2.443	2.229	.91236	50
20	2812	2931	1.0423	3.556	3.412	.95964	40	20	.4120	.4522	1.097	2.427	2.211	.91116	40
30	2840	2962	1.0429	3.521	3.376	.95882	30	30	.4147	.4557	1.0989	2.411	2.194	.90996	30
40	2868	2994	1.0438	3.487	3.340	.95799	20	40	.4173	.4592	1.1004	2.396	2.177	.90875	20
50	2896	3026	1.0448	3.453	3.305	.95715	10	50	.4200	.4628	1.1019	2.381	2.161	.90753	10
17	2924	3057	1.0457	3.420	3.271	.95630	73	25	.4226	.4663	1.1034	2.366	2.145	.90631	65
10	2952	3089	1.0466	3.388	3.237	.95545	50	10	.4253	.4699	1.1049	2.351	2.128	.90507	50
20	2979	3121	1.0476	3.357	3.204	.95459	40	20	.4279	.4734	1.1064	2.337	2.112	.90383	40
30	3007	3153	1.0485	3.326	3.172	.95372	30	30	.4305	.4770	1.1079	2.323	2.097	.90259	30
40	3035	3185	1.0495	3.295	3.140	.95284	20	40	.4331	.4806	1.1095	2.309	2.081	.90133	20
50	3062	3217	1.0505	3.265	3.108	.95195	10	50	.4358	.4841	1.1110	2.295	2.066	.90007	10
18	3090	3249	1.0515	3.236	3.078	.95106	72	26	.4384	.4877	1.1126	2.281	2.050	.89879	64
10	3118	3281	1.0525	3.207	3.048	.95015	50	10	.4410	.4913	1.1142	2.268	2.035	.89752	50
20	3145	3314	1.0535	3.179	3.018	.94924	40	20	.4436	.4950	1.1158	2.254	2.020	.89623	40
30	3173	3346	1.0545	3.152	2.989	.94832	30	30	.4462	.4986	1.1174	2.241	2.006	.89493	30
40	3201	3378	1.0555	3.124	2.960	.94740	20	40	.4488	.5022	1.1190	2.228	1.991	.89363	20
50	3228	3411	1.0566	3.098	2.932	.94646	10	50	.4514	.5059	1.1207	2.215	1.977	.89232	10
19	3256	3443	1.0576	3.072	2.904	.94552	71	27	.4540	.5095	1.1223	2.203	1.963	.89101	63
10	3283	3476	1.0587	3.046	2.877	.94457	50	10	.4566	.5132	1.1240	2.190	1.949	.88968	50
20	3311	3508	1.0598	3.020	2.850	.94361	40	20	.4592	.5169	1.1257	2.178	1.935	.88835	40
30	3338	3541	1.0608	2.996	2.824	.94264	30	30	.4617	.5206	1.1274	2.166	1.921	.88701	30
40	3365	3574	1.0619	2.971	2.798	.94167	20	40	.4643	.5243	1.1291	2.154	1.907	.88566	20
50	3393	3607	1.0631	2.947	2.773	.94068	10	50	.4669	.5280	1.1308	2.142	1.894	.88431	10
20	3420	3640	1.0642	2.924	2.747	.93969	70	28	.4695	.5317	1.1326	2.130	1.881	.88295	62
10	3448	3673	1.0653	2.900	2.723	.93869	50	10	.4720	.5354	1.1343	2.119	1.868	.88158	50
20	3475	3706	1.0665	2.878	2.699	.93769	40	20	.4746	.5392	1.1361	2.107	1.855	.88020	40
30	3502	3739	1.0676	2.856	2.675	.93667	30	30	.4772	.5430	1.1379	2.096	1.842	.87882	30
40	3529	3772	1.0688	2.833	2.651	.93565	20	40	.4797	.5467	1.1397	2.085	1.829	.87743	20
50	3557	3805	1.0700	2.811	2.628	.93462	10	50	.4823	.5505	1.1415	2.073	1.816	.87603	10
21	3584	3839	1.0711	2.790	2.605	.93358	69	29	.4848	.5543	1.1434	2.063	1.804	.87462	61
10	3611	3872	1.0723	2.769	2.583	.93253	50	10	.4874	.5581	1.1452	2.052	1.792	.87321	50
20	3638	3906	1.0736	2.749	2.560	.93148	40	20	.4899	.5619	1.1471	2.041	1.780	.87178	40
30	3665	3939	1.0748	2.729	2.539	.93042	30	30	.4924	.5658	1.1490	2.031	1.767	.87036	30
40	3692	3973	1.0760	2.709	2.517	.92935	20	40	.4950	.5696	1.1509	2.020	1.756	.86892	20
50	3719	4006	1.0773	2.689	2.496	.92827	10	50	.4975	.5735	1.1528	2.010	1.744	.86748	10
22	3746	4040	1.0785	2.670	2.475	.92718	68	30	.5000	.5774	1.1547	2.000	1.732	.86603	60
10	3773	4074	1.0798	2.650	2.455	.92609	50	10	.5025	.5812	1.1566	1.990	1.720	.86457	50
20	3800	4108	1.0811	2.632	2.434	.92499	40	20	.5050	.5851	1.1586	1.980	1.709	.86310	40
30	3827	4142	1.0824	2.613	2.414	.92388	30	30	.5075	.5890	1.1606	1.970	1.698	.86163	30
40	3854	4176	1.0837	2.595	2.394	.92276	20	40	.5100	.5930	1.1626	1.961	1.686	.86015	20
50	3881	4210	1.0850	2.577	2.375	.92164	10	50	.5125	.5969	1.1646	1.951	1.675	.85866	10
23	3907	4245	1.0864	2.559	2.356	.92050	67	31	.5150	.6009	1.1666	1.924	1.664	.85717	59
10	3934	4279	1.0877	2.542	2.337	.91936	50	10	.5175	.6048	1.1687	1.932	1.653	.85567	50
20	3961	4314	1.0891	2.525	2.318	.91822	40	20	.5200	.6088	1.1707	1.923	1.643	.85416	40
30	3987	4348	1.0904	2.508	2.300	.91706	30	30	.5225	.6128	1.1728	1.914	1.632	.85264	30
40	4014	4383	1.0918	2.491	2.282	.91590	20	40	.5250	.6168	1.1749	1.905	1.621	.85112	20
50	4041	4417	1.0932	2.475	2.264	.91472	10	50	.5275	.6208	1.1770	1.896	1.611	.84959	10
							66 ° ′								58 ° ′
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle		Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

TABLE IV CONTD. NATURAL TRIGONOMETRICAL FUNCTIONS

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.		Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							° ′	° ′							
32	.5299	.6249	1.1792	1.887	1.600	.84805	58	39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.5324	.6289	1.1813	1.878	1.590	.84650	50	10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40	20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30	30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20	40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10	50	.6406	.8342	1.3022	1.561	1.199	.76791	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57	40	.6428	.8391	1.3054	1.556	1.192	.76604	50
10	.5471	.6536	1.1946	1.828	1.530	.83708	50	10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40	20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30	30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20	40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10	50	.6539	.8642	1.3217	1.529	1.157	.75661	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56	41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.5616	.6787	1.2086	1.781	1.473	.82741	50	10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40	20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30	30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20	40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10	50	.6670	.8952	1.3421	1.499	1.117	.74509	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55	42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.5760	.7046	1.2233	1.736	1.419	.81748	50	10	.6713	.9057	1.3492	1.490	1.104	.74120	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40	20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30	30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20	40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10	50	.6799	.9271	1.3636	1.471	1.079	.73333	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54	43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.5901	.7310	1.2387	1.695	1.368	.80730	50	10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40	20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30	30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20	40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10	50	.6926	.9601	1.3863	1.444	1.042	.72136	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53	44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6041	.7581	1.2549	1.655	1.319	.79688	50	10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40	20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.6088	.7673	1.2605	1.642	1.303	.79335	30	30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20	40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10	50	.7050	.9942	1.4101	1.418	1.006	.70916	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52		.7071	1	1.414	1.414	1	.70711	45
10	.6180	.7860	1.2719	1.618	1.272	.78622	50								
20	.6202	.7907	1.2748	1.612	1.265	.78442	40								
30	.6225	.7954	1.2778	1.606	1.257	.78261	30								
40	.6248	.8002	1.2808	1.601	1.250	.78079	20								
50	.6271	.8050	1.2838	1.595	1.242	.77897	10								
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle		Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

TABLE III. TRIGONOMETRIC FORMULAE



Solution of Right Triangles

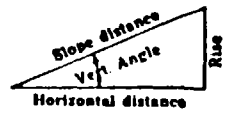
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B,\ c = \sqrt{a^2+b^2} = a\sqrt{1+\frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B,\ b = \sqrt{(c+a)(c-a)} = c\sqrt{1-\frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}$.
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}$.
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A$.

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A+B = 180° - C,\ \tan \frac{1}{2}(A-B) = \frac{(a-b)\tan\frac{1}{2}(A+B)}{a+b}$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2},\ \sin\frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}$, $\sin\frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}},\ C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, IV, cos 5° 10′ = .9959. Horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 − cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained: Cosine 5° 10′ = .9959; 1 − .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 − 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately: — the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

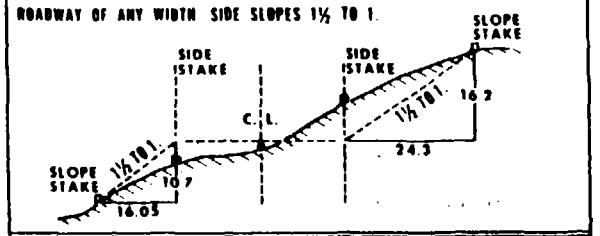
TABLE IV. NATURAL TRIGONOMETRICAL FUNCTIONS

Angle	Sin	Tan	Sec	Cosec	Cotg	Cosin		Angle	Sin	Tan	Sec	Cosec	Cotg	Cosin	
° ′								° ′							
0	0	0	1.	∞	∞	1.	90	8	.1392	.1405	1.0098	7.185	7.115	.99027	82
10	.0029	.0029		343.8	343.8	1.	50	10	.1421	.1435	1.0102	7.040	6.968	.98986	50
20	.0058	.0058		171.9	171.9	.99998	40	20	.1449	.1465	1.0107	6.900	6.827	.98944	40
30	.0087	.0087		114.6	114.6	.99996	30	30	.1478	.1495	1.0111	6.766	6.691	.98902	30
40	.0116	.0116	1.0001	85.94	85.94	.99993	20	40	.1507	.1524	1.0115	6.636	6.561	.98858	20
50	.0145	.0145	1.0001	68.76	68.75	.99989	10	50	.1536	.1554	1.0120	6.512	6.435	.98814	10
1	.0175	.0175	1.0002	57.30	57.29	.99985	89	9	.1564	.1584	1.0125	6.394	6.314	.98769	81
10	.0204	.0204	1.0002	49.11	49.10	.99979	50	10	.1593	.1614	1.0129	6.277	6.197	.98723	50
20	.0233	.0233	1.0003	42.98	42.96	.99973	40	20	.1622	.1644	1.0134	6.166	6.084	.98676	40
30	.0262	.0262	1.0003	38.20	38.19	.99966	30	30	.1650	.1673	1.0139	6.059	5.976	.98629	30
40	.0291	.0291	1.0004	34.38	34.37	.99958	20	40	.1679	.1703	1.0144	5.955	5.871	.98580	20
50	.0320	.0320	1.0005	31.26	31.24	.99949	10	50	.1708	.1733	1.0149	5.855	5.769	.98531	10
2	.0349	.0349	1.0006	28.65	28.64	.99939	88	10	.1736	.1763	1.0154	5.759	5.671	.98481	80
10	.0378	.0378	1.0007	26.45	26.43	.99929	50	10	.1765	.1793	1.0160	5.665	5.576	.98430	50
20	.0407	.0407	1.0008	24.56	24.54	.99917	40	20	.1794	.1823	1.0165	5.575	5.485	.98378	40
30	.0436	.0437	1.0010	22.93	22.90	.99905	30	30	.1822	.1853	1.0170	5.488	5.396	.98325	30
40	.0465	.0466	1.0011	21.49	21.47	.99892	20	40	.1851	.1883	1.0176	5.403	5.309	.98272	20
50	.0494	.0495	1.0012	20.23	20.21	.99878	10	50	.1880	.1914	1.0181	5.320	5.226	.98218	10
3	.0523	.0524	1.0014	19.11	19.08	.99863	87	11	.1908	.1944	1.0187	5.241	5.145	.98163	79
10	.0552	.0553	1.0015	18.10	18.07	.99847	50	10	.1937	.1974	1.0193	5.164	5.066	.98107	50
20	.0581	.0582	1.0017	17.20	17.17	.99831	40	20	.1965	.2004	1.0199	5.089	4.989	.98050	40
30	.0610	.0612	1.0019	16.38	16.35	.99813	30	30	.1994	.2035	1.0205	5.016	4.915	.97992	30
40	.0640	.0641	1.0020	15.64	15.60	.99795	20	40	.2022	.2065	1.0211	4.945	4.843	.97934	20
50	.0669	.0670	1.0022	14.96	14.92	.99776	10	50	.2051	.2095	1.0217	4.877	4.773	.97875	10
4	.0698	.0699	1.0024	14.34	14.30	.99756	86	12	.2079	.2126	1.0223	4.810	4.705	.97815	78
10	.0727	.0729	1.0027	13.76	13.73	.99736	50	10	.2108	.2156	1.0230	4.745	4.638	.97754	50
20	.0756	.0758	1.0029	13.23	13.20	.99714	40	20	.2136	.2186	1.0236	4.682	4.574	.97692	40
30	.0785	.0787	1.0031	12.75	12.71	.99692	30	30	.2164	.2217	1.0243	4.620	4.511	.97630	30
40	.0814	.0816	1.0033	12.29	12.25	.99668	20	40	.2193	.2247	1.0249	4.560	4.449	.97566	20
50	.0843	.0846	1.0036	11.87	11.83	.99644	10	50	.2221	.2278	1.0256	4.502	4.390	.97502	10
5	.0872	.0875	1.0038	11.47	11.43	.99619	85	13	.2250	.2309	1.0263	4.445	4.331	.97437	77
10	.0901	.0904	1.0041	11.10	11.06	.99594	50	10	.2278	.2339	1.0270	4.390	4.275	.97371	50
20	.0929	.0934	1.0043	10.76	10.71	.99567	40	20	.2306	.2370	1.0277	4.336	4.219	.97304	40
30	.0958	.0963	1.0046	10.43	10.39	.99540	30	30	.2334	.2401	1.0284	4.284	4.165	.97237	30
40	.0987	.0992	1.0049	10.13	10.08	.99511	20	40	.2363	.2432	1.0291	4.232	4.113	.97169	20
50	.1016	.1022	1.0052	9.839	9.788	.99482	10	50	.2391	.2462	1.0299	4.182	4.061	.97100	10
6	.1045	.1051	1.0055	9.567	9.514	.99452	84	14	.2419	.2493	1.0306	4.133	4.011	.97030	76
10	.1074	.1080	1.0058	9.309	9.255	.99421	50	10	.2447	.2524	1.0314	4.086	3.962	.96959	50
20	.1103	.1110	1.0061	9.065	9.010	.99390	40	20	.2476	.2555	1.0321	4.039	3.914	.96887	40
30	.1132	.1139	1.0065	8.834	8.777	.99357	30	30	.2504	.2586	1.0329	3.994	3.867	.96815	30
40	.1161	.1169	1.0068	8.614	8.556	.99324	20	40	.2532	.2617	1.0337	3.949	3.821	.96742	20
50	.1190	.1198	1.0072	8.405	8.345	.99290	10	50	.2560	.2648	1.0345	3.906	3.776	.96667	10
7	.1219	.1228	1.0075	8.206	8.144	.99255	83	15	.2588	.2679	1.0353	3.864	3.732	.96593	75
10	.1248	.1257	1.0079	8.016	7.953	.99219	50	10	.2616	.2711	1.0361	3.822	3.689	.96517	50
20	.1276	.1287	1.0082	7.834	7.770	.99182	40	20	.2644	.2742	1.0369	3.782	3.647	.96440	40
30	.1305	.1317	1.0086	7.661	7.596	.99144	30	30	.2672	.2773	1.0377	3.742	3.606	.96363	30
40	.1334	.1346	1.0090	7.496	7.429	.99106	20	40	.2700	.2803	1.0386	3.703	3.566	.96285	20
50	.1363	.1376	1.0094	7.337	7.269	.99067	10	50	.2728	.2836	1.0394	3.665	3.526	.96206	10
							82								74
							° ′								° ′
	Cosin	Cotg	Cosec	Sec.	Tan	Sin	Angle		Cosin	Cotg	Cosec.	Sec	Tan	Sin	Angle

TABLE I. SLOPE STAKE

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

ROADWAY OF ANY WIDTH SIDE SLOPES 1½ TO 1.



Cut or Fill	Distance out from Side or Shoulder Stake.										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.00	1.15	1.30	1.45	1.60	1.75	1.90	2.05	2.20	2.35	1
2	2.00	2.15	2.30	2.45	2.60	2.75	2.90	3.05	3.20	3.35	2
3	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	3
4	4.00	4.15	4.30	4.45	4.60	4.75	4.90	5.05	5.20	5.35	4
5	5.00	5.15	5.30	5.45	5.60	5.75	5.90	6.05	6.20	6.35	5
6	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	6
7	7.00	7.15	7.30	7.45	7.60	7.75	7.90	8.05	8.20	8.35	7
8	8.00	8.15	8.30	8.45	8.60	8.75	8.90	9.05	9.20	9.35	8
9	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	9
10	10.00	10.15	10.30	10.45	10.60	10.75	10.90	11.05	11.20	11.35	10
11	11.00	11.15	11.30	11.45	11.60	11.75	11.90	12.05	12.20	12.35	11
12	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	12
13	13.00	13.15	13.30	13.45	13.60	13.75	13.90	14.05	14.20	14.35	13
14	14.00	14.15	14.30	14.45	14.60	14.75	14.90	15.05	15.20	15.35	14
15	15.00	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	15
16	16.00	16.15	16.30	16.45	16.60	16.75	16.90	17.05	17.20	17.35	16
17	17.00	17.15	17.30	17.45	17.60	17.75	17.90	18.05	18.20	18.35	17
18	18.00	18.15	18.30	18.45	18.60	18.75	18.90	19.05	19.20	19.35	18
19	19.00	19.15	19.30	19.45	19.60	19.75	19.90	20.05	20.20	20.35	19
20	20.00	20.15	20.30	20.45	20.60	20.75	20.90	21.05	21.20	21.35	20
21	21.00	21.15	21.30	21.45	21.60	21.75	21.90	22.05	22.20	22.35	21
22	22.00	22.15	22.30	22.45	22.60	22.75	22.90	23.05	23.20	23.35	22
23	23.00	23.15	23.30	23.45	23.60	23.75	23.90	24.05	24.20	24.35	23
24	24.00	24.15	24.30	24.45	24.60	24.75	24.90	25.05	25.20	25.35	24
25	25.00	25.15	25.30	25.45	25.60	25.75	25.90	26.05	26.20	26.35	25
26	26.00	26.15	26.30	26.45	26.60	26.75	26.90	27.05	27.20	27.35	26
27	27.00	27.15	27.30	27.45	27.60	27.75	27.90	28.05	28.20	28.35	27
28	28.00	28.15	28.30	28.45	28.60	28.75	28.90	29.05	29.20	29.35	28
29	29.00	29.15	29.30	29.45	29.60	29.75	29.90	30.05	30.20	30.35	29
30	30.00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	30
31	31.00	31.15	31.30	31.45	31.60	31.75	31.90	32.05	32.20	32.35	31
32	32.00	32.15	32.30	32.45	32.60	32.75	32.90	33.05	33.20	33.35	32
33	33.00	33.15	33.30	33.45	33.60	33.75	33.90	34.05	34.20	34.35	33
34	34.00	34.15	34.30	34.45	34.60	34.75	34.90	35.05	35.20	35.35	34
35	35.00	35.15	35.30	35.45	35.60	35.75	35.90	36.05	36.20	36.35	35
36	36.00	36.15	36.30	36.45	36.60	36.75	36.90	37.05	37.20	37.35	36
37	37.00	37.15	37.30	37.45	37.60	37.75	37.90	38.05	38.20	38.35	37
38	38.00	38.15	38.30	38.45	38.60	38.75	38.90	39.05	39.20	39.35	38
39	39.00	39.15	39.30	39.45	39.60	39.75	39.90	40.05	40.20	40.35	39
40	40.00	40.15	40.30	40.45	40.60	40.75	40.90	41.05	41.20	41.35	40

TABLE II. STADIA CORRECTION AND HORIZONTAL DISTANCES

STADIA REDUCTIONS FOR READING 100

Vertical Angle	Horizontal Correction	Difference in Elevation	Vertical Angle	Horizontal Correction	Difference in Elevation
2°–00′	0.1	3.5	18°–30′	10.1	30.1
3°–00′	0.3	5.3	19°–00′	10.6	30.8
4°–00′	0.5	7.0	19°–30′	11.2	31.5
5°–00′	0.8	8.7	20°–00′	11.7	32.1
6°–00′	1.1	10.4	20°–30′	12.3	32.8
7°–00′	1.5	12.1	21°–00′	12.8	33.5
8°–00′	1.9	13.8	21°–30′	13.4	34.1
9°–00′	2.5	15.5	22°–00′	14.0	34.7
10°–00′	3.0	17.10	22°–30′	14.7	35.4
10°–30′	3.3	17.9	23°–00′	15.3	36.0
11°–00′	3.6	18.7	23°–30′	15.9	36.6
11°–30′	4.0	19.5	24°–00′	16.5	37.2
12°–00′	4.3	20.3	24°–30′	17.2	37.7
12°–30′	4.7	21.1	25°–00′	17.9	38.3
13°–00′	5.1	21.9	25°–30′	18.6	39.0
13°–30′	5.5	22.7	26°–00′	19.2	39.4
14°–00′	5.9	23.4	26°–30′	19.9	39.9
14°–30′	6.3	24.2	27°–00′	20.6	40.5
15°–00′	6.7	25.0	27°–30′	21.3	41.0
15°–30′	7.2	25.8	28°–00′	22.0	42.0
16°–00′	7.6	26.5	28°–30′	22.8	41.9
16°–30′	8.1	27.2	29°–00′	23.5	42.4
17°–00′	8.5	28.0	29°–30′	24.3	42.9
17°–30′	9.0	28.7	30°–00′	25.0	43.3
18°–00′	9.5	29.4			

Chains to Feet	
1	66
2	132
3	198
4	264
5	330
6	396
7	462
8	528
9	594
10	660

Feet to Chains	
100	1.515
200	3.030
300	4.545
400	6.060
500	7.575
600	9.090
700	10.606
800	12.121
900	13.636
1,000	15.151

INDEX OF
CURVE AND REDUCTION TABLES

Table I—SLOPE STAKE

Table II—STADIA CORRECTION AND HORIZONTAL DISTANCES

Table III—TRIGONOMETRIC FORMULAE

Table IV—NATURAL TRIGONOMETRICAL FUNCTIONS

CURVE FORMULAE

Table V—TANGENTS AND EXTERNALS TO A 1° CURVE

USEFUL RELATIONS

Table VI—INCHES TO DECIMALS OF A FOOT

Table VII—MINUTES IN DECIMALS OF A DEGREE

Table VIII—MIDDLE ORDINATES OF RAILS

Table IX—SHORT RADIUS CURVES

Table X—RODS IN FEET, 10THS AND 100THS OF FEET

Table XI—LINKS IN FEET, 10THS AND 100THS OF FEET

(117)

Date File M N O SE MF LBC

Station	Scale	10m 0830	20m 0920	40m 1010
185	30	10.0	13.5	40
165		13.0	13	12
166		15.0	14.5	17.5
167		11.0	13	15
168		9.5	11	14.5
169		8.5	11.25	12
170	Scale 10	5.5	5.5	12.5
171		9.0	10.5	16
172	30	10.5	15	13.25
173		10.0	12	15
174		9.0	11.5	14
175	10	7.4	8.8	13
176		7.3	9.4	12
177		7.85	10.0	15
178	30	10.0	11	15
179		14.0	15.25	15
180		13.5	15.5	16
181		13.5	15	16.5
182		13.0	13.5	15
183		12.0	14.25	15
184		13.0	14.0	15

This concludes traverse

(118)

1105 Flinn/Sainen arrive back on site

(15)

This Page

Blank

(116)

Ruetgers-Nease Salem, Ohio
May 1, 1990
202-01-07 241
EM-34 Survey

Arrive On-site
0730 calibrated HNU 101 units
A, B, C.
load EM-34 equipment

0800 Leave to run Survey
Run Survey along NE bank
of the middle Fork of Little
Beaver Creek MFLBC

0820 Start Traverse
Following pages are result
of that traverse

Weather: cloudy, 50's NE
wind

Mary Sammy

(1.3)

SWMFLBC

Station	30 scale	10m 1456 Data file G	20m 1525 Data H	40m I	
149		20	19	20	100 scale
186		16	18.5	26	
187		16	18	15	30 scale
188		14	17	18	
189		17	20	25	
190		17	20	22	
191		18.5	20	22	
192		19	20	25	
193		19	19	14	
194		17	13	see Note	

Note could not get this reading because 40M Loc was in land fill DG

This finishes traverse on south west side MFLBC.

1625 Sainey + Flinn run line by sewage plant

Mary J. Sainey

(1.4)

Sewage File JKL		J 10m	K 20m	40m
Station		1633	1648	1700
205	30 scale	17	17.2	22.0
204		18	17.5	20.5
203		18	19.5	17.5
202		20.5	19.5	18.0
201		21.0	18.5	20.0

1715 This finishes traverse behind sewage treatment

1733 Arrive on site
Begin down load in
EM-34 polycorder)

1922 calibrate HNU (3)
to calibration gases 58 ppm
w/ 11.7 bulb.

1950 Leave site

Mary J. Sainey

Data File A, B+C Northwest Middle Fork Little Beaver Creek

NWMFLBC Station		10m 1045 File A	20m 1129 File B	40m 1156 File C
150	30 scale	11	13	15
151		10.5	12	15
152		13.5	14.25	15
153		14	13	15
154		11	13.5	17
155		12	13.5	17
156		17	17	17.5
157		16	17	20
158		17	18	16.5
159		14.5	10	20

1228 Sainey & Flinn break for lunch

1321 Sainey & Flinn return from lunch prepare to survey line northeast side of the middle Fork of Little Beaver Creek

Mr Sainey

Data File D, E, F Northeast middle Fork Little Beaver Creek

NE MFLBC Station	Scale	10m 1335	20m 1400	40m 1430
164	30	16.5	~~16.5~~ 17.8	16.5
163		17.5	16.0	17.0
162		14.0	15.0	7.0
161		14.0	15.2	8.0
160		17.0	15.0	18.0

1410 Bill Slankard stops by while we are traversing the 20 M line

1446 Finish NE Traverse along MFLBC

Mr Sainey

This page
Blank

Ruetgers - Nease Salem, Ohio
202-01-07 241
April 30, 1990
EM Survey

0530 Sainey & Flinn leave for site
0045 Sainey & Flinn arrive on site
calibrate two meters

0055 visit Soils gas survey along
railroad tracks, Brian Greene
travels w/ Sainey & Flinn

0120 Return back on-site start
calibrating EM 34

1020 leave site to run EM survey

Following pages are results
of survey

Survey starts at station S-150
on NW side of MFLBC

Weather clear - wind out of East

Tony Sainey

107

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/25/90 Time 1616

Weather Conditions, Temp. 80's Skies clear Wind SW

Sampling Device Not Applicable

Photoionization Detector

Type _____ 8010, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA GC128 B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/25/90 0748

Recorder Scaling Full Range X-1

Time of injection ~~1608~~ 1616 Start of purge _____

Max Total Reading _____ Stabilized Reading _____

Identified Compounds - Measured Concentration - Actual

Comments:

Tony Sa

108

1530 Ayer/Sainey arrive on site prepare equipment for calibration

calibrate HNU 101 w/ isobutylene calibration gas

1616 Run air blank on OVA128GC B. Prepare unit C for shipment back to Columbus. Repair work needed on igniter plug, strip chart recorder.

1640 Run calibration gases on OVA 128 GC unit B. Used gases 10.2, 95.3 + 787 ppm

1700 off-site

Tony So

105

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-244 Date 4/25/90 Time 1403

Weather Conditions, Temp. 80s Skies clear Wind SW

Sampling Device

Photoionizer

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization

Chromatograph OVA 128 GC B TJS Column T-B

Column Temperature 80°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection 1429 Start of purge 1442

Max Total Reading 10 ppm Stabilized Reading 10 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

OVA GC unit will not ignite
wait on unit B to finish purge
and sampling

Terry Sam

106

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-245 Date 4/25/90 Time ___

Weather Conditions, Temp. 80s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-B

Column Temperature 80°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of Injection 1503 Start of purge 1509

Max Total Reading 2 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry Sam

103

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-242 Date 4/25/90 Time 1322

Weather Conditions, Temp. 80s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 24 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection 1333 Start of purge 1348

Max Total Reading 7 ppm Stabilized Reading 7 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Thomas Sam

184

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-243 Date 4/25/90 Time 1334

Weather Conditions, Temp. 80's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 24 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection 1358 Start of purge 1410

Max Total Reading ___ Stabilized Reading ___

Identified Compounds - Measured Concentration - Actual

Comments:

Thomas So

(10)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-240 Date 4/25/90 Time 1309

Weather Conditions, Temp. 80's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC B Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hole has abundant water
GC was not run because OVA
reads 0 ppm while purging
soils gas probe. Put in new ice pack

Terry Sauer

(10)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-241 Date 4/25/90 Time 1316

Weather Conditions, Temp. 80's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 5 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC B Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection 1318 Start of purge 1320

Max Total Reading >10 ppm Stabilized Reading >10 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry Sauer

(99)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-239 Date 4/25/90 Time 1133

Weather Conditions, Temp. 70's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type Hanvel Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA GC 128 C Column T-8

Column Temperature 0° C Carrier Flow 2/4 m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/25/90

Recorder Scaling Full Range X-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe.

Mary Sam

(100)

TSS
1255 Ayer / Sainey break for lunch.

1255 Ayer / Sainey return from lunch continue soil gas survey along railroad
Following pages report on soils gas investigation

Mary Sam

(97)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-237 Date 4/25/90 Time 1114

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 60°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0ppm while purging soils gas probe

Terry Sauer

(98)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-235 Date 4/25/90 Time 1126

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 60°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0750

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0ppm while purging soils gas

Terry Sauer

(95)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-235 Date 4/25/90 Time 1035

Weather Conditions, Temp. 70's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNV 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging

Tim Same

(96)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-236 Date 4/25/90 Time 1050

Weather Conditions, Temp. 70's Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNV 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90

Recorder Scaling Full Range X-1

Time of Injection 1105 Start of purge 1120

Max Total Reading >10 Stabilized Reading >10

Identified Compounds - Measured Concentration - Actual

Comments:

Observation that connection lines between probe & GC are recording 3 ppm on OVA. HNV recording 0 ppm. Tim zeroing background out.

Tim Same

(93)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-233 Date 4/25/90 Time 0982

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC-C Column T-8

Column Temperature 80 Carrier Flow 24m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range x-1

Time of injection 1008 Start of purge 1021

Max Total Reading 2ppm Stabilized Reading 1ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Tony Sauro

(94)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-234 Date 4/25/90 Time 010

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA GC 128 B Column T-8

Column Temperature 0°C Carrier Flow 24m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range x-1

Time of injection - Start of purge -

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while pumping soils gas probe.

Tony Sauro

(91)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-231 Date 4/25/90 Time 0925

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0320

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 Column T-8

Column Temperature 0° C Carrier Flow 24 m

Injection Volume 2.5 ml Chart Speed

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection 0920 Start of purge 0940

Max Total Reading 3.3 ppm Stabilized Reading 2.0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry Sauer

(92)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-232 Date 4/25/90 Time 0935

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 Sec. B Column T-8

Column Temperature 0° C Carrier Flow 24 m

Injection Volume 2.5 ml Chart Speed

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection 0944 Start of purge 0950

Max Total Reading 7.5 ppm Stabilized Reading 7.5 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry Sauer

(89)

SOILS GAS FORM for RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-229 Date 4/25/90 Time 0854

Weather Conditions; Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-B

Column Temperature 0°C Carrier Flow 24 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading <0ppm

Identified Compounds - Measured Concentration - Actual

Comments: Some water in hole. Did not run GC because OVA reading <0 ppm while purging soils gas probe. HNU also reading 0 ppm

Terry Sauer

(90)

SOILS GAS FORM for RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-230 Date 4/25/90 Time 0914

Weather Conditions; Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-B

Column Temperature 0°C Carrier Flow 24 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments: Abundant fluid in hole. Possible methane kick of 3.5 but disappeared. Pull probe again and ~~not~~ TGS did not run GC because OVA did not record > 0 ppm.

Terry Sauer

(82)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-222 Date 4/25/90 Time 0925

Weather Conditions, Temp. 70 Skies [illegible] Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0.2 ppm Stabilized Reading 0.2 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 7.5 ml. Chart Speed ___

Time and date of last calibration 4/25/90 0745

Recorder Scaling Full Range ___

Time of injection 0930 Start of purge 0941

Max Total Reading 7.5 ppm Stabilized Reading 7.5 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Replace S-222 closer to trucks
22' off, may be methane
GC did not show volatile

Terry Sa

(83)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-228 Date 4/25/90 Time 0941

Weather Conditions, Temp. 70 Skies clear Wind Sw

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date [illegible] calibration 4/25/90 0730

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC [illegible] Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume [illegible]

Time and date 4/25/90

Recorder Scaling Full [illegible] 0745

Time of injection 0944 [illegible] 0959

Max Total Reading 3.5 ppm [illegible] 2.0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Trace of volatiles however one very
early eluter with high reading possibly
methane

Terry Sam.

1900 Ayer, Sainey arrive back on site.

1911 calibrate HNU 101 for ERM Inc.

1914 calibrate HNU 101 for ERM midwest

1926 calibrate OVA 128 GC units A, B, C.

1930 leave site.

Terry Sainey

Ruetgers-Nease Salem Ohio
202-01-07 242
April 25, 1990
Soils Gas Investigation

Weather 70° variable cloudy SW winds

0720 Ayer/Sainey arrive on site prepare to conduct soils gas survey along railroad tracks.

0730 calibrate HNU 101

0745 calibrate OVA 128 GC units B + C.

0752 recharge hydrogen cylinders

Terry Sainey

(83)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-226 Date 4/24/90 Time 1819

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNu 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC B Column T-8

Column Temperature 0°C Carrier Flow 24m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 1400

Recorder Scaling Full Range X-1

Time of Injection 1836 Start of purge ___

Max Total Reading 7.5 ppm Stabilized Reading 7.5 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

no record on GC Probably methane.

Tim Sam

(84)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-227 Date 4/24/90 Time 1835

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNu 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 24m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0755

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading <0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA reads <0ppm while purging soils gas probe

Tim Sam

(B)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station ~~S-222~~ S-224 TJS Date 4/24/90 Time 1745

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA128GC B Column T-8

Column Temperature 0°C Carrier Flow 2.4m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/24/90 1400

Recorder Scaling Full Range X-1

Time of injection 1745 Start of purge 1800

Max Total Reading 3ppm Stabilized Reading 1ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hole full of water

(B)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station ~~S-224~~ S-223 TJS Date 4/24/90 Time 1750

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA128GC C Column T-8

Column Temperature 0°C Carrier Flow 2.4m

Injection Volume ml. Chart Speed

Time and date of last calibration 4/24/90 0740

Recorder Scaling Full Range X-1

Time of injection 1805 Start of purge 1820

Max Total Reading 2.5ppm Stabilized Reading 2ppm

Identified Compounds - Measured Concentration - Actual

Comments:

(79)

1620 Sainey / Ayer back on site
repair broken cordle in chuck
and change OVA.

1720 Back on railroad track
traverse.

Following pages are informatic
about soils gas survey.

(80)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-229 Date 4/24/90 Time 1722

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/24/90 0740

Recorder Scaling Full Range x-1

Time of injection 1724 Start of page 1738

Max Total Reading 3ppm Stabilized Reading 1ppm

Identified Compounds - Measured Concentration - Actual

Comments:

22' off of rail, Good GC, chan TJS
ice pack missing column may
have eluted quicker than normal.

7-7-80

(17)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-221 Date 4/24/90 Time 1538

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0737

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-9

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0741

Recorder Scaling Full Range X-1

Time of injection 1549 Start of purge 1552

Max Total Reading 2 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry Sauer

(18)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-222 TB Date 4/24/90 Time 1542

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0737

Range 0-20 ppm

Max Total Reading 10 ppm Stabilized Reading 10 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC 3 Column T-9

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 1400

Recorder Scaling Full Range X-1

Time of injection 1556 Start of purge 1608

Max Total Reading 710 ppm Stabilized Reading —

Identified Compounds - Measured Concentration - Actual

Comments:

water in hole pulled into hose connecting probe with OVA Read. may be inaccurate because of water

Terry Sauer

(75)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-219 Date 4/24/90 Time 1449

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC ~~A~~ B Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration ~~4/24/90~~ ~~0733~~ 0733

Recorder Scaling Full Range 4/24/90 1400 X-1

Time of injection 1520 Start of purge 1532

Max Total Reading 3.5 ppm Stabilized Reading 2 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Has to switch to OVA unit B. Although this machine was inoperative early on in program. Now pump appears to be working fine.

Mary Sam

(76)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-220 Date 4/24/90 Time 1526

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0734

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/24/90 0740

Recorder Scaling Full Range X-1

Time of injection - Start of purge -

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA reads 0 ppm while purging soils gas probe.

Mary Sam

(73)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-217 Date 4/24/90 Time 1426

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC Column T-3

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0745

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA reads 0 ppm while purging soil gas check w/ OVA unit A for verification

Terry Sauer

(74)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-218 Date 4/24/90 Time 1439

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A C TJS Column T-3

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0745 ~~0785~~ TJS

Recorder Scaling Full Range X-1

Time of injection 1445 Start of purge 1457

Max Total Reading 8ppm Stabilized Reading 4ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry Sauer

(71)

1300 Ayer / Sainy break for lunch

1400 Ayer / Sainy return from lunch. Set up OVA B for RAF to use to scan of TJS over wells before purging. Calibrate to 10.5ppm 95.3ppm 787 ppm

1411 Arrive back at railroad tracks to continue soil gas survey.

Change ice packs in thermal pack on OVA 128 GC with A+C.

The following pages report the results of the soil gas survey.

Tony Sainy

(72)

SOIL GAS FORM
for
KUTTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-216 Date 4/24/90 Time 1419

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector

Type HNU 101 Bulb 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0° C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/24/90 0740

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA did not record above 0ppm ~~on OVA~~. TJS

Tony Sainy

(49)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/24/90 Time 1213

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector not Applicable

Type UV 101 Bulb, 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration

Range

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA128GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/24/90

Recorder Scaling Full Range X-1

Time of injection 1213 Start of purge 1225

Max Total Reading Stabilized Reading

Identified Compounds - Measured Concentration - Actual

Comments:

Air blank shows slight show at beginning of elution may be because of volatiles in air. Took air blank along railroad tracks behind pond 2

Terry Sam

(77)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/24/90 Time 1242

Weather Conditions, Temp. 70s Skies clear Wind SW

Sampling Device

Photoionization Detector Not Applicable

Type Bulb, 9.5 ev 10.2 ev 11.7 ev

Time and date of last calibration

Range

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/24/90

Recorder Scaling Full Range X-1

Time of injection 1242 Start of purge

Max Total Reading Stabilized Reading

Identified Compounds - Measured Concentration - Actual

Comments:

Air blank looks acceptable

Terry Sam

(3)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-214 Date 4/24/90 Time 1137

Weather Conditions, Temp. 60s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC ~~A~~ C TDS Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0740 ~~0785~~

Recorder Scaling Full Range X-1

Time of injection 1130 reinject Start of purge 1202

Max Total Reading 3 ppm Stabilized Reading 3 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Reinject w/ another machine c. purge unit A @ 1130 On second run w/ GC unit C got good chromatograph

Terry. Sam

(68)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-215 Date 4/24/90 Time 1206

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-28 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0740

Recorder Scaling Full Range X-1

Time of injection 1228 Start of purge 1240

Max Total Reading 2.5 ppm Stabilized Reading 2.0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terry. Sam

(5)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-212 Date 4/24/90 Time 1110

Weather Conditions, Temp. 60's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type [illegible] 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA GC Column T-9

Column Temperature 0° C Carrier Flow 2 ml

Injection Volume [illegible] Chart Speed ___

Time and date of last calibration 4/24/90 0742

Recorder Scaling Full X-1

Time of injection 1114 Start of purge 1116

Max Total Reading 5 ppm Stabilized Reading 5 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Nancy Sang

(6)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-213 Date ~~4/20~~ 4/24/90 Time 1120

Weather Conditions, Temp. 60's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA GC 128 A Column T-9

Column Temperature 0° Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/24/90 0755

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA reading 0 ppm while purging soil gas probe

Nancy Sang

(63)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-210 Date 4/24/90 Time 1021

Weather Conditions [illegible] Skies _____ Wind _____

Sampling Device

Photoionization Detector

Type HNU 101 [illegible] 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration 4/24/90 0756

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 80°C Carrier Flow 24 ml

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/24/90 0748

Recorder Scaling Full Range Vol

Time of injection 1031 Start of purge 1042

Max Total Reading 4 ppm Stabilized Reading 4 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Tung Sam

(64)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-211 Date 4/24/90 Time 1038

Weather Conditions, Temp. 60's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 80°C Carrier Flow 24 ml

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/24/90 0755

Recorder Scaling Full Range Vol

Time of injection 1045 Start of purge 1104

Max Total Reading 2100 ppm Stabilized Reading 2100 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

water in hole. H2S to run GC twice
column appears to be contaminated
because meter drifting upwards

Tung S

(61)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-208 Date 4/24/90 Time 0942

Weather Conditions, Temp. 60's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0740

Recorder Scaling Full Range X-1

Time of injection 0948 Start of purge 1001

Max Total Reading 0.8 ppm Stabilized Reading 0.9 ppm

Identified Compounds - Measured Concentration

Comments:

[signature]

(62)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-209 Date 4/24/90 Time 0959

Weather Conditions, Temp. 60's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0733

Recorder Scaling ~~Full~~ Half Scale Range X-1 - X-10

Time of injection 1000 Start of purge 1018

Max Total Reading 5 ppm Stabilized Reading 5 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

used ½ scale instead of full scale.
had to go to X-10 when meter
drifted off-scale

[signature]

(59)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-206 Date 4/24/90 Time 0900

Weather Conditions, Temp. 60s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC ~~A~~ G Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 ~~0785~~ 0740 TJS

Recorder Scaling Full Range X-10

Time of injection 0908 Start of purge 0921

Max Total Reading 8ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Tony. Sam

(60)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-207 Date 4/24/90 Time 0917

Weather Conditions, Temp. 60s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/24/90 0732

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/24/90 0755

Recorder Scaling Full Range X-1

Time of injection 0926 Start of purge 0938

Max Total Reading >10 ppm Stabilized Reading 4 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

water in hole. Shows numerous peaks on chromatograph. OVA appeared to be drifting @ end of run or long eluters coming late. Backflush went to bale line

Tony. Sam

1650 Talked w/ Mrs. Moore telephone # 337-1066 Moore residence phone after Thursday

1655 Arrive back on-site

1700 Talk w/ Bill Adams about Rich Dorr accident

1710 Calibrate OVA GC 128 machine ~~A~~ 700 C to gases 10.2 ppm, 95.3 ppm and 787 ppm.

~~1720 calibrate~~

1711 Calibrate HNU 101 to 58 ppm isobutylene calibration gas 11.7 ev. lamp.

1720 Calibrate OVA 128GC unit A to gases 10.2 ppm, 95.3 ppm & 787 ppm.

1730 Help pack Sample Savers for RAF & ERM INC.

1900 off-site

Mary Sam

Ruetgers-Nease Salem, Ohio
202-01-07 242
Soil Gas Investigation
April 24, 1990

0730 Ayer / Sainey arrive on site start calibrating instruments

HNU calibration of ERM Inc. equipment using 58 ppm isobutylene gas calibrate to 11.7 ev. bulb.

0732 calibrate ERM midwest HNU 101 to isobutylene 58 ppm gas calibrate to 11.7 ev. bulb.

0740 Calibrate OVA 128GC machine C to calibration gases 10.2, 95.3 & 787 ppm gas.

0745 Ayers recharging hydrogen cylinders on OVA 128 GC machine

0755 Calibrate OVA 128GC unit A Load up supplies & vehicle to go.

0830 Leave site to run soils gas survey along railroad tracks. Following pages are results of that investigation Mary Sam

(55)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-38 Date 4/23/90 Time 1633

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1510

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/23/90 1520

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading <0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded <0 ppm while purging soil gas. HNU also recorded 0 ppm

Tony Sam

(56)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-39 Date 4/23/90 Time 1635

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1510

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/23/90 1520

Recorder Scaling Full Range X-1

Time of injection 1641 Start of purge 1653

Max Total Reading 0.4 ppm Stabilized Reading 0.4 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

This terminates transect along moore drain property line.

Tony So

(53)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-36 Date 4/23/90 Time 1623

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1810

Range 0-20ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0° C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/23/90 1820

Recorder Scaling Full Range K-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments: Hole in fence.
Did not record GC because OVA did not record greater than 0 ppm while purging soils gas probe. HNU also recorded 0 ppm

[signature]

(54)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-37 Date 4/23/90 Time 1628

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1810

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0° C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/23/90 1828

Recorder Scaling Full Range K-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:
Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU recorded 0 ppm.

[signature]

(51)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-34 Date 4/23/90 Time 1610

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1520

Range 0-20 ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/23/90 1540

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0ppm while purging soils gas probe. HNU also recorded 0ppm

[signature]

(52)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-35 Date 4/23/90 Time 1618

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1520

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/23/90 1540

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hand driving probe. Did not run GC because OVA recorded 0ppm while purging soils gas probe. HNU also recorded 0ppm

[signature]

1545 Ayer and Saining leave site to perform soil gas survey on Moore property.

The following pages are the results of the soil gas survey on the Moore property.

Tim Saining

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-33 Date 4/23/90 Time 1557

Weather Conditions, Temp 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/23/90 1520

Range 0-10

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-9

Column Temperature 0°C Carrier Flow 24 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/23/90 1546

Recorder Scaling Full Range X-C

Time of injection 1600 Start of purge 1613

Max Total Reading 2ppm Stabilized Reading 1ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Good chromatograph

1645 Samey/Ayer arrive on site
Calibrate HNU + OVA GCs
Copy notes.

1800 Leave site

Rustgers-Nease Salem Ohio
202-01-07 242
April 23, 1990
Soils Gas Investigation

1515 Log back into site (Samey + Ayer) after running EM-34 survey. Ran background line of 10 meters, 20 meters and 40 meters. Then traversed Allen Road 10 meters, 20 meters + 40 meters. Then traversed Dunlop capped landfill 10 meter, 20 meter and 40 meter. These results are in Rick Parr field book.

~~1520~~ TJS
1520 Calibrate HNU 101 w/ isobutylene 50 ppm w/ 1 ind bulb prior to performed soil gas survey on Moore property.

1540 calibrate OVA 1286C machines A + C to calibration gases 105 ppm, 95.3 ppm and 787 ppm.

[illegible]

45

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-204 Date 4/22/90 Time 1609

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:
Did not run GC because OVA recorded 0 ppm while purging soil gas probe. HNU also recorded 0 ppm.

[illegible signature]

46

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-205 Date 4/22/90 Time 1615

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20ppm

Max Total Reading 0ppm Stabilized Reading 0ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0ppm Stabilized Reading 0ppm

Identified Compounds - Measured Concentration - Actual

Comments:
This terminates traverse, junction of tributary to MFLBC on east side of landfill. Did not run GC because OVA recorded 0ppm while purging soil gas probe. HNU also recorded 0ppm

[illegible signature]

43

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-202 Date 4/22/90 Time 1553

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds – Measured Concentration – Actual

Comments:

In sand along bank of MFLBC.
Did not run GC because OVA recorded
0 ppm while purging soils gas probe.
HNU recorded <0 ppm.

[illegible]

44

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-203 Date 4/22/90 Time 1600

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds – Measured Concentration – Actual

Comments:

Did not run GC because OVA recorded
0 ppm while purging soils gas probe
HNU also recorded 0 ppm.

[illegible]

41

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-200 Date 4/22/90 Time 1455

Weather Conditions, Temp. 70's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA did not read above 0 ppm while purging soils gas probe. HNU also recorded 0 ppm.

[signature]

42

1500 walk to pass of landfill to see how to get to east side of soils gas line.

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-201 Date 4/22/90 Time 1545

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 10[illegible] 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU also recorded 0 ppm

[signature]

39

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-198 Date 4/22/90 Time 1441

Weather Conditions, Temp. 70s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0741

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC S Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA did not record above 0 ppm while purging soils gas probe. HNU also did not record above 0 ppm.

Ruth J. Sam

40

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-199 Date 4/22/90 Time 1448

Weather Conditions, Temp. 70s Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging the soils gas probe. HNU also records 0 ppm.

Ruth J. Sam

37

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-191 Date 4/22/90 Time 1428

Weather Conditions, Temp. 70's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810 ~~0760~~ TJS

Recorder Scaling Full Range K-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hand ~~drill~~ TJS driving probe.
Did not run GC because OVA recorded
0 ppm while purging soils gas probe.
HNU also recorded 0 ppm.

[signature]

38

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-197 Date 4/22/90 Time 1435

Weather Conditions, Temp. 50's Skies clear Wind W

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range K-1

Time of injection - Start of purge -

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Hand driving probe. 24" into ground very
wet. Did not run GC because OVA
registered <0 ppm while purging soils
gas probe. HNU also recorded <0 ppm

[signature]

1215 Arrive at site, clamp + run Air Blank
~~1240~~ TJS on machine C. OVA 128 GC

1240 Break for lunch

1340 Log back in from lunch

Resupply equipment needs.
change ice packs in thermal
packs for GC columns both
OVA 128 GC ~~[illegible]~~ TJS A + C

1400 Leave for line of soils
gas behind Dunlop Land SM

Following pages report on
soils gas activities

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-195 Date 4/22/90 Time 1423

Weather Conditions, Temp. 70s Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU-101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0750

Recorder Setting Full Range X-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds — Measured Concentration — Actual

Comments:

Did not run GC because OVA records
0 ppm while purging soils gas probe.
HNU operable now, did not record
above zero ppm.

[illegible]

33

SOIL GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-184 Date 4/23/90 Time 1149

Weather Conditions, Temp. 60s Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 ml/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of Injection — Start of purge _____

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA records 0 ppm while purging soil gas probe. The station finishes traverse from Allen Road to seismic line A on east side of Middle Fork of Little Beaver Creek.

Terry Sauer

34

SOIL GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/22/90 Time 1220

Weather Conditions, Temp. 60s Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection 1220 Start of purge 1226

Max Total Reading — Stabilized Reading —

Identified Compounds - Measured Concentration - Actual

Comments:

Chromatograph shows column to be clean.

Terry Sauer

31

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-182 Date 4/22/90 Time 1131

Weather Conditions, Temp. 60 Skies clear Wind calm

Sampling Device

~~Photoionization Detector~~ Not Applicable

~~Type ____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____~~

~~Time and date of last calibration ____~~

~~Range ____~~

~~Max Total Reading ____ Stabilized Reading ____~~

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soil gas probe

[signature]

32

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-183 Date 4/22/90 Time 1140

Weather Conditions, Temp. 60s Skies clear Wind calm

Sampling Device

~~Photoionization Detector~~ Not Applicable

~~Type ____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____~~

~~Time and date of last calibration ____~~

~~Range ____~~

~~Max Total Reading ____ Stabilized Reading ____~~

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed ____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe

[signature]

29

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station Flie Blank Date 4/22/90 Time 1111

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type Bulb, 9.5 ev 10.2 ev 11.7 ev

Time and date of last calibration

Range

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection ~~1110~~ 1111 Start of purge 1123

Max Total Reading Stabilized Reading

Identified Compounds - Measured Concentration - Actual

Comments:

Chromatograph shows no indication of a contaminated column.

Tur Sam

30 8A

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-181 Date 4/22/90 Time 1126

Weather Conditions, Temp. 60 Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type Bulb, 9.5 ev 10.2 ev 11.7 ev

Time and date of last calibration

Range

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection 1126 Start of purge 1138

Max Total Reading 2 ppm Stabilized Reading 1 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

(27)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-179 Date 4/22/90 Time 1040

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0° C Carrier Flow 2 4m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while pursing soils gas probe

[illegible]

(28)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-180 Date 4/22/91 Time 1048

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type _____ [illegible] 11.7 ev

Time and date of [illegible]

Range _____

Max Total Reading _____ [illegible]ing

Flame Ionization [illegible]

Chromatograph OVA 128 GC A T-8

Column Temperature 0°C 2 4m

Injection Volume 2.[illegible] 4/22/90 0810

Time and date of last [illegible]

Recorder Scaling Full X-1

Time of injection –

Max Total Reading 0 ppm 0 ppm

Identified Compounds - Measu[illegible]

Comments:

Did not run GC because OVA recorded 0 ppm while pursing soils gas probe

[illegible]

(25)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-177 Date 4/22/90 Time 1038

Weather Conditions Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type Bulb, 9.5 ev 10.7 ev 11.7 ev

Time and date of last calibration

Range

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range 4-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe.

Thomas Sawyer

(26)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-178 Date 4/22/90 Time 1633

Weather Conditions Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type Bulb, 9.5 ev 10.2 ev 11.7 ev

Time and date of last calibration

Range

Max Total Reading Stabilized Reading

Flame Ionization Detector

Chromatograph OVA 128GC Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range 4-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe.

Thomas Sawyer

(23)

202-01-07 242

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-175 Date 4/22/90 Time 1014

Weather Conditions, Temp 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging

Highest elevation on traverse

[illegible] Sa[illegible]

(24)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-176 Date 4/22/90 Time 1020

Weather Conditions, Temp 50's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type _____ Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection - Start of purge -

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Traverse heading back into stream bottom (gradually)

Did not run TDS GC because OVA recorded 0 ppm while purging soils gas.

[illegible] Sa

(21)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-133 Date 4/22/90 Time 1002

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0910

Recorder Scaling Full Range X-1

Time of injection — Start of purge _____

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging the soil gas probe

Terry Sauner

(22)

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station S-134 Date 4/22/90 Time 1008

Weather Conditions, Temp. _____ Skies _____ Wind _____

Sampling Device

Photoionization Detector Not Applicable

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml/m

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/22/90 0910

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging the soil gas probe. Just beyond flowing monitor-well.

Terry Sauner

(19)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-171 Date 4/22/90 Time 0949

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

~~Photoionization Detector~~ Not Applicable

~~Type 9.5 ev 10.2 ev 11.7 ev~~

~~Time and date of last calibration~~

~~Range~~

~~Max Total Reading Stabilized Reading~~

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier 24 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded <0ppm while purging soils gas probe

[signature]

(20)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-172 Date 4/22/90 Time 0953

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Not Applicable

Photoionization Detector

~~Type Bulb, 9.5 ev 10.2 ev 11.7 ev~~

~~Time and date of last calibration~~

~~Range~~

~~Max Total Reading Stabilized Reading~~

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0910

Recorder Scaling Full Range X-1

Time of injection – Start of purge –

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe

[signature]

(19)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-169 Date 4/22/90 Time 0930

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0340

Range 0-20 ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2.4 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

HNU non-functional because of moisture. Due to high moisture in ground I decide to continue survey w/o HNU 101. Did not run GC because OVA records 0 ppm while purging soil gas probe

Mary Sam

(18)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-170 Date 4/22/90 Time 0942

Weather Conditions, Temp. 50's Skies clear Wind calm

Sampling Device

Photoionization Detector Not Applicable

Type ___ 9.5 ev ___ 10.2 ev ___ 11.7 ev ___

Time and date of last calibration ___

Range ___

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2.4 ml

Injection Volume ___ Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range x-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Stayed on traverse line but line was uphill. Did not run GC because OVA recorded 0 ppm while purging soil gas probe.

Mary Sam

(15)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-167 Date 4/22/90 Time 0914

Weather Conditions, Temp. 50° Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/20/90 0740

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/20/90 0810

Recorder Scaling Full Range X-1

Time of Injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU recorded <0 ppm (trouble w/ moisture)

[illegible]

(16)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-168 Date 4/22/91 Time 0920

Weather Conditions, Temp 50° Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading — Stabilized Reading —

Flame Ionization Detector

Chromatograph OVA 128GC C Column T-8

Column Temperature 0°C Carrier Flow 2 ml

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection 0922 Start of purge 0935

Max Total Reading 4 ppm Stabilized Reading 3 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

HNU would not stabilize

Approximately 1 foot of water on end of soils gas probe.

(13)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-165 Date 4/22/90 Time 0852

Weather Conditions Temp. 40's Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20 ppm

Max Total Reading 5 ppm rising Stabilized Reading not stabilized

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

HNU erratic because of Fog.
Did not run GC because OVA recorded 0 ppm while soils gas probe was being purged.

[signature]

(14)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-166 Date 4/22/90 Time 0906

Weather Conditions, Temp. 50's Skies clear Wind calm
fog

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev 10.2 ev 11.7 ev ✓

Time and date of last calibration 4/22/90 0745

Range 0-20 ppm

Max Total Reading 3 ppm rising Stabilized Reading not stabilized

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 24 m

Injection Volume 2.5 ml. Chart Speed

Time and date of last calibration 4/22/90

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe.
HNU erratic because of fog conditions

[signature]

(11)

0830
~~0820~~ Leave for off-site location.
Plan to run soils gas line on north side of the middle Fork of Little Beaver Creek.

The following pages are the results of the soils gas investigation

(12)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-185 Date 4/22/90 Time 0843

Weather Conditions, Temp. 40s Sky clear (fog) Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/22/90 0740

Range 0-20ppm

Max Total Reading ___ Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA GC17B A Column T-8

Column Temperature 0°C Carrier Flow 3 ml/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/22/90 0810

Recorder Scaling Full Range X-1

Time of injection 0849 Start of purge 0904

Max Total Reading 3ppm Stabilized Reading 0.3ppm

Identified Compounds - Measured Concentration - Actual

Comments:
HNU almost inoperative because of fog conditions.

This page = blank

Ructgers - Nease Salem, Ohio

202-01-07 242

April 22, 1990

Soils Gas Survey

0730 Arrive on site. Sainey / Ayer.
Ayer starts filling calibration
gas bags. Sainey calibrates
ERM Inc. HNU 101.

0740 Sainey calibrates HNU 101 for
ERM Midwest using 53ppm w/ 11.7
ev bulb isobutylene cal. gas.

Start OVAs and prepare to calibrate
loading van with supplies.

0810 Calibrates both OVA 128 GC
machines A & C to calibration
gas 10.5ppm 95.3ppm & 787ppm.

Mary Sainey

(7)

1658 Brent starts Air Blank
machine A.

SOILS GAS FORM
for
RUTGERS-NEASE SALEM, OHIO SITE

General Data

Station Air Blank Date 4/21/90 Time 1658

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type _____ Bulb, 9.5 ev ____ 10.2 ev ____ 11.7 ev ____

Time and date of last calibration _____

Range _____

Max Total Reading _____ Stabilized Reading _____

Flame Ionization Detector

Chromatograph OVA 128GC A Column T-8

Column Temperature 0°C Carrier Flow 2 cc

Injection Volume 2.5 ml. Chart Speed _____

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection _____ Start of purge _____

Max Total Reading _____ Stabilized Reading _____

Identified Compounds - Measured Concentration - Actual

Comments:

Air blank indicates column is clean.

(8)

1730 Ayers calibrates ERM Midwest HNU 101 to 58 ppm isobutylene calibration gas. HNU has 11.7 ev. lamp.

1800 Ayers calibrates ERM Inc. HNU to 58 ppm isobutylene gas
HNU has 11.7 ev lamp.

1810 Ayer + Sainey calibrate OVA 128GC machine A-C calibrate gases 10.5 ppm, 95.3 ppm, 787 ppm.

1815 Leave Site

Terry Sainey

(5)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-193 Date 4/21/90 Time 1958

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA GC 128 C Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Did not run GC because OVA recorded 0 ppm while pursing soils gas probe. HNU also recorded 0 ppm.

Terry Sami

MITCHELL ENERGY & DEVELOPMENT CORP.

(6)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-194 Date 4/21/90 Time 1605

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A T-8

Column Temperature 0°C 2 l/m

Injection Volume 2.5 ml.

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full X-1

Time of injection 1609

Max Total Reading 2 ppm Stabilized Reading 2 ppm

Identified Compounds - Measured Concentration - Actual

Comments:

Terminated soils gas line at edge of landfill. Smell of gas may be methane.

Terry Sami

(3)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-191 Date 4/21/90 Time 1543

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading <0 ppm Stabilized Reading <0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/21/90 0818

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds	Measured Concentration	Actual

Comments:

Did not run GC because OVA did not record above 0 ppm while soils gas probe was purged. HNU also read below 0 ppm

Terry Sauer

MITCHELL ENERGY & DEVELOPMENT CORP

(4)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-192 Date 4/21/90 Time 1551

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Flame Ionization Detector

Chromatograph OVA 128 GC C Column T-8

Column Temperature 0°C Carrier Flow 2 L/m

Injection Volume 2.5 ml Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds	Measured Concentration	Actual

Comments:

Did not purge GC because OVA recorded 0 ppm while purging soils gas probe. HNU also recorded 0 ppm.

Terry Sauer

(1)

The pages 2-6 are notes taken in the field and have been placed in the book as part of the permanent record.

Thomas Sainey

(2)

SOILS GAS FORM
for
RUETGERS-NEASE SALEM, OHIO SITE

General Data

Station S-190 Date 4/21/90 Time 1536

Weather Conditions, Temp. 70 Skies clear Wind calm

Sampling Device

Photoionization Detector

Type HNU 101 Bulb, 9.5 ev ___ 10.2 ev ___ 11.7 ev ✓

Time and date of last calibration 4/21/90 0715

Range 0-20 ppm

Max Total Reading 0 ppm Stabilized Reading ___

Flame Ionization Detector

Chromatograph OVA 128 GC A Column T-8

Column Temperature 0°C Carrier Flow 2 l/m

Injection Volume 2.5 ml. Chart Speed ___

Time and date of last calibration 4/21/90 0810

Recorder Scaling Full Range X-1

Time of injection — Start of purge —

Max Total Reading 0 ppm Stabilized Reading 0 ppm

Identified Compounds	Measured Concentration	Actual

Comments:

Did not run GC because OVA recorded 0 ppm while purging soils gas probe. HNU also recorded 0 ppm

Thomas Sainey

MITCHELL ENERGY & DEVELOPMENT CORP.

Property of ERM Midwest Inc

Address 450 West Wilson Bridge
Columbus, Ohio 43085

Telephone 614-433-7900

This Book is manufactured of a High Grade 50% Rag Paper having a Water Resisting Surface, and is sewed with Nylon Waterproof Thread.

INDEX

202-01-07 242
Rustgers - Near Salem, Ohio

Soils Gas Survey
Book 2
Tim Sainey
Brent Ayer

202-01-07 241
Rustgers-Near Salem, Ohio
Em-34 Survey

Tim Sainey
Doug Flinn

202-01-07 242 Book 2

202-01-07

242

Soils Gas

Book 2

202-01-07

241

EM-34

TELEDYNE

407

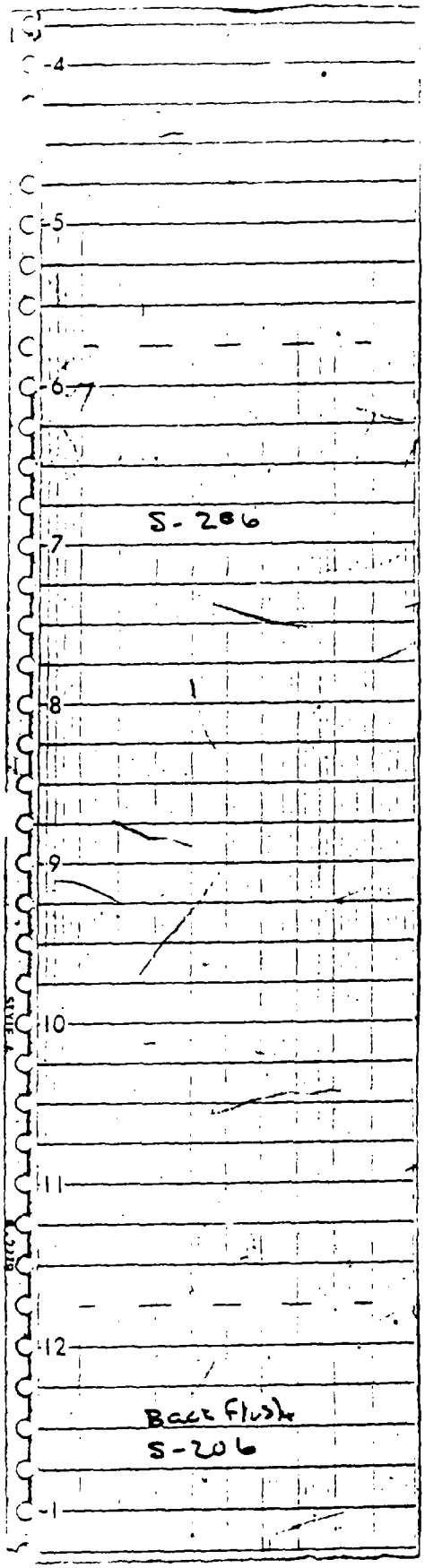
FIELD BOOK

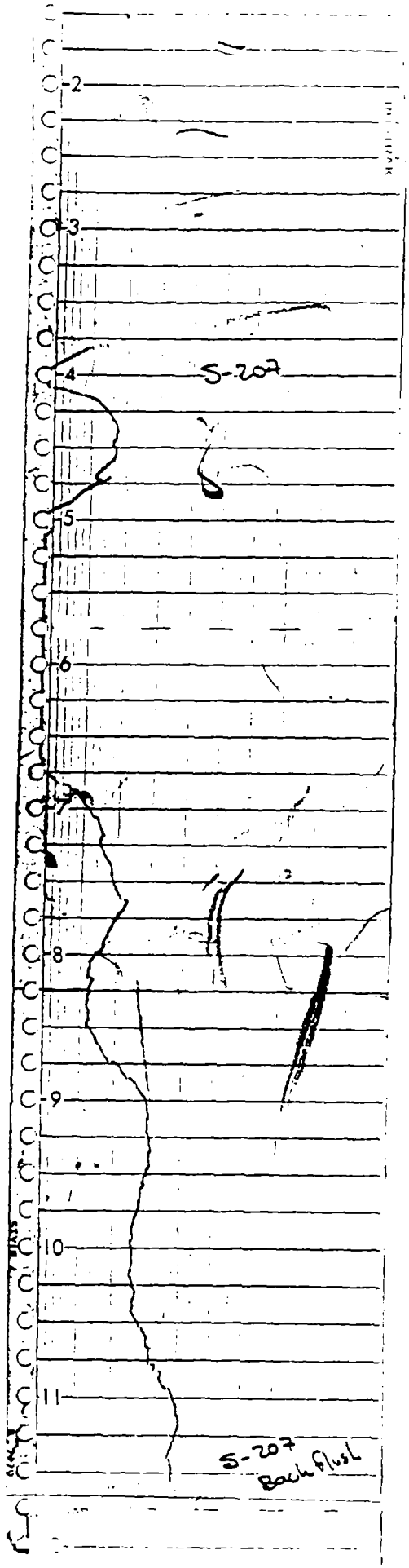
GAS CHROMATOGRAPH READINGS

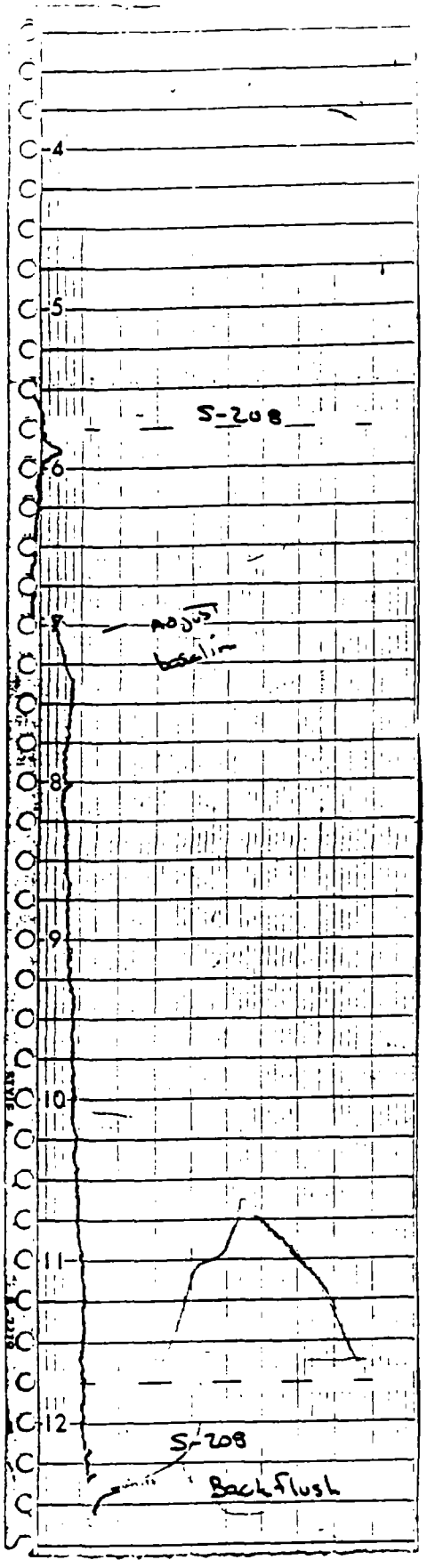
CHROMOTOGRAPH
READINGS

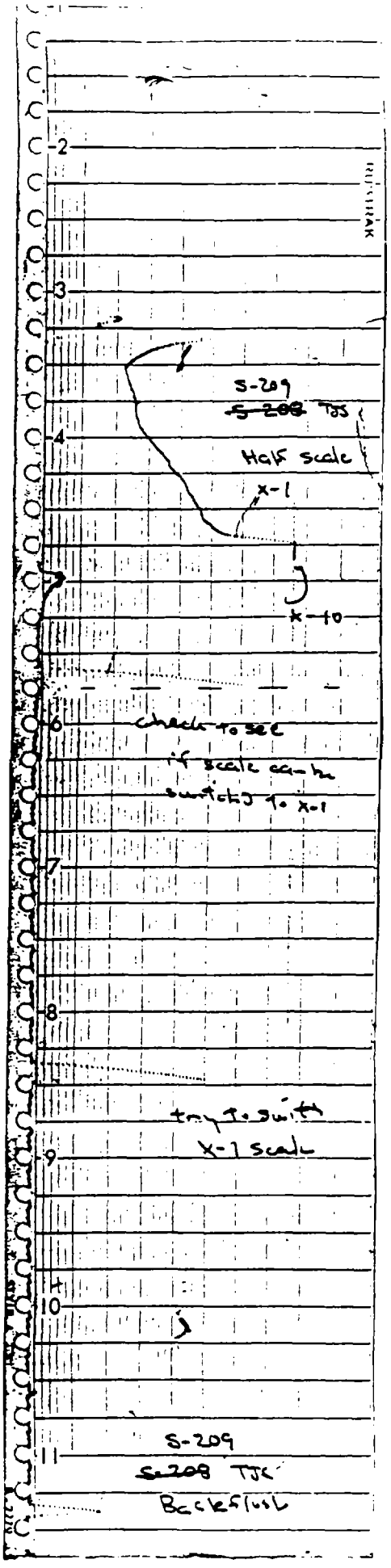
RUSTRAK
S-20
Backfill

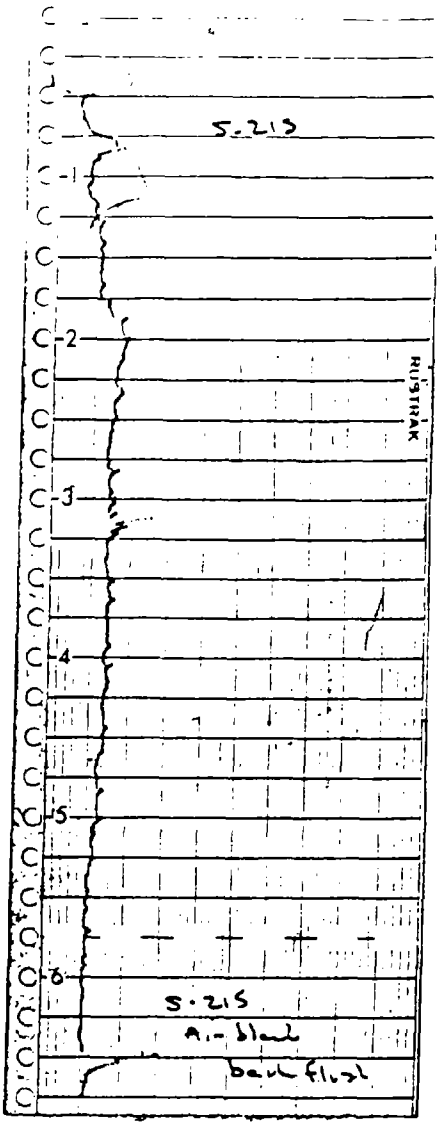
RUSTRAK
S-21
Backfill

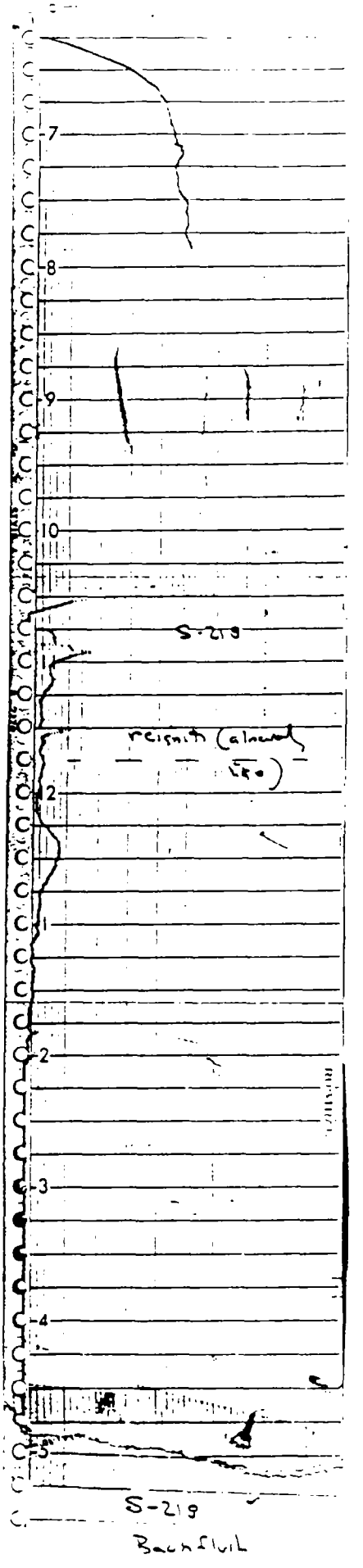

-4
-5
-6
S-206
-7
-8
-9
-10
-11
-12
Back flush
S-206
-1

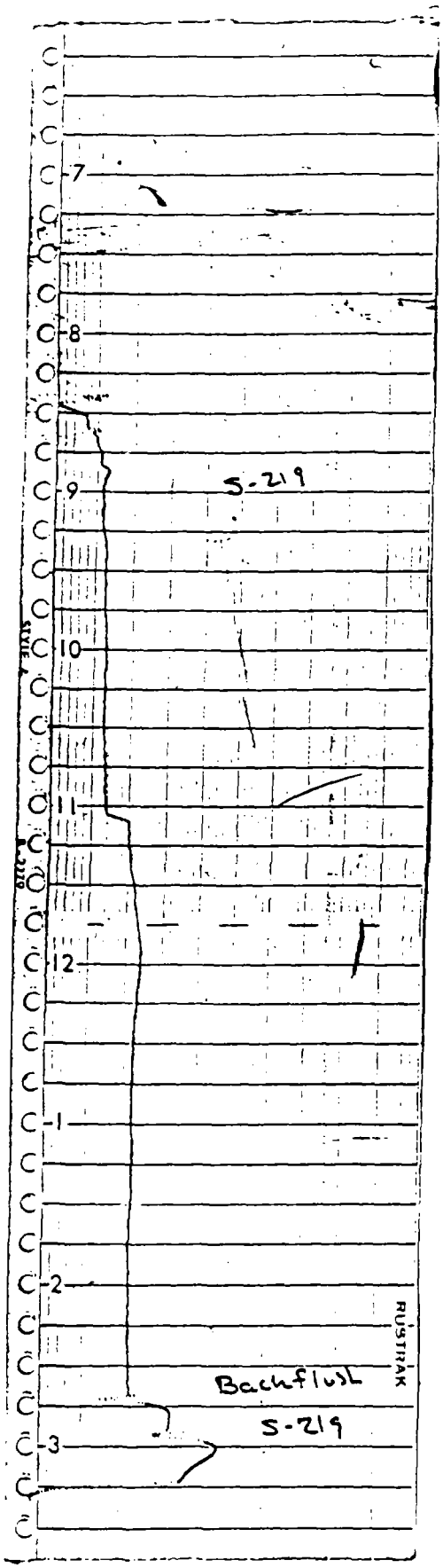

-2
-3
-4
S-207
-5
-6
-7
-8
-9
-10
-11
S-207
Back flush

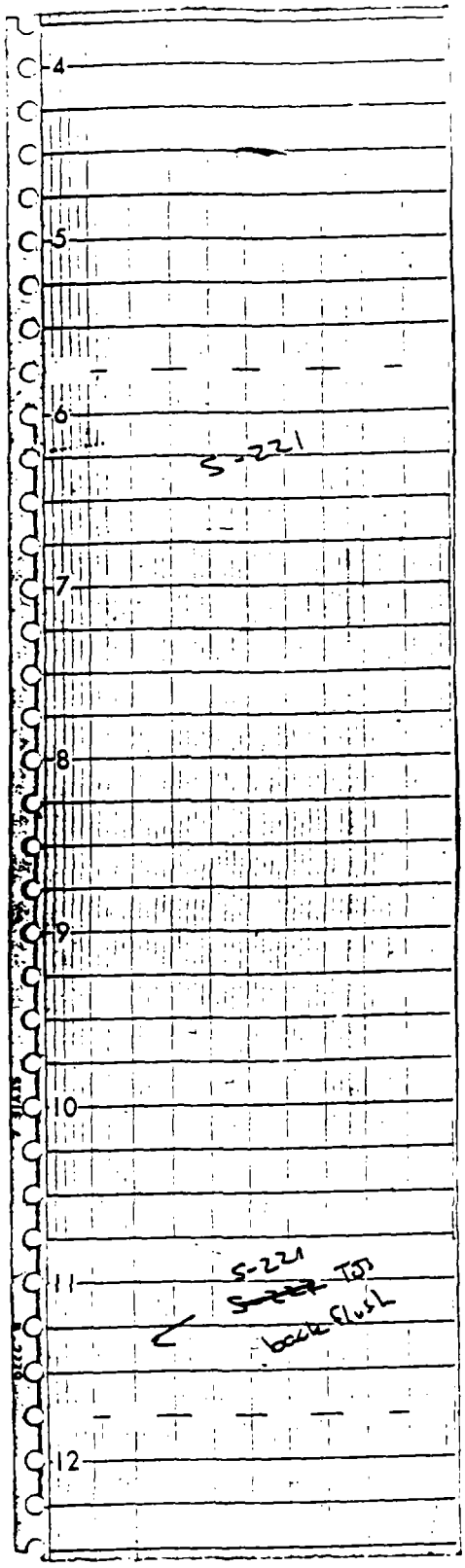

-4
-5
S-208
-6
Adjust baseline
-8
-9
-10
-11
-12
S-208
Backflush

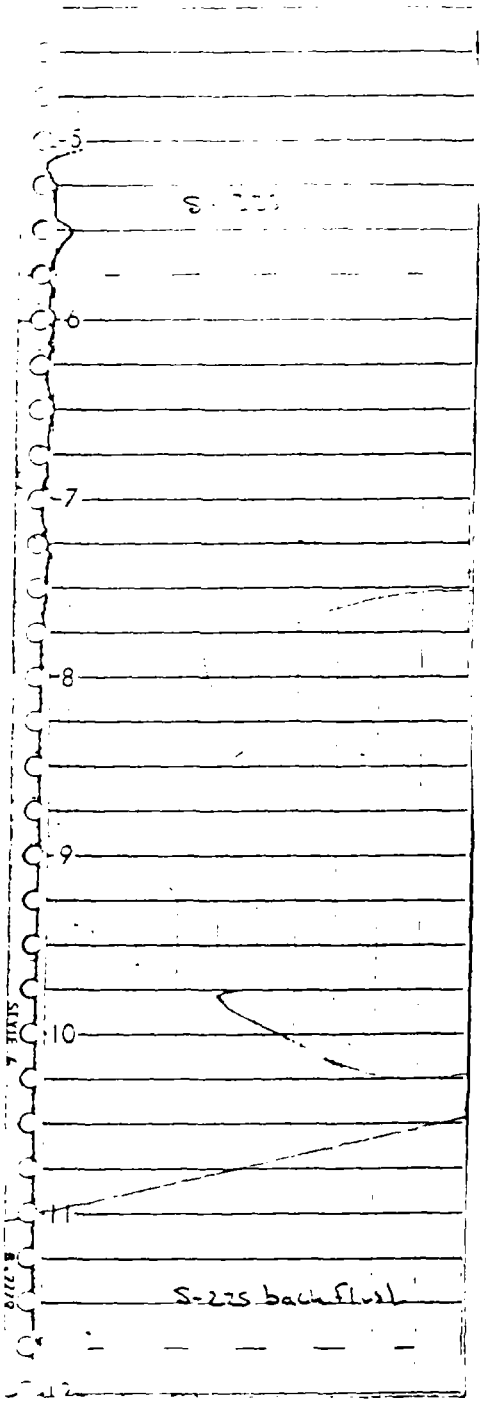

-2
-3
S-209
~~S-208~~ TJS
-4
Half scale
x-1
x-10
-6
check to see
if scale can be
switching to x-1
-7
-8
try to switch
x-1 scale
-9
-10
-11
S-209
~~S-208~~ TJC
Backflush

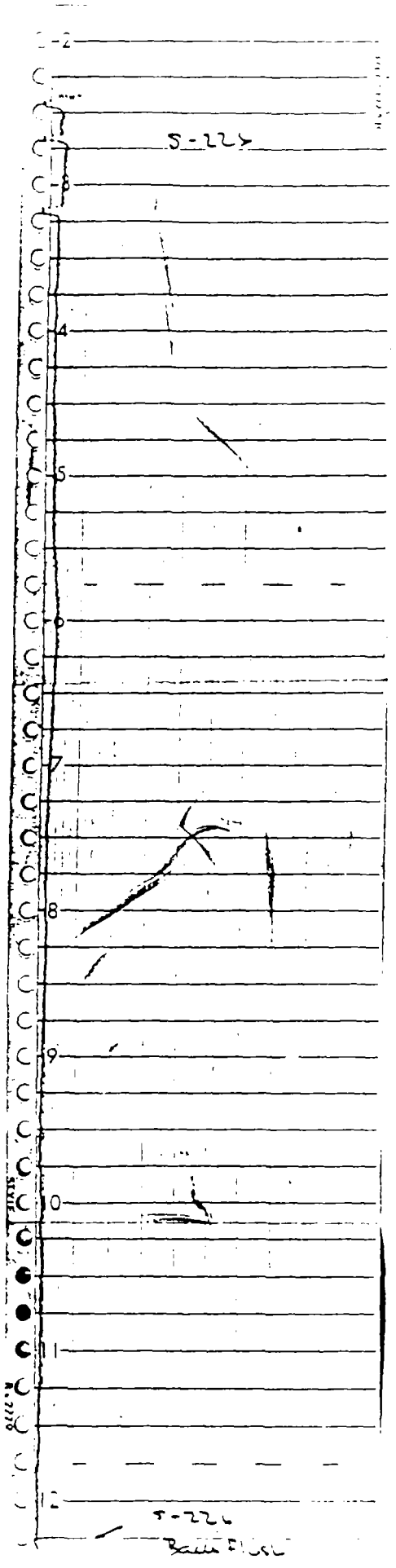

S-215
S-215
Air-blank
backfill

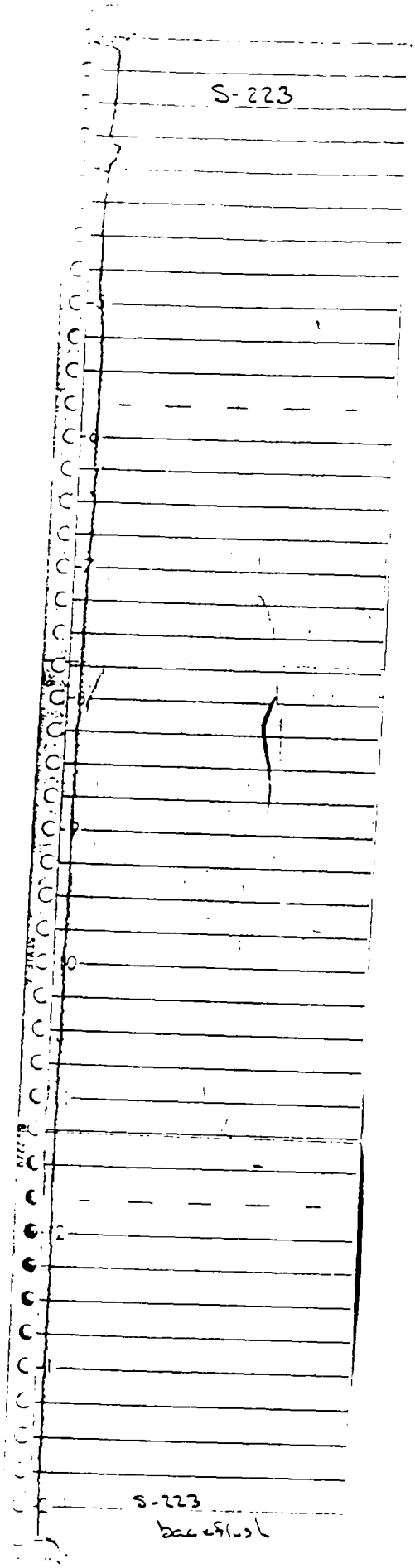

S-219
S-219
Backfill

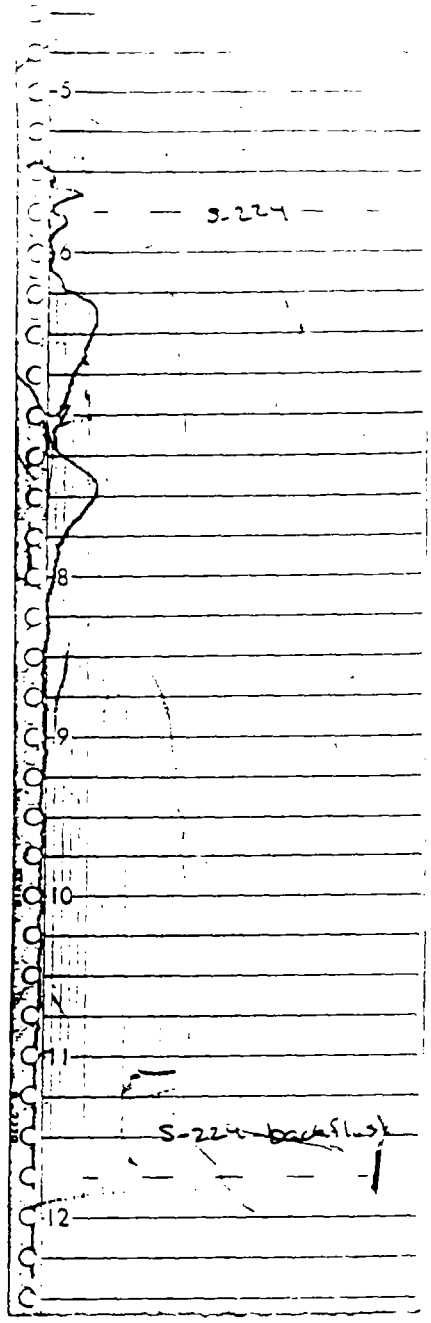

7
8
9
10
11
12
1
2
3
S-219
Backflush
S-219
RUSTRAK


4
5
6
7
8
9
10
11
12
S-221
S-221 TJ3
backflush


S-225 backflush

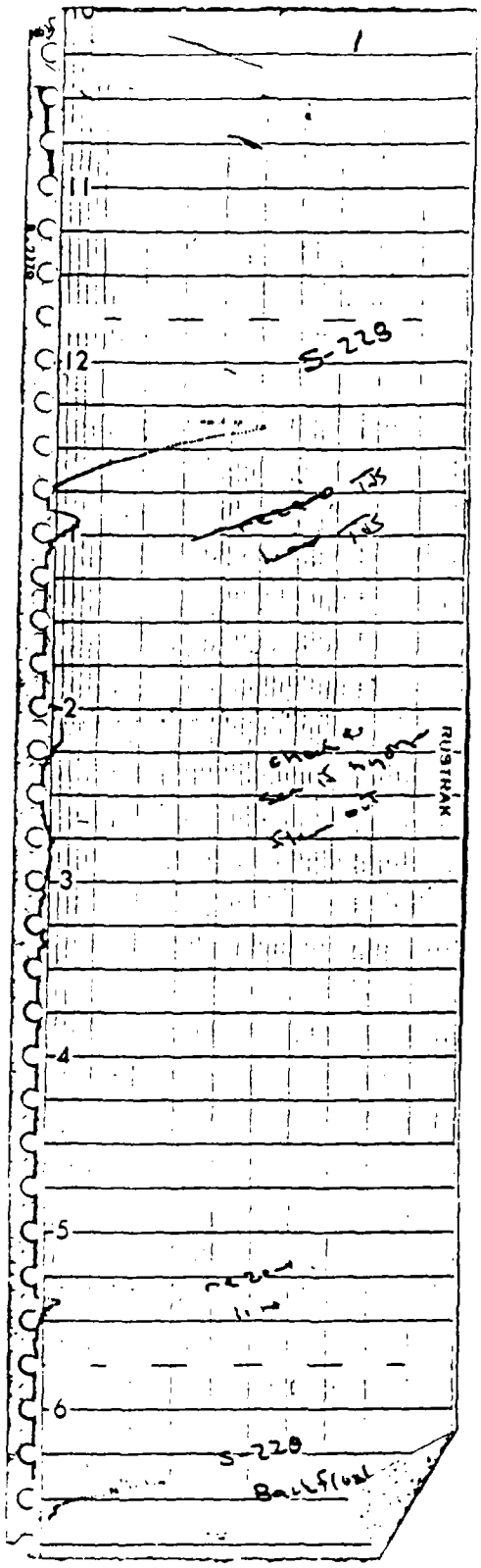

S-226
S-226
Backflush


S-223
S-223
backflow


S-224
S-224 backflow

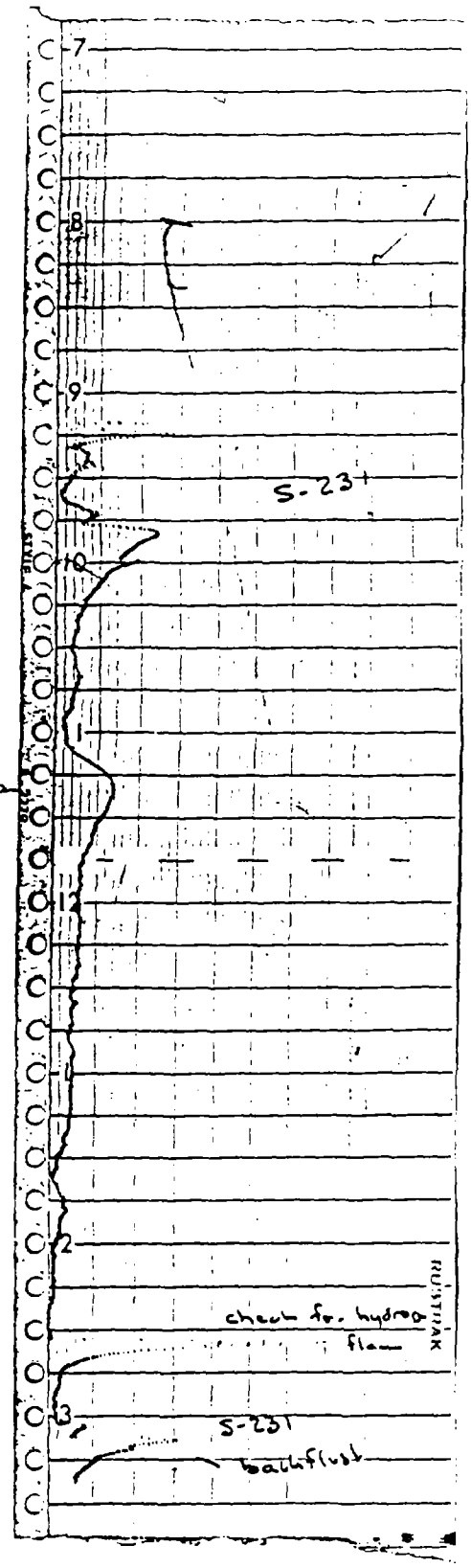
RUSTRAK

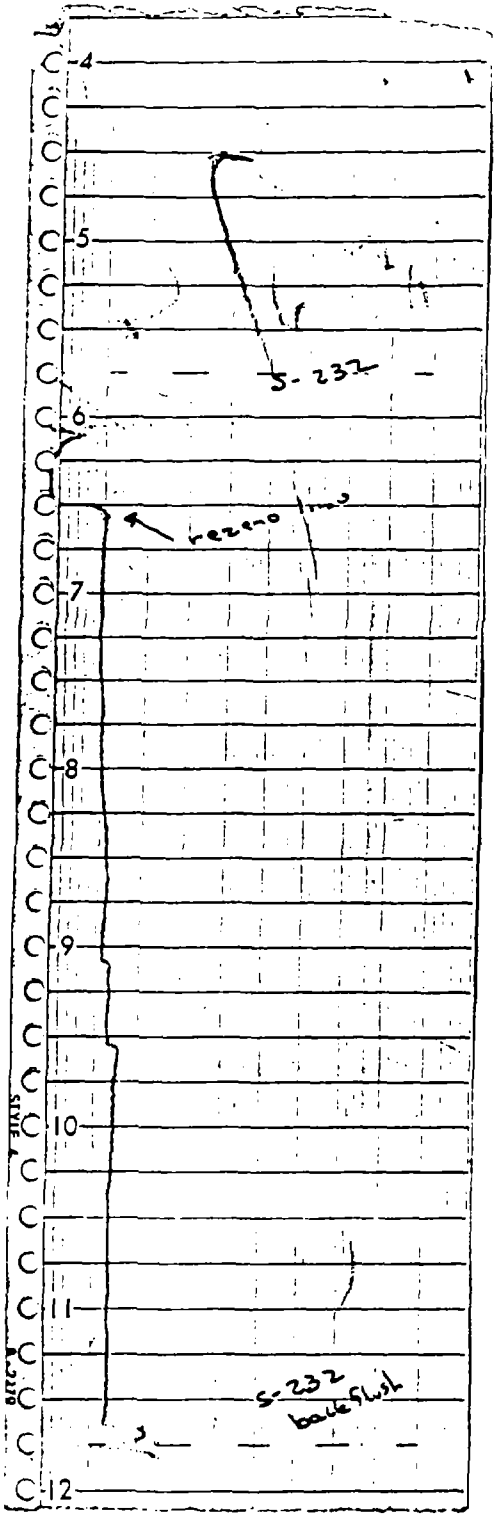
RUSTRAK

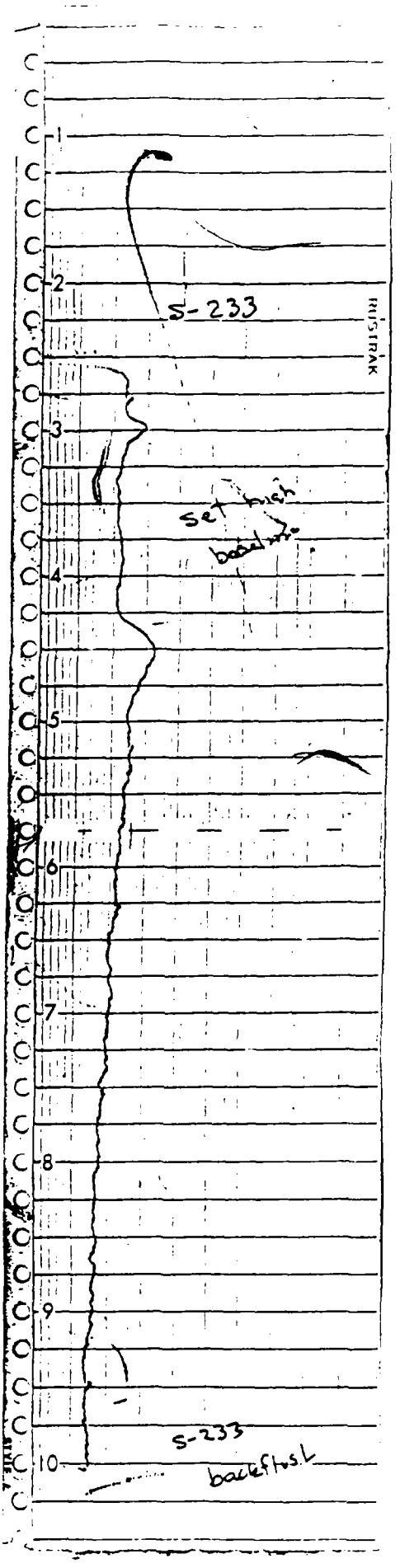


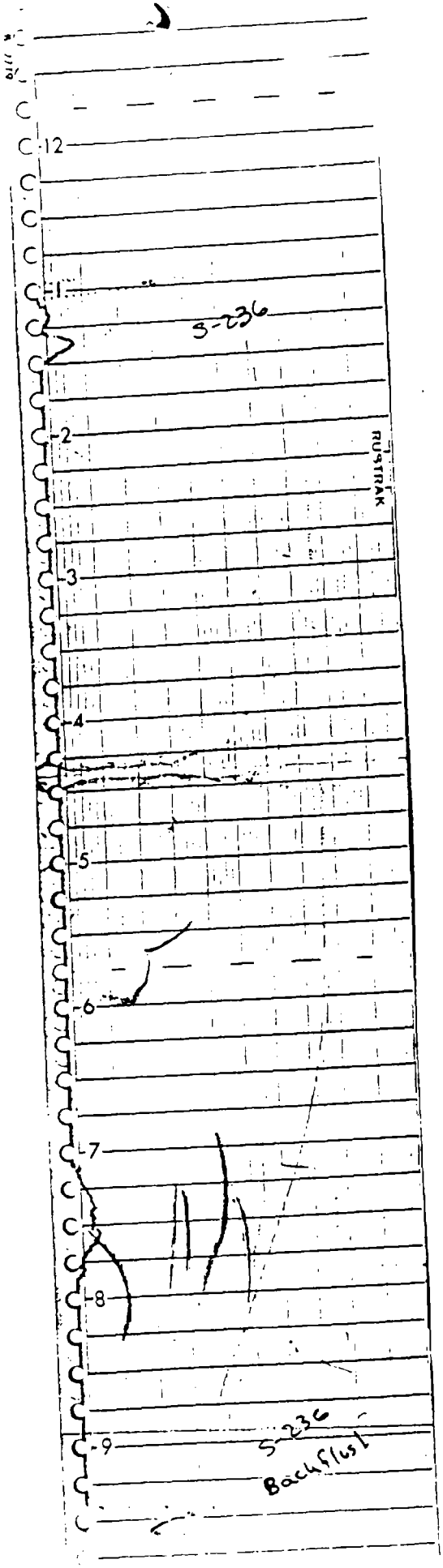
1,2 DCE
1,1,1 TCA
TCE
Benzene

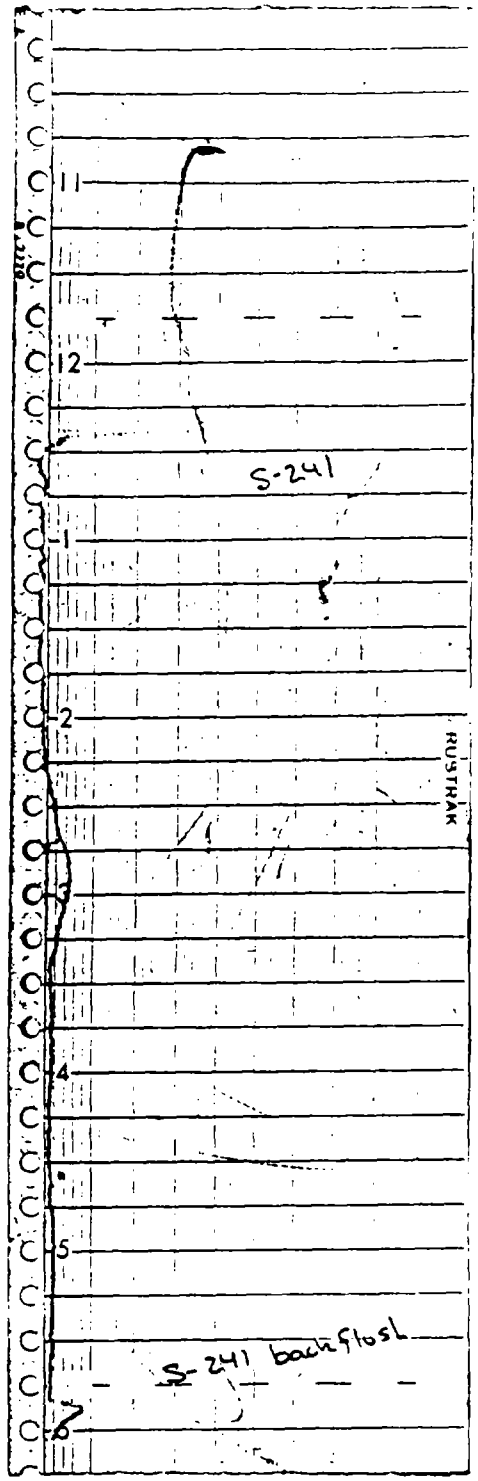
1,2 Dichloropropane
1,2 Dichloroethane
Toluene

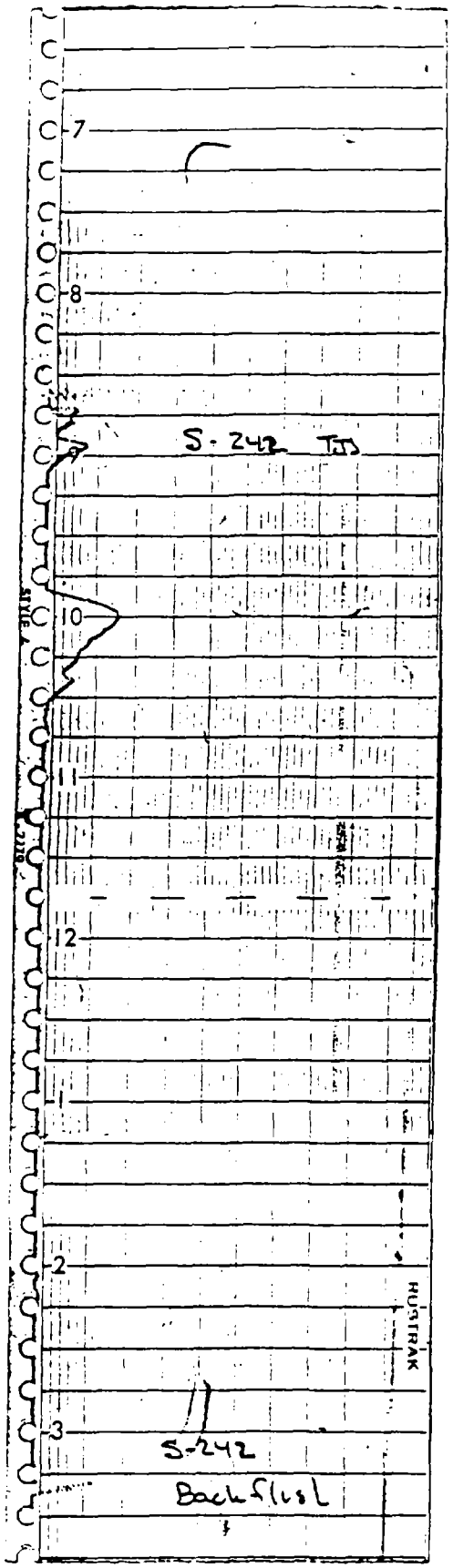


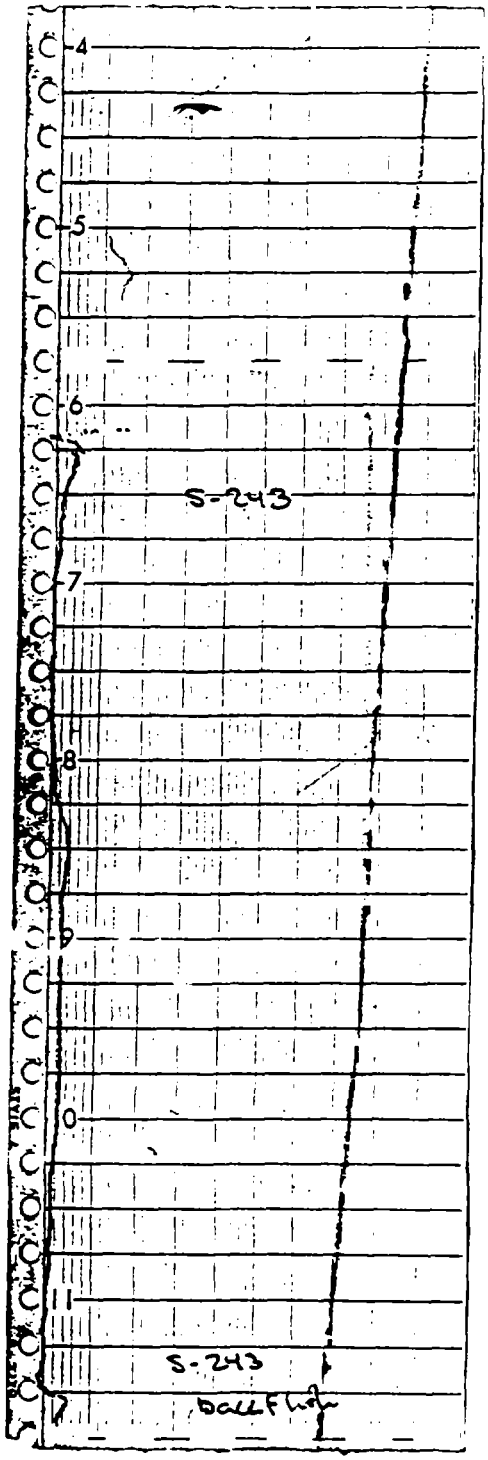

4
5
6
7
8
9
10
11
12
S-232
rezero line
S-232
backflush

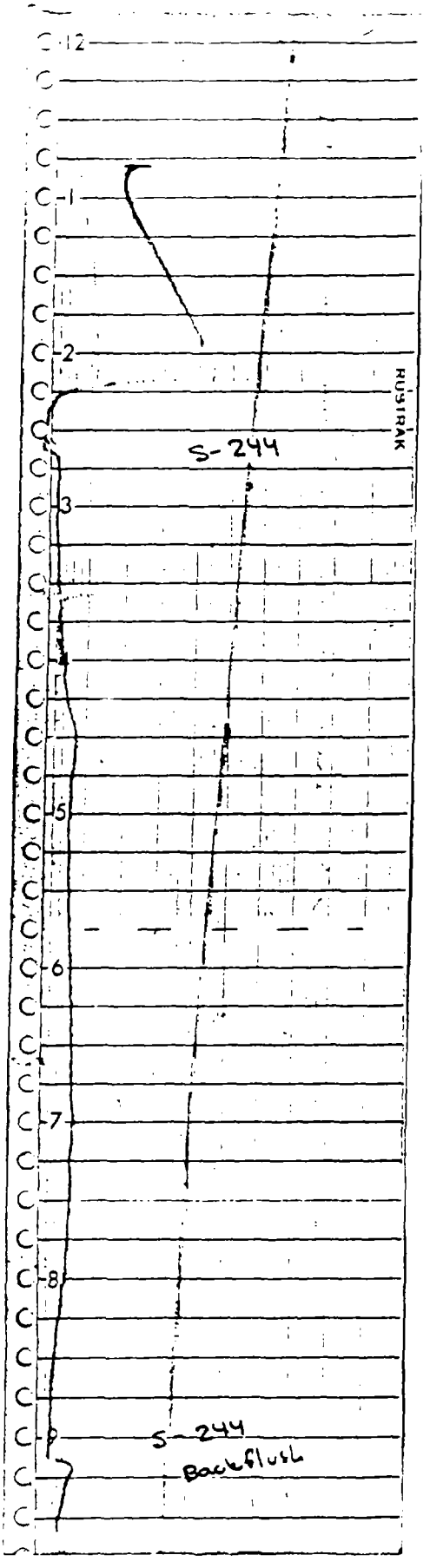

1
2
3
4
5
6
7
8
9
10
S-233
set high
backflush
S-233
backflush

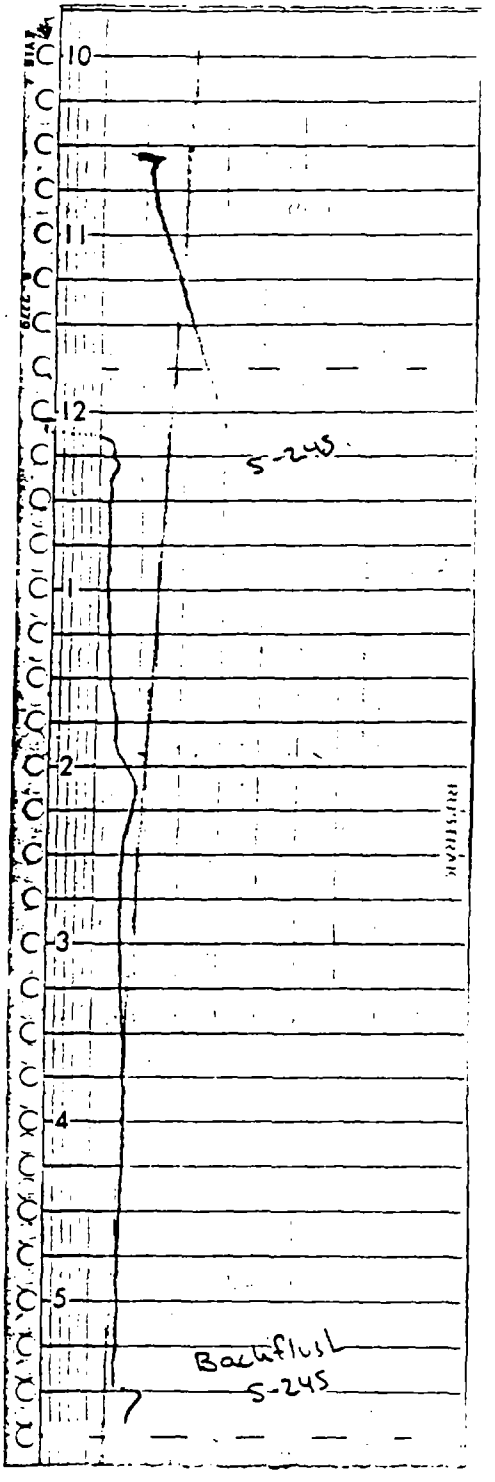

12
1
S-236
2
RUSTRAK
3
4
5
6
7
8
9
S-236
Backflush

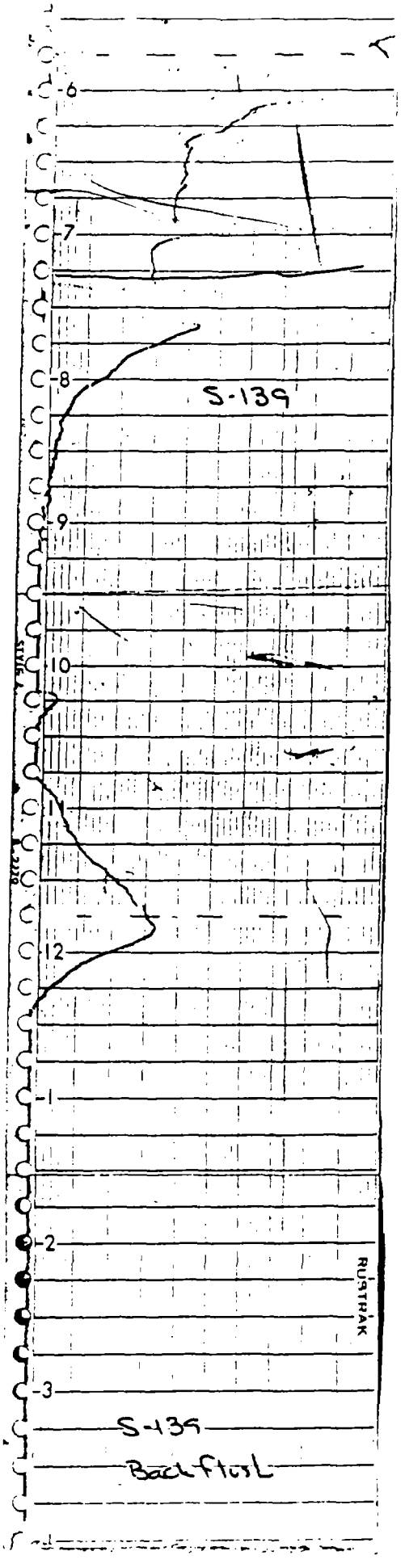

11
12
S-241
1
2
RUSTRAK
3
4
5
S-241 backflush
6

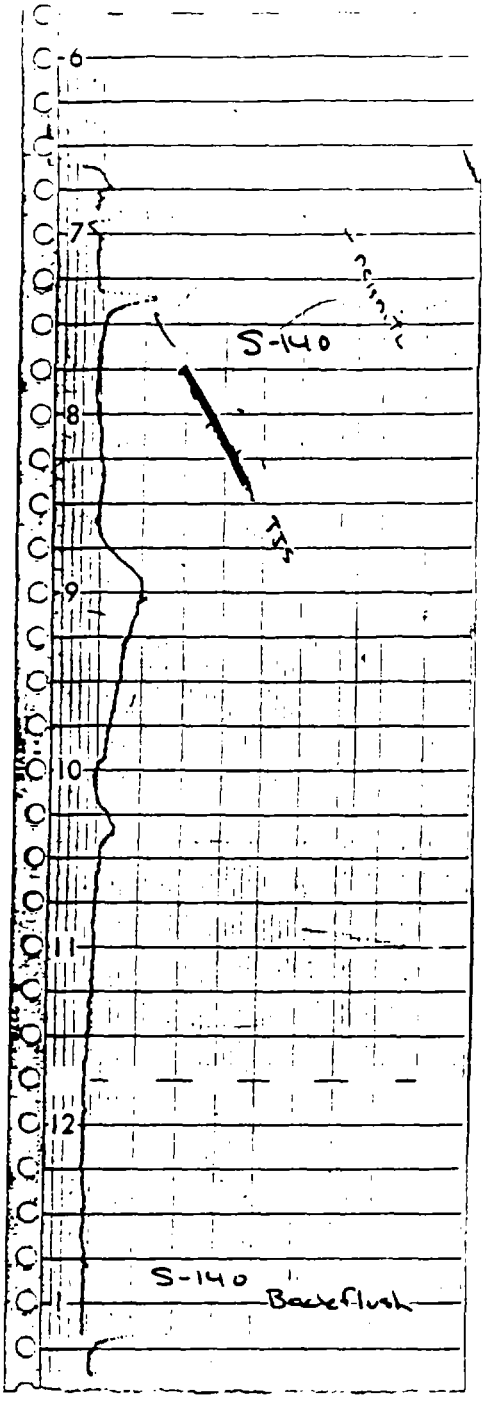

7
8
S-242 TJJ
10
11
12
1
2
3
S-242
Backflush
HUSTRAK

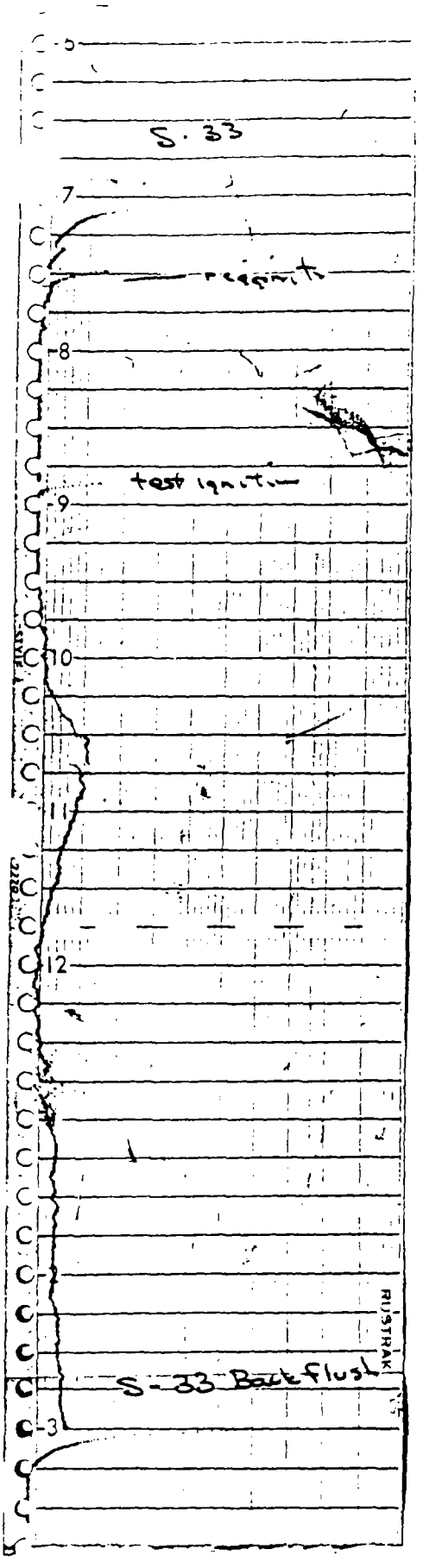

4
5
6
S-243
7
8
9
0
1
S-243
Backflush

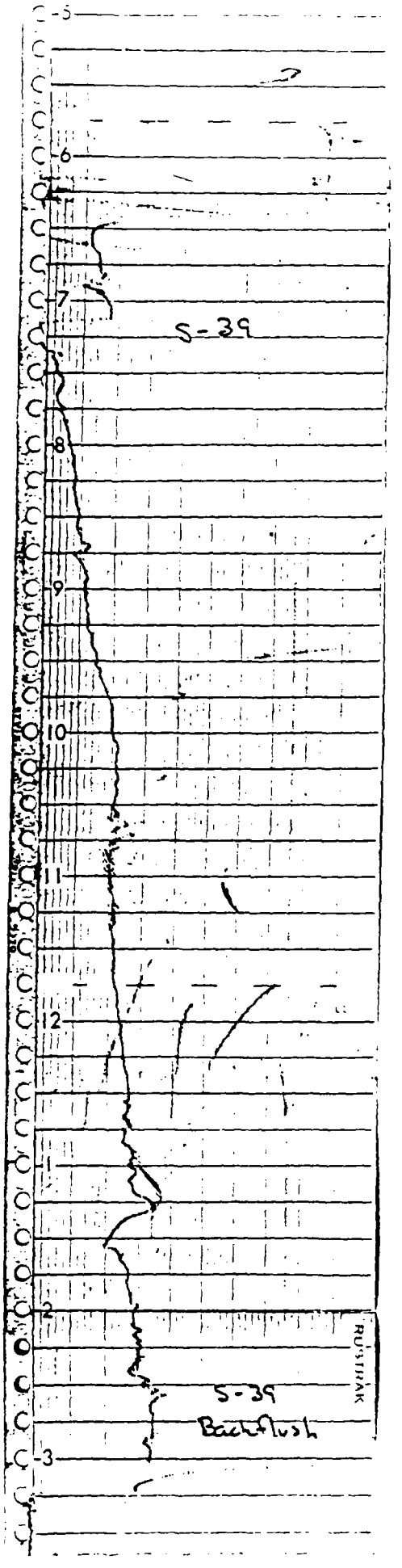

S-244
S-244
Backflush

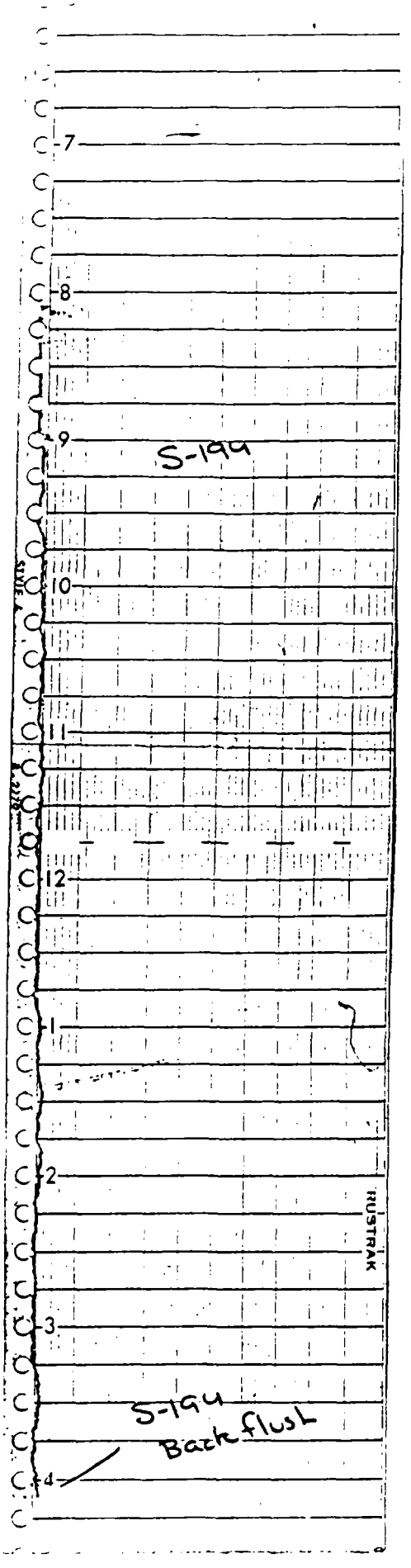

S-245
Backflush
S-245

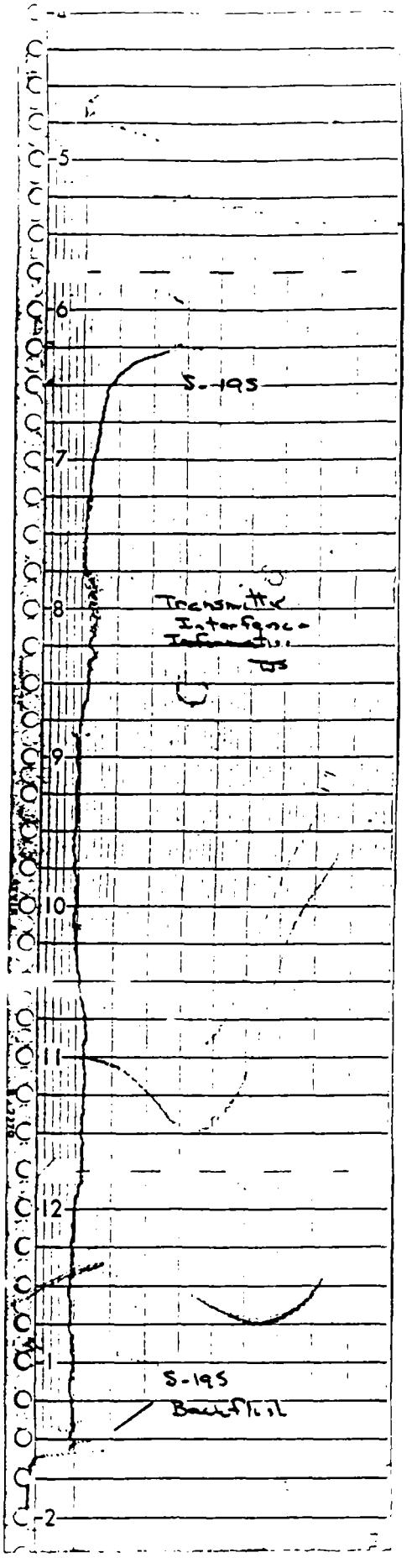

-6
-7
-8
S-139
-9
-10
-11
-12
-1
-2
-3
S-139
Backflush
RUSTRAK

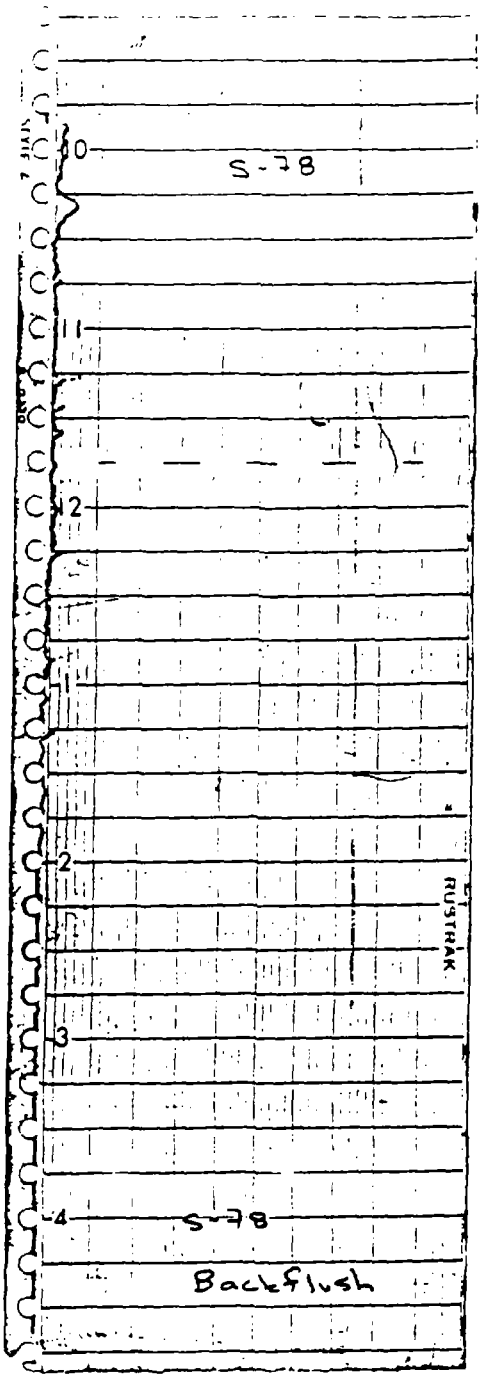

-6
-7
S-140
-8
-9
-10
-11
-12
-1
S-140
Backflush

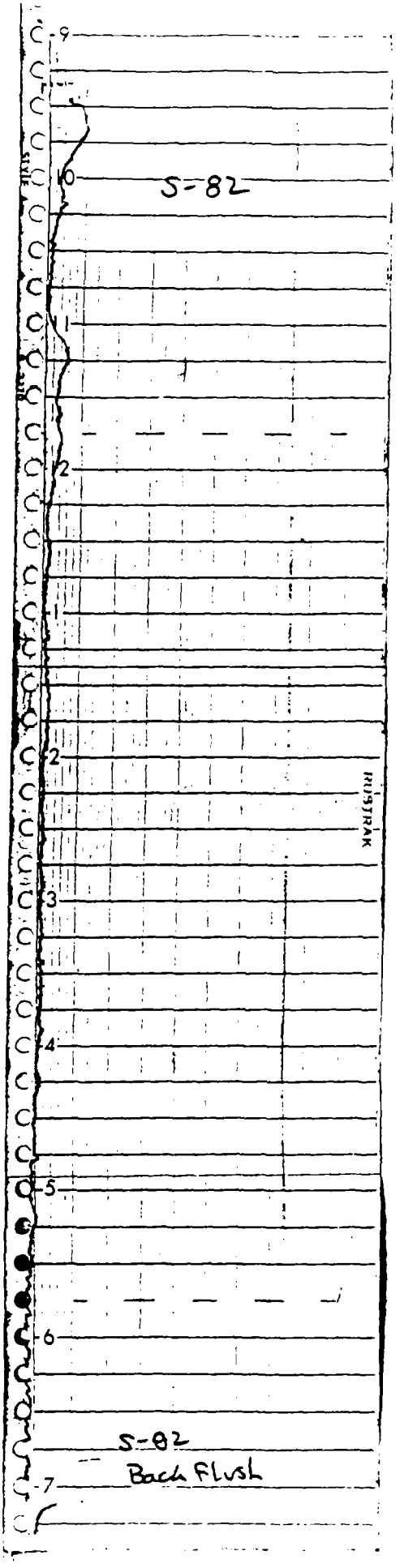

S. 33
reagents
test ignition
S-33 Backflush
RUSTRAK

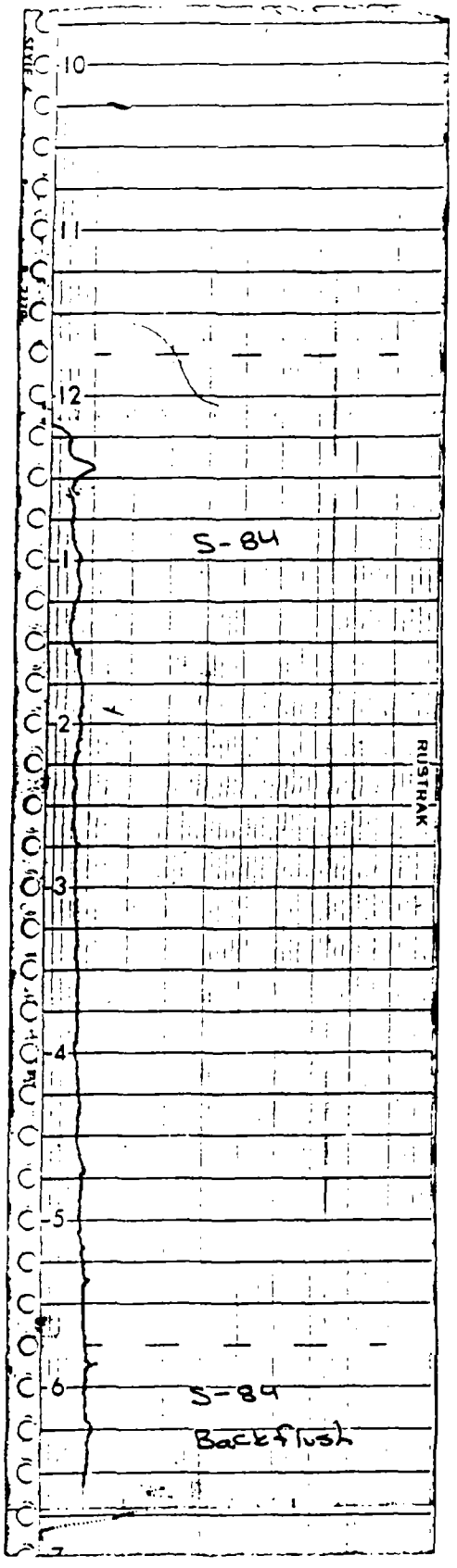

S-39
S-39
Backflush
RUSTRAK

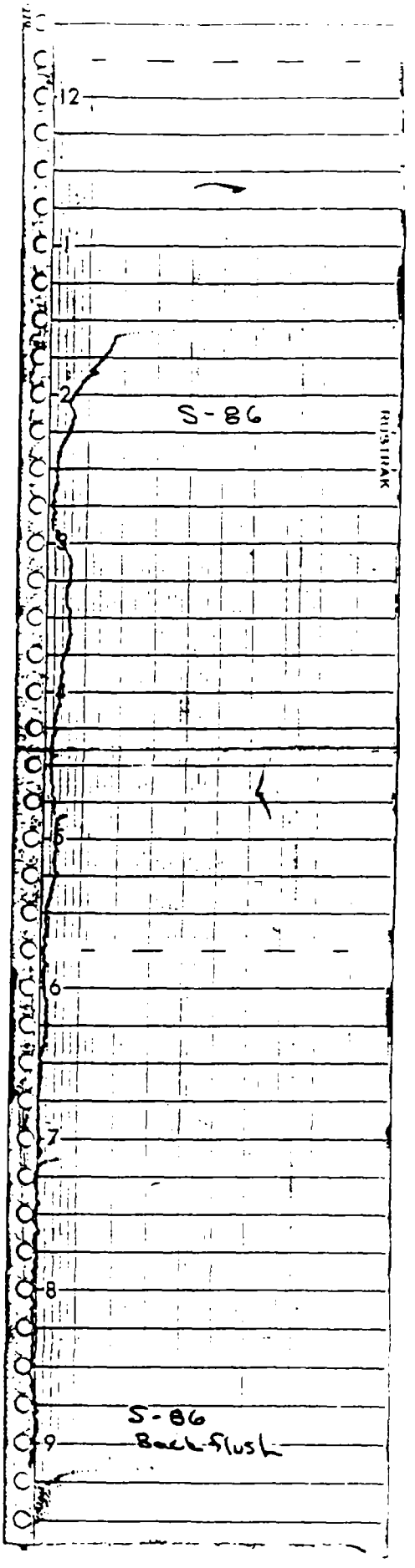

7
8
9
S-194
10
11
12
1
2
3
4
S-194
Back flush
RUSTRAK

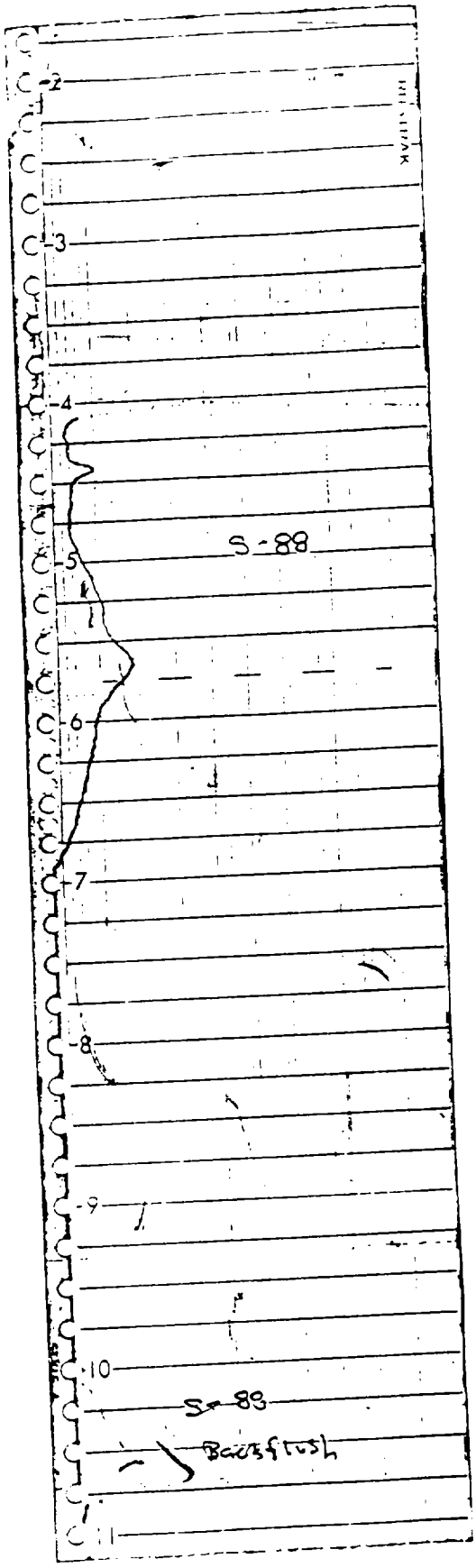

5
6
S-195
7
8
Transmitter
Interference
9
10
11
12
1
S-195
Backfill
2

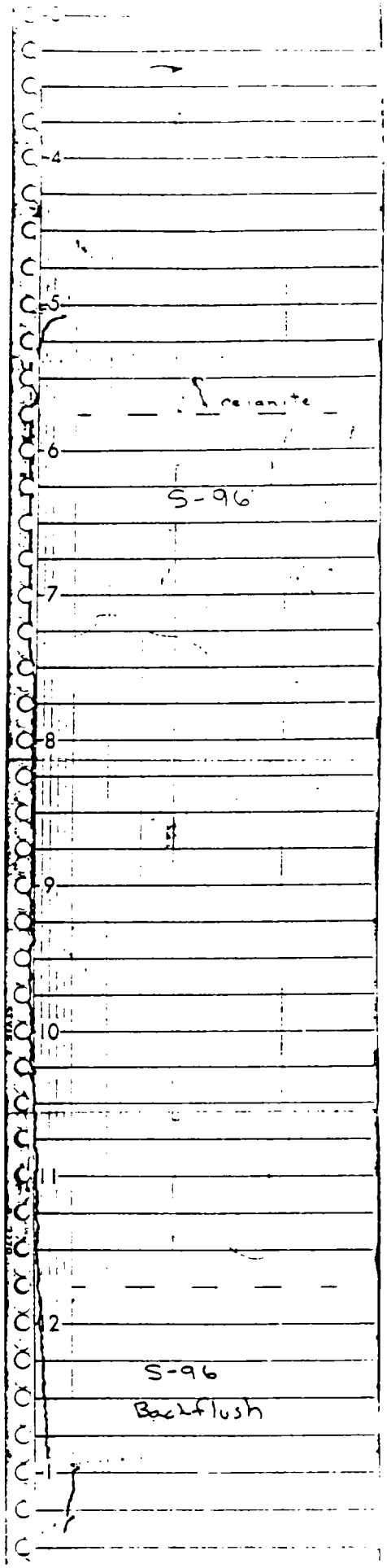

S-78
S-78
Backflush
RUSTRAK

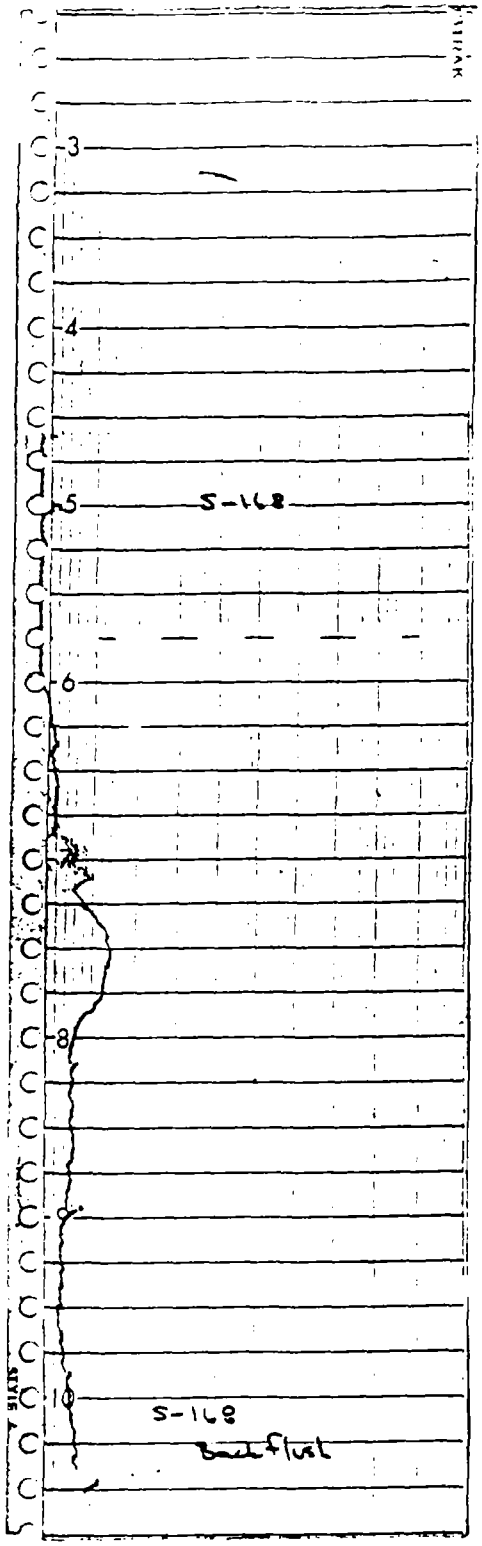

S-82
S-82
Back Flush
RUSTRAK

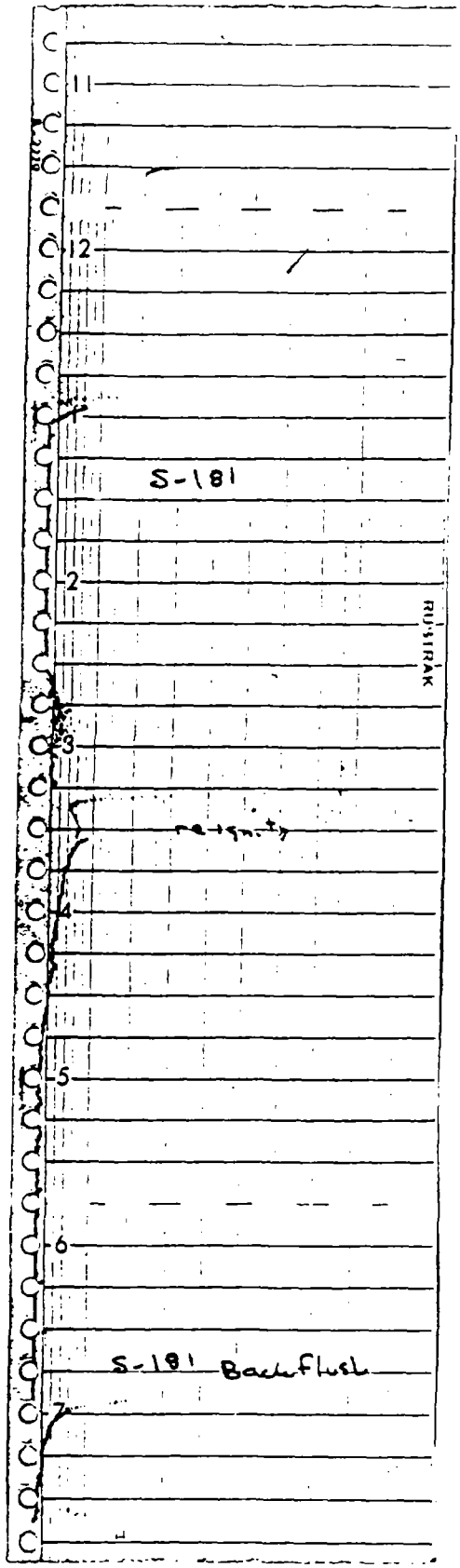

10
11
12
1
2
3
4
5
6
S-84
S-84
Backflush
RUSTRAK

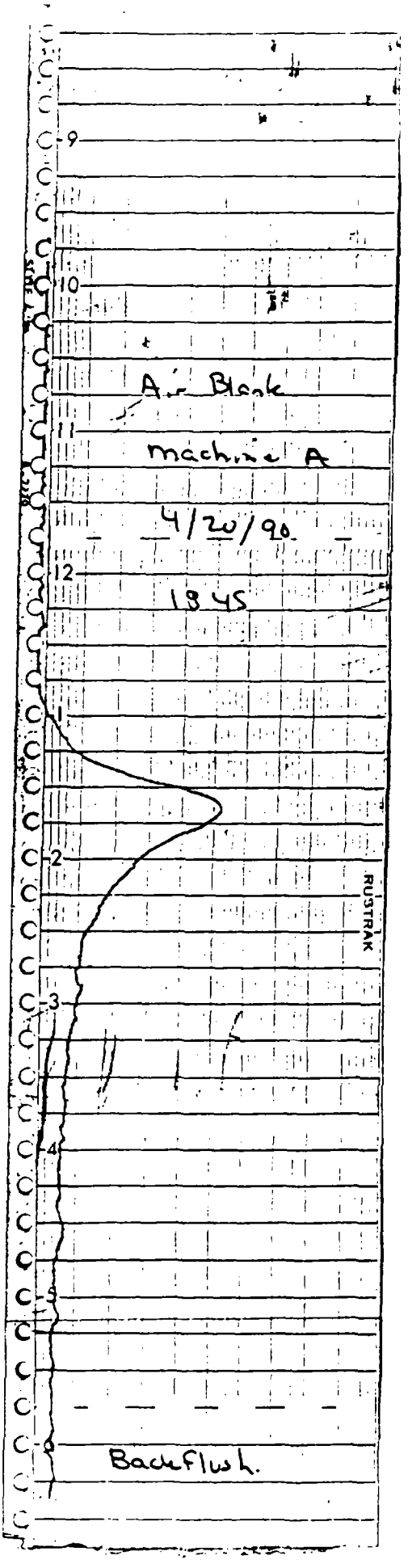

12
1
2
3
4
5
6
7
8
9
S-86
S-86
Backflush
RUSTRAK

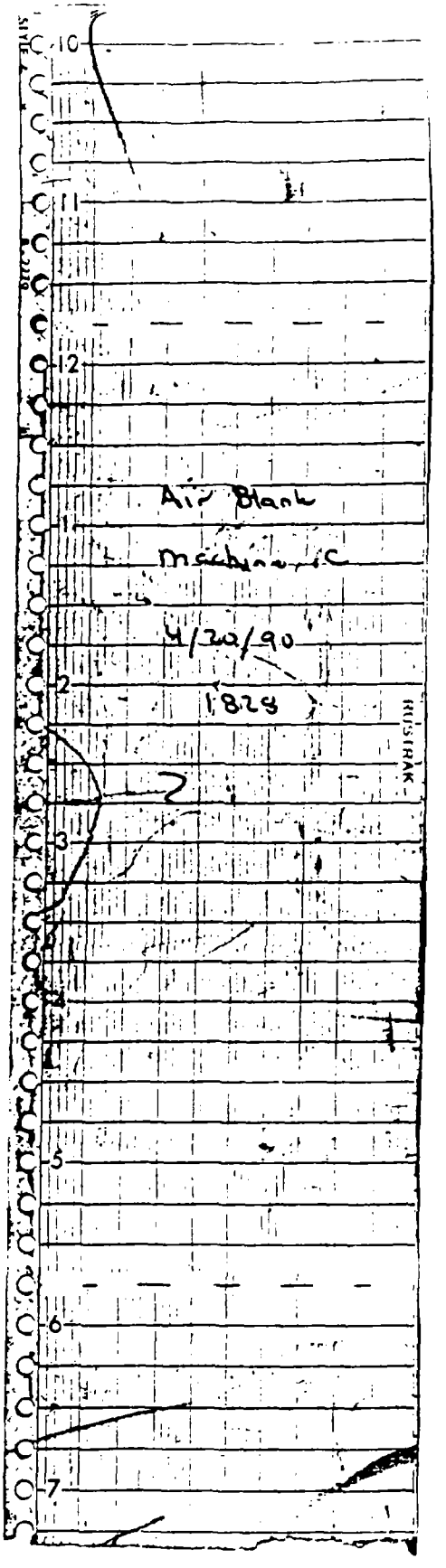

-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
S-88
S-88
Backflush


-4
-5
-6
-7
-8
-9
-10
-11
-12
-1
Granite
S-96
S-96
Backflush

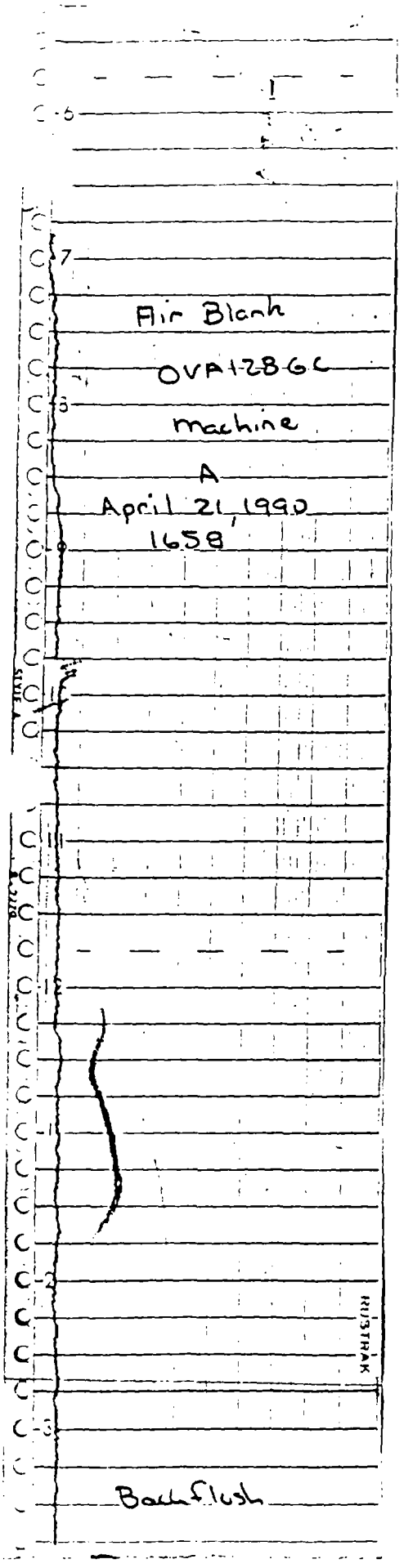

3
4
5
S-168
6
8
9
10
S-168
Backflush

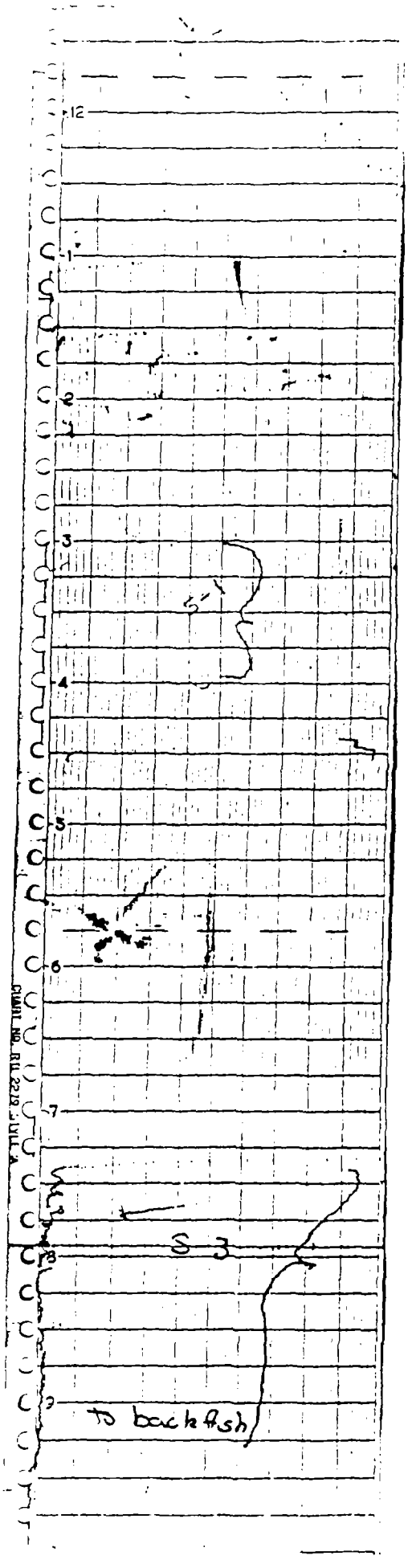

11
12
S-181
2
3
4
5
6
7
S-181 Backflush

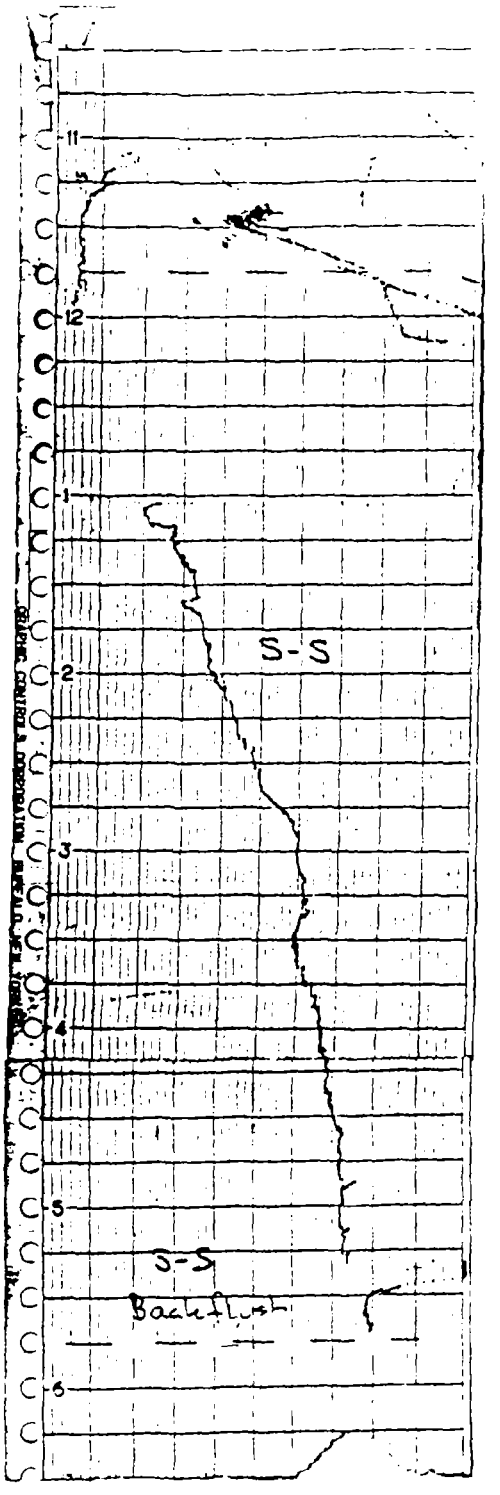

Air Blank
machine A
4/20/90
1845
Backflush.
RUSTRAK

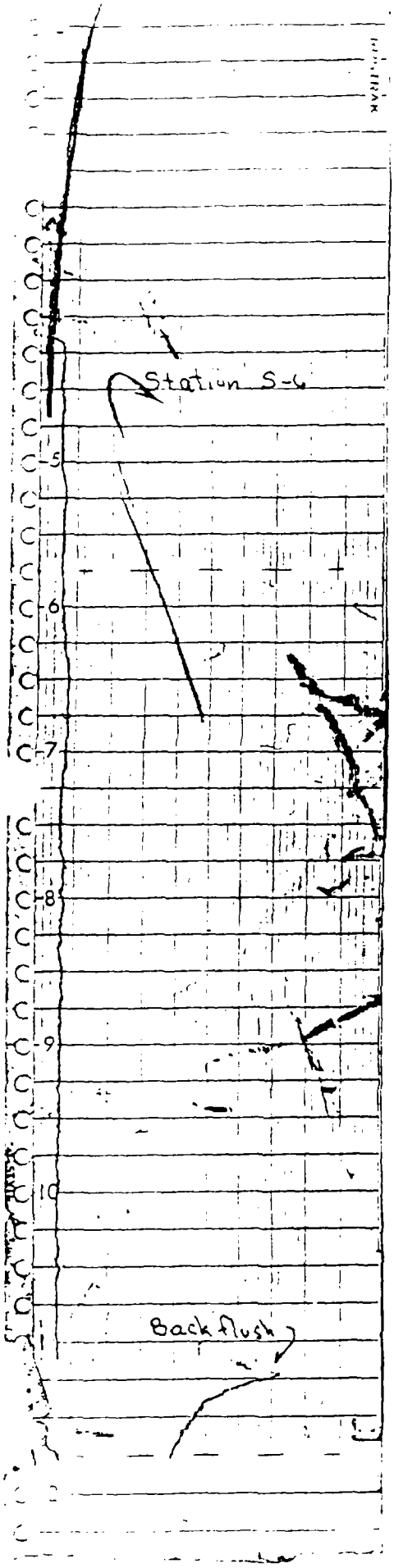

Air Blank
machine C
4/20/90
1829
RUSTRAK

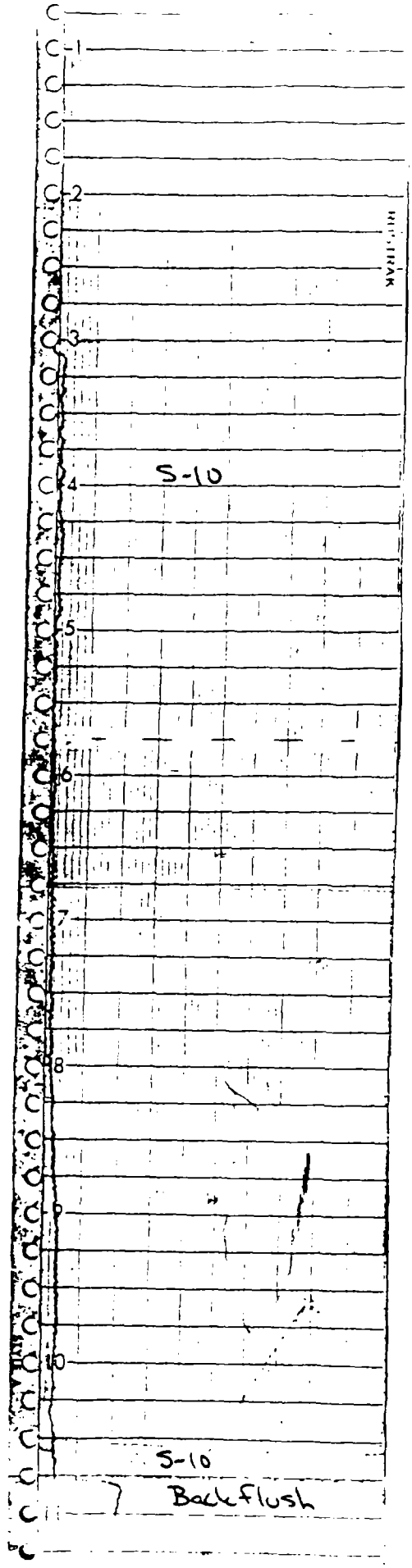
RUSTRAK
RUSTRAK

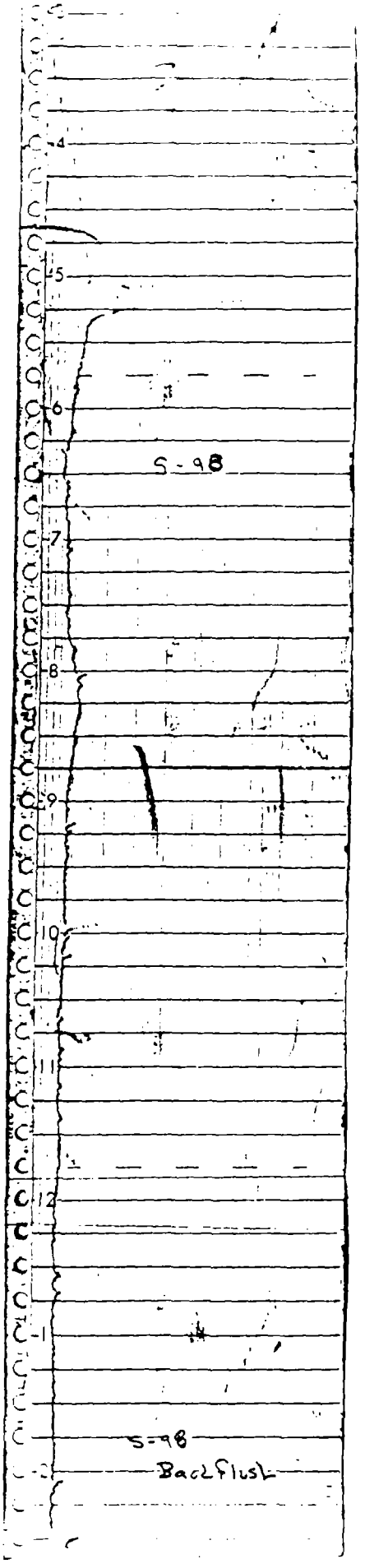

Air Blank
OVA128GC
machine
A
April 21, 1990
1658
Backflush


12
1
2
3
4
5
6
7
8
9
S-3
S-3
to backflush


11
12
1
2
3
4
5
6
S-S
S-S
Backflush


Station S-6
Backflush


S-10
S-10
Backflush


4
5
6
S-98
7
8
9
10
11
12
1
S-98
Backflush

D: MONITOR WELL DRILLING DESCRIPTIONS

APPENDIX D

MONITOR WELL DRILLING DESCRIPTIONS

APPENDIX D - MONITOR WELL DRILLING DESCRIPTIONS

1.0 MONITOR WELL INSTALLATIONS

Nease Chemical Company Site, Salem, Ohio

This appendix presents details concerning the installation of monitor wells at the Nease Chemical Site during spring and summer of 1990 and late summer and fall of 1991.

Amendments to the Work Plan

There were five basic amendments or deviations were jointly approved by the U.S. EPA and the Ohio EPA during the field operations at the Site. All of the deviations involved casing and well installations.

(1) The Agencies jointly approved the use of carbon filtered water for three different well installation practices:

- Carbon filtered water could be used if an insufficient amount of formation water was available for circulation purposes when boreholes were being advanced utilizing rotary drill bits or rock coring tools.
- If running sands were encountered during borehole advancement or well installation, carbon filtered water could be used to maintain a hydraulic head on the sand formation.
- Carbon filtered water could be used to load permanent casings to offset casing buoyancy within the grout seal. Potable water could also be used for this purpose as long as all of the water was removable with whatever pumping device was available.

One stipulation on the use of the carbon filtered water was that at least three volumes of this water had to be removed from the formation, if the water was lost within the well completion zone.

(2) The approved Work Plan stated that the borehole would be advanced and a permanent casing set at least 10 feet below the aquifer that is to be isolated from the rest of the borehole. As the field work proceeded, it became apparent that only in isolated instances was there 10 feet of confining material between the aquifers; therefore, a permanent casing could be installed within a confining layer even if the interval was less than 10 feet thick.

(3) The installation of the sand pack and bentonite seal for many wells deviated from the work plan. The work plan required the sand pack to extend 2 feet above the top of the screen and the bentonite seal to extend 3 feet above the top of the sand pack. During the field investigation, two basic situations arose which required deviations from this portion of the work plan:

- If well screen installations were very shallow and did not permit enough grout to be installed below the ground surface, the thickness of the sand pack and bentonite seal was modified.
- If the screen was set less than 5 feet below a permanent casing the thickness of the sand pack and bentonite seal was modified.

(4) The fourth approved deviation from the Work Plan involved the length of well screen used. The work plan stated that a 10-foot-long screen would be used, but in some instances, the saturated intervals were less than 5 feet thick. A decision was made between ERM and the Agencies' on-site representative to modify the work plan when saturated units with a thickness less than 5 feet were encountered. When the saturated unit is less than five feet and the installation of a 10-foot screen could possibly connect two separate water-bearing zones, a 5-foot screen length would be used.

(5) The final modification to the Work Plan was initiated because of borehole cave-in while rotary washing through sandy intervals with a tricone bit. The Agencies approved the use of Aquagel (powdered bentonite) in the circulation fluid for wall stabilization. This bentonite was the same material used for grout preparation. The powdered bentonite could only be used during permanent casing installation zones, not during well installations

1.1 *LOCATION A*

1.1.1 *A-Shallow*

Boring Advancement

The drilling of A-Shallow began on June 5, 1990 by advancing the borehole using 4-1/4-inch inside diameter (ID) hollow stem augers (HSA). A saturated sand interval was delineated during the drilling of A-Upper Bedrock. The boring for A-Upper Bedrock was sampled continuously

from below ground surface (B-65) to bedrock. One split-spoon sample was collected from this boring from 14 to 16 feet BGS to confirm the presence of the saturated sand unit. The A-Shallow borehole was advanced to a total depth of 21 feet BGS. The saturated zone extended from a depth of 10 to 17 feet BGS and contained 2.5 foot of dry interbedded till.

Well Installation

The A-Shallow well was installed on June 5, 1990 to a total depth of 21 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 21 to 19 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 9 to 1.4 feet above ground surface (AGS). The sand pack was installed to 7 feet BGS followed by a bentonite pellet seal to 4 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1 foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water ir the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened. There were no deviations from the work plan during the drilling or installation of this well.

1.1.2 *A-Upper Bedrock*

Boring Advancement

On June 3, 1990, the drilling of A-Upper Bedrock began on June 3, 1990 by continuously sampling with split-spoon samplers through 4-1/4-inch ID hollow-stem augers (HSA). The augers were advanced through the unconsolidated glacial sediment to the shale bedrock surface at a depth of 44 feet BGS. A saturated zone was encountered from 10 to 17 feet BGS. The boring was enlarged with 12-1/4-ID HSA to 45 feet BGS to accommodate a 10-inch ID PVC casing.

On June 13, 1990, the 10 inch ID PVC casing was installed in A-Upper Bedrock to a depth of 43.5 feet BGS in order to isolate the shallow aquifer zone from the upper bedrock aquifer zone. Prior to the installation of the casing, the augers were half filled with bentonite/cement grout using a 3/4-inch ID tremie hose. The 3/4-inch ID tremie hose was lowered to the bottom of the augers and the grout was pumped. Next, the 10-inch ID PVC casing with PVC end cap was lowered into the augers to 43.5 BGS. Potable water was added to the casing to displace the grout into the annulus.

On June 14, 1990 4-inch outside diameter (OD) temporary casing with a drive shoe attached was lowered to the base of the 10-inch ID PVC casing. A small tricone bit was used to cut through the PVC end cap on the casing. The 4-inch OD temporary casing was then driven to a depth of 45.3 feet BGS.

The NX-Wireline coring system was utilized and the boring was advanced to a depth of 58.4 feet BGS using compressed air as the circulation media. The top of the water bearing interval was encountered at a depth of 46 feet BGS.

The potable water used in the 10-inch ID PVC casing was removed prior to removal of the 4 inch OD temporary casing from the bedrock to avoid introduction of non-formation water to the boring. The corehole was then enlarged with a 5-1/2-inch tricone bit to accommodate well materials to a depth of 58.5 feet BGS using carbon filtered water as circulation media.

Well Installation

The well was constructed entirely of 2-inch ID 304 stainless steel, except for 17.2 feet of schedule 40 PVC riser. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 56.7 to 54.7 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 44.7 to 14.7 feet BGS. The 2 inch ID PVC riser was installed from 14.7 feet BGS to 2.21 feet AGS. The sand pack was installed to 44.25 feet BGS followed by a bentonite pellet seal to 42.2 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4 inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.2 *LOCATION B*

1.2.1 *B-Shallow*

Boring Advancement

The drilling of B-Shallow began on June 2, 1990 by continuously sampling with split-spoon samplers through 4-1/4 inch ID hollow stem augers (HSA) and augering to 20.5 feet BGS. Wet silts and sands were

encountered at 9.5 feet BGS. The borehole was advanced to a total depth of 20.5 feet BGS to delineate the thickness of the saturated zone. The saturated zone extended from 9.5 to 11.0 feet BGS.

Well Installation

The B-Shallow well was installed on June 2, 1990 to a total depth of 20.5 feet. The well was constructed entirely of 2 inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2 foot sump was set at 20.5 to 18.5 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 8.5 to 2.03 feet AGS. The sand pack was installed to 7 feet BGS followed by a bentonite pellet seal to 5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1 foot BGS. The grout was installed through a 3/4 inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.3 *LOCATION C*

1.3.1 *C-Shallow*

Boring Advancement

The drilling of well C-Shallow began on June 28, 1990 by augering with 4-1/4-inch ID hollow stem augers (HSA). Information on the shallow aquifer was made available from the split-spoon samples collected from C-Lower Bedrock, therefore only confirmation samples were needed from well C-Shallow. The boring was advanced to 12 feet BGS without sampling. Continuous samples were collected from 12 to 24 feet BGS using split-spoon samplers. Total depth of the boring was 24 feet BGS.

Well Installation

On June 28, 1990 a well was installed in C-Shallow. The well was constructed entirely of 2 inch ID 304 stainless steel materials. A 2 foot sump was set from 23.4 to 21.4 feet BGS followed by a 10 foot (10 slot) screen. Stainless steel riser was installed from 11.4 feet BGS to 2.25 feet AGS. The sand pack was installed to 9.4 feet BGS followed by bentonite pellet seal to 5.8 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to approximately 2 feet BGS. A permanent locking cover was installed with a cement pad after the grout hardened.

1.3.2 *C-Upper Bedrock*

Boring Advancement

The drilling of well C-Upper Bedrock began on June 28, 1990 by augering through the unconsolidated glacial material and to the top of bedrock at a depth of 40 feet BGS with 6-1/4inch ID hollow stem augers (HSA). Information on the unconsolidated sediments was made available from the split-spoon samples collected from the previously drilled C-Lower Bedrock.

On June 29, 1990 the 8-inch ID steel casing to a depth of 40 feet was installed in C-Upper Bedrock by filling the 6-1/4-inch ID HSA with bentonite\cement grout. The augers were then pulled and the 8 inch ID steel casing with a PVC end cap was lowered into the boring, displacing the grout to the annulus.

On July 10, 1990, the 8-inch ID casing was reentered with a 5-1/2-inch tricone bit and the boring was advanced to a total depth of 56.5 feet BGS. Information on the Upper Bedrock aquifer was made available during the previous coring of C-Lower Bedrock. The cuttings were circulated from the borehole with filtered water.

Well Installation

On July 10, 1990 a well was installed in C-Upper Bedrock. The well was constructed entirely of 2-inch ID 304 stainless steel materials. A 2-foot sump was set from 54 to 52 feet BGS followed by a 10-foot (10 slot) screen. Stainless steel riser was installed from 42 feet BGS to 3 feet AGS. The sand pack was installed to 40.8 feet BGS followed by a bentonite pellet seal to 37.5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to approximately 2 feet BGS. A permanent locking cover was installed with a cement pad after the grout hardened.

1.3.3 *C-Lower Bedrock*

Boring Advancement

The drilling of well C-Lower Bedrock began on June 26, 1990 by continuously sampling with split-spoon samplers through 12-1/4-inch ID hollow-stem augers (HSA) and augering to 39.5 feet BGS. The top of bedrock was encountered at 39 feet BGS.

On June 28, 1990, 39.5 feet of 10-inch ID schedule 40 PVC casing with a PVC end cap was grouted in place. After pumping grout into the bottom of the 12-1/4-inch ID HSA, the grout was displaced in the annulus between the HSA and PVC casing by filling the PVC with filtered water. After the PVC seated, the augers were removed and the annulus was sealed with the bentonite/cement grout. The grout was pumped through a 3/4-inch ID tremie hose lowered to the bottom of the boring to displace any water remaining in the annulus.

On June 29, 1990 4-inch OD temporary casing was lowered to the bottom of the 10-inch ID PVC casing. A small tricone bit was also lowered and used to cut through the PVC end cap on the casing. The 4-inch OD temporary casing was then driven to a depth of 41.5 feet BGS into underclay.

The NX-Wireline coring system was set up and advanced from 41.5 to 45.8 feet BGS using compressed air for circulation. The cuttings generated were not being returned properly so carbon filtered water was then utilized. The NX-Wireline coring system was then advanced to a depth of 106.5 feet BGS. The corehole was then enlarged with a 7-7/8-inch tricone bit to 106.5 feet BGS into a shale horizon located below the Upper Bedrock Aquifer. The cuttings were removed from the borehole with filtered water.

On July 2, 1990 a 3/4-inch ID tremie hose was lowered to the bottom of the borehole and the bentonite/cement grout was installed. After the grout was installed, 6 inch ID steel casing with a cement end plug was lowered into the borehole, displacing the grout to the annulus. The 6 inch ID casing became difficult to advance at a depth of 92.5 feet BGS and had to be driven to 106.5 feet BGS.

After the 6-inch ID casing was installed, it was discovered that part of the tool used to drive the casing had been lost inside the casing. Several attempts were made to recover the tool but to no avail. A decision was made by ERM and Mathes personnel to abandon further attempts at retrieving the lost tool. The 6-inch ID steel casing was filled with grout on July 27, 1990. The 10-inch ID and the 8-inch ID casings were cut off approximately 1 foot below ground surface.

On July 27, 1990 a new C-Lower Bedrock well was initiated by augering to a depth of 39.5 feet BGS with 6-1/4-inch ID HSA. A 3/4-inch ID tremie hose was lowered to the bottom of the augers and the bentonite/cement grout was installed. After the grout was installed the 6-1/4-inch ID HSA were removed. At this time 8-inch ID steel casing with a cement end plug

was lowered, displacing the grout to the annulus. The 8 inch ID steel casing was installed to a depth of 39.5 feet BGS to the top of the bedrock surface.

On July 29, 1990 a 7-7/8-inch tricone bit was lowered to the base of the 8-inch ID casing. A decision was made by ERM-Midwest personnel that the borehole would be advanced to a depth of 108.5 feet BGS into the shale horizon located below the Upper Bedrock Aquifer. The borehole was advanced to 108.5 feet BGS using compressed air to remove the rock cuttings. The use of compressed air during the borehole advancement generated approximately 3900 gallons of water from the Upper Bedrock Aquifer, which was contained in drums and subsequently disposed of properly by Ruetgers-Nease.

On July 30, 1990 a 3/4-inch ID tremie hose was lowered to the bottom of the borehole and the bentonite/cement grout was installed. At this time 6-inch ID steel casing with a cement end plug was lowered, displacing the grout to the annulus. The 6-inch ID steel casing was installed to a depth of 105.1 feet BGS into the shale below the Upper Bedrock Aquifer. After the casing was installed, the 3/4-inch tremie hose was lowered into the grout between the 6-inch and 8-inch casing and the remaining annulus was filled.

On July 31, 1990 temporary 4-inch OD casing was lowered into the 6-inch ID permanent casing. On August 1, 1990 the NX-Wireline coring system was set up and advanced from 105.1 to 126 feet BGS. Initially the NX-Wireline system was set up to circulate with compressed air, however the circulation system became clogged and the system was switched to filtered water. A water bearing zone was encountered at 111 feet BGS. The corehole was then enlarged with a 5-1/2-inch tricone bit and the cuttings were removed with filtered water to a depth of 126.6 feet BGS.

Well Installation

On August 7, 1990 a well was installed in C-Lower Bedrock to a depth of 122 feet BGS. The well was constructed entirely of 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 122 to 120 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 110 feet BGS to 2.3 feet AGS. The sand pack was installed to 109 feet BGS followed by a bentonite pellet seal to 106.6 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any

standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.4 *LOCATION D*

1.4.1 *D-Valley Fill-2*

Boring Advancement

The drilling of D-Valley Fill-2 began on July 1, 1990 by continuously sampling with split-spoon samplers through 4-1/4-inch ID hollow-stem augers (HSA). Wet silts and sands were encountered at a depth of 4 feet BGS. The borehole was advanced to a total depth of 18 feet BGS to delineate the extent of the saturated zone. The zone extended from 4 to 15 feet BGS. This saturated zone was interbedded with several dry clayey till units.

Well Installation

The D-Valley Fill-2 well was installed on July 1, 1990 to a total depth of 17 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 17 to 15 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 5 to 3.1 feet AGS. The sand pack was installed to 3.5 feet BGS followed by a bentonite pellet seal to 2 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4 inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.4.2 *D-Valley Fill-3*

Boring Advancement

The drilling of D-Valley Fill-3 began on July 10, 1990 by advancing 6-1/4-inch ID HSA to 17 feet BGS to set a permanent casing below the shallow aquifer screened in well D-Valley Fill-2. The purpose of the casing was to avoid any possible cross contamination between the aquifers during further drilling. A split-spoon sample was then collected from 17 to 19 feet BGS to confirm that the bottom of the casing was not going to be set in a saturated zone. The interval from 0 to 17 feet BGS was not sampled in

this borehole because the D-Valley Fill-2 boring was sampled continuously.

The split-spoon sample confirmed that this zone was not saturated and the boring was advanced to 19 feet BGS and then the 6-1/4-inch HSA were removed from the borehole. The borehole was then re-entered using 12-1/4-inch ID HSA and re-advanced to 19 feet BGS to accommodate the installation of 10-inch PVC casing.

Prior to the installation of the casing, the 12-1/4-inch ID HSA were filled with bentonite/cement grout using a 3/4-inch ID tremie hose. The 3/4-inch ID tremie hose was placed at the bottom of the augers and the grout was installed. Next, 20 feet of decontaminated 10-inch PVC casing, with bottom cap, was lowered through the augers to 19 feet BGS. The augers were then removed from the borehole and any remaining annular space between the coring and borehole was filled with grout.

After 24 hours, drilling resumed on D-Valley using 4-1/4-inch ID HSA. The borehole was advanced to 22 feet BGS and a split spoon was driven to 24 feet BGS to confirm the saturated zone. (Soil samples were collected from depths of 19 to 46 feet BGS during the advancement of boring D-Lower Bedrock). The borehole was advanced to a total depth of 25 feet BGS. The augers were pulled back to a total depth of 18 feet BGS in preparation of a pump test that was to be performed on this zone. While pulling back the augers, heaving sands blocked the center plug in the augers and approximately 20 gallons of carbon filtered water was added to the borehole to help free the plug. A pump test was performed on the depth interval from 19 to 25 feet BGS.

Field results of the pump test determined a flow rate of slightly less than 1 gallon per minute (gpm). However, while pumping the water out of the borehole, the water level inside of the augers did not drop, but rather increased slightly. Due to this occurrence, it was decided and agreed upon by the Agencies' on-site representative that this water-bearing zone probably produced more than 1 gpm. During pumping of the augers, the flow out of the pump may have been impeded by sand that had heaved into the augers and blocked the intake of the hose. After the pump test was completed, the borehole was advanced to a total depth of 29 feet BGS.

Well Installation

The D-Valley Fill-3 well was installed on July 13, 1990 to a total depth of 29 feet. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 29 to 27 feet BGS, followed by a 5-

foot long (10 slot) screen. Stainless steel riser pipe extended from 22 feet to 2.5 feet AGS. The sand pack was installed to 20 feet BGS followed by a bentonite pellet seal to 18.5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

A complication occured during the installation of bentonite pellets. As the pellets were being installed, the pellets became lodged inside the augers and would not settle into the proper position. Enough pellets were added to get the seal 0.5 feet up into the casing however (1.5 feet total amount added). Therefore, a decision was made to remove the augers and then finish installing the pellets. After the augers were removed and the borehole re-measured it was noticed that cuttings had fallen off of the augers and had accumulated about 2.5-foot thick on top of the 1.5-foot bentonite seal. An additional two feet of pellets were then added to the borehole. Bentonite/Cement grout was then installed through 3/4-inch ID tremie hose.

Upon completion of the well, it was noticed that the well was under artesian conditions. To cease the flow from the well, a stainless steel screw-on cap was installed approximately 2.5 feet above ground surface.

1.4.3 *D-Lower Bedrock*

Boring Advancement

The drilling of D-Lower Bedrock began on July 1, 1990 by advancing the borehole using 12-1/4-inch ID HSA to a total depth of 19 feet BGS. Split-spoon soil samples were collected only from the depth intervals of 16-18 feet and 18-20 feet BGS. Information on the unconsolidated sediments was available from the split-spoon samples collected from D-Valley Fill-4 which was sampled continuously to 18 feet BGS. These samples were collected to confirm that the bottom of the casing was not going to be set in a saturated zone. The samples collected confirmed the interval was not saturated.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout using a 3/4-inch ID tremie hose. The 10-inch ID PVC casing with bottom cap, was lowered through the augers to 19 feet BGS. The augers were then pulled from the borehole and the remaining annulus filled with additional grout.

After 24 hours, drilling resumed on D-Lower Bedrock using 4-1/4 HSA and continuous split-spoon samples. Water was encountered between 20 and 25 feet BGS. The borehole was advanced to a total depth of 46.5 feet BGS with bedrock being encountered at 44 feet BGS. No other significant water zones were encountered between 25 feet BGS and bedrock.

A 6-inch steel casing was then set in D-Lower Bedrock to a depth of 46.5 feet BGS to seal off the water-bearing zone between 20 and 25 feet BGS. Grout was pumped into the augers via 3/4-inch ID tremie hose and then the augers were pulled from the borehole and the steel casing inserted (with bottom plug) to a total depth of 46.5 feet BGS.

After the steel casing set for at least 24 hours the borehole was advanced into the lower bedrock to a total depth of 63.5 feet BGS utilizing NXW methods. Prior to coring, temporary 4-inch OD flush mounted steel casing was installed in the borehole. Coring initially proceeded by using compressed air. However, when water from the lower bedrock aquifer was encountered at 49 feet BGS, cuttings clogged the borehole reducing circulation and the drillers were forced to core with filtered water for the remainder of the borehole. After the target depth of 63.5 feet BGS was reached, the borehole was then enlarged with a 5-1/2-inch tricone bit to 63 feet BGS. No water was lost to the formation during coring or reaming.

Well Installation

The D-Lower Bedrock well was installed on July 15, 1990 to a total depth of 61 feet BGS. Prior to well installation, the depth interval from 63 to 61 feet BGS was built up with sand so that the screen would monitor the proper water-bearing zone. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 61 to 59 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 49 feet BGS to 2.3 feet AGS. The sand pack was installed to 47 feet BGS followed by a bentonite pellet seal to 45 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

One problem was encountered during installation of the well. While the drillers were adding the sand pack to the well, they inadvertently added approximately 12 inches of excess sand. A 3/4-inch ID tremie hose was lowered into the borehole and water that was collected during drilling activities was circulated down the borehole lifting the extra sand. After

the excess sand was removed, well installation resumed without any additional problems.

When well installation was completed it was noticed that the well exhibited flowing artesian conditions. After the water level had equilibrated, water was measured at 11.55 feet above ground surface. In an attempt to install a well protector, the standard stainless steel cap was adapted to provide a sampling port. A brass spigot was attached to the top of the cap. The cap was threaded onto the stainless steel riser, forming a height seal that prevented continuous flow out of the monitor well.

1.5 *LOCATION E*

1.5.1 *E-Valley Fill-1*

Boring Advancement

The drilling of E-Valley Fill-1 began on May 3, 1990 by continuously sampling with split-spoon samplers through 4-1/4-inch ID hollow-stem augers (HSA). The borehole was advanced to a total depth of 14 feet BGS. Saturated sands and gravels were identified in the borehole between 7.5 and 10 feet BGS.

Well Installation

The E-Valley Fill-1 well was installed on May 3, 1990 to a total depth of 13 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 13 to 11 feet BGS, followed by a 5-foot long (10 slot) screen. Stainless steel riser pipe extended from 6 feet BGS to 2.3 feet AGS. The sand pack was installed to 4.5 feet BGS followed by a bentonite pellet seal to 2.5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1 foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.5.2 *E-Valley Fill-2*

Boring Advancement

The drilling of E-Valley Fill-2 began on July 17, 1990. The first step in this boring was to set 10-inch PVC casing to seal off the shallow aquifer to avoid any possible cross contamination between the aquifers. The borehole was advanced using 6-1/4-inch ID H.S.A and augering to 13 feet BGS. A split spoon was taken from 13 to 15 feet BGS to confirm that the bottom of the casing was not going to be set in a saturated zone. Upon confirmation, the borehole was advanced to 15 feet BGS.

The 6-1/4-inch ID HSA were then removed from the borehole and the borehole re-entered with 12-1/4-inch ID HSA and enlarged to 15 feet BGS to accommodate the installation of the 10 inch PVC casing.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout using a 3/4-inch ID tremie hose. The 10-inch ID PVC casing, with bottom cap, was lowered through the augers to 15 feet BGS. The augers were then removed from the borehole and the remaining annulus filled with additional grout.

After the grout hardened, drilling resumed on E-Valley Fill-2 using 4-1/4-inch ID HSA. The borehole was advanced to 20 feet BGS and a split-spoon sample was taken from 20 to 22 feet BGS to confirm the presence of the targeted saturated zone. Once confirmed, the borehole was further advanced to a total depth of 31 feet BGS. The saturated zone was located from 20 to 26 feet BGS.

Well Installation

The E-Valley Fill-2 well was installed on July 24, 1990 to a total depth of 31 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 31 to 29 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 19 to 2 feet AGS. During well installation, carbon filtered water was used to control heaving sands. The sand pack was installed to 17 feet BGS followed by a bentonite pellet seal to 14 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

There was one problem encountered while setting the well. On July 18, 1990, the E-Valley Fill-2 well was installed. After the stainless steel well materials had been constructed and lowered through the augers, formation sand heaved up into the augers making installation of the sand pack difficult. The best solution to this problem was to add carbon filtered water to the borehole during installation to keep enough pressure on the heaving sands so that the sand would not continue to enter the augers. In order to do this, the well had to be pulled from the borehole. The well material was steam cleaned, and the borehole was redrilled.

1.5.3 *E-Valley Fill-3*

Boring Advancement

The drilling of E-Valley Fill-3 began on October 8, 1991 by advancing the borehole through unconsolidated glacial sediments using a 11-1/4 tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water. The boring was advanced to 18.5 feet where a split spoon was collected from 18.5 to 20.5 confirming the presence of till. Information on this interval was available from samples collected in wells E-Valley Fill-1 and E-Lower Bedrock. The tricone bit was advanced to 20 feet BGS to seal off the shallow aquifer with 8 inch ID PVC casing.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. An attempt was made to lower the 8 inch ID PVC casing, with bottom cap, to 20 feet. Cobbles had fallen into the base of the borehole inhibiting the casing to pass below 18.5 feet. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened in the borehole, it was advanced utilizing a 7-7/8 tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water and aquagel to stabilize the borehole walls. The boring was advanced to 26 feet where split spoons were collected from 26 to 28 feet confirming the location of the till. Information on this interval was available from samples collected in wells E-Valley Fill-1 and E-Lower Bedrock. Based upon information from the split-spoon samples, a decision was made to set a 5-inch ID PVC casing at 28 feet to seal off the Valley Fill-2 aquifer.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. Next, 5-inch ID PVC casing, with bottom cap, was lowered into the boring to 28 feet BGS. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

The borehole was then advanced to 30 feet utilizing a 4-3/4-inch tricone bit and rotary wash techniques. A confirmatory split spoon was collected from 30 to 32 feet confirming the presence of the saturated interval. The boring was then advanced to 50 feet to allow installation of the well materials in within the proper interval.

Well Installation

The E-Valley Fill-4 well was installed on October 8, 1991 to a total depth of 43.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 43.5 to 41 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 31 feet BGS to 2.76 feet AGS. The sand pack was installed to 29.5 feet BGS followed by a bentonite slurry seal to 26 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.5.4 *E-Valley Fill-4*

Boring Advancement

The drilling of E-Valley Fill-4 began on May 4, 1990 by advancing the borehole through unconsolidated glacial sediments using 12-1/4-inch ID HSA to 20 feet BGS. Information on this interval was available from samples collected in wells E-Valley Fill-1 and E-Lower Bedrock. The augers were advanced to 20 feet BGS to seal off the shallow aquifer with 10-inch ID PVC casing.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. Next, 10-inch ID PVC casing, with bottom cap, was lowered through the augers to 20 feet BGS. The augers were then pulled from the borehole and the remaining annulus filled with additional grout.

After the grout hardened, the borehole was advanced to 46 feet BGS using 4-1/4-inch ID HSA. Information on this interval was available from well E-Lower Bedrock. A split spoon was then driven from 46 to 48 feet BGS to confirm the presence of saturated sand. After confirmation of the saturated sand, the borehole was advanced to a final depth of 52 feet BGS.

Well Installation

The E-Valley Fill-4 well was installed on May 9, 1990 to a total depth of 52 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 52 to 50 feet BGS, followed by a 5-foot long (10 slot) screen. Stainless steel riser pipe extended from 45 feet BGS to 2.5 feet AGS. The sand pack was installed to 43 feet BGS followed by a bentonite slurry seal to 38 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.5.5 *E-Lower Bedrock*

Boring Advancement

The drilling of E-Lower Bedrock began on May 3, 1990 by augering to 14 feet BGS with 12-1/4-inch ID hollow-stem augers (HSA). Information on this interval was available from well E-Valley Fill-1. Split-spoon samples were collected through the augers continuously from 14 to 20 feet BGS as the boring was advanced to 20 feet BGS. A 10-inch ID PVC casing was then installed to seal off the shallow aquifer to avoid any possible cross contamination between the aquifers.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout using a 3/4-inch ID tremie hose. Next, the 10-inch PVC casing, with bottom cap, was lowered through the augers to 20 feet BGS. The augers were then removed from the borehole and the remaining annulus filled with additional grout.

After the grout hardened, drilling resumed on E-Lower Bedrock by continuously sampling with split-spoon samplers through 4-1/4-inch ID HSA and augering to 24 feet BGS. Wet sands and gravels were encountered between 20 and 24 feet BGS. The augers were pulled back to 20 feet BGS and a pump test was performed to determine the flow rate of this interval. Results of the pump test indicated a flow rate of less than 1 gpm; therefore, permanent casing was not necessary. Continuous sampling and augering continued to 60 feet BGS. Another saturated sand zone was encountered between 46 and 47.5 feet BGS. A pump test was performed on this zone which revealed a flow rate of less than 1 gpm.

Additional saturated sands and gravels were encountered between 48 and 50 feet BGS. A pump test was performed on the entire zone between 46 and 50 feet BGS. Results of this test indicated a flow rate of 1.5 gpm. The boring was advanced 10 feet below the bottom of this aquifer, 49.5 feet BGS, in a non-saturated till zone and 6-inch steel casing was set to 60 feet BGS.

The casing was set by first filling the augers with grout, then removing the augers. The 6-inch steel casing with a PVC bottom cap was lowered into the borehole to a total depth of 60 feet BGS. Potable water was added to the casing to displace the grout to the annulus.

After the grout hardened, all of the potable water present in the 6-inch casing was removed except for approximately 54 gallons which the pump could not lift out. Because this water could not be removed from the casing about 150 gallons of carbon filtered water was added to help dilute/flush out the potable water. Next, this water was pumped out of the casing until there was about 51 gallons left which could not be removed.

The boring was sampled continuously with split-spoon samplers to the bedrock surface at 78.2 feet BGS. The boring was advanced by driving a split-spoon sample and then washing out the casing with a 5-1/2-inch tricone bit and filtered water. No water-bearing zones were encountered in the borehole between 60 and 78.2 feet BGS.

Initially this boring was to be completed as an Interface well; however, because no saturated zone was encountered between 60 and 78.2 (top of rock) feet BGS, the borehole was sealed with bentonite/cement grout to ground surface using a 3/4-inch ID tremie hose.

Ruetgers-Nease later authorized ERM to complete this boring as a Lower Bedrock well. On September 21, 1991 the grout was removed from the 6-inch casing utilizing a 5-7/8-inch tricone bit and compressed air for circulation. The borehole was reamed to 80.5 feet BGS.

On September 23, 1991 the borehole was cored from 80.5 to 90.5 feet BGS. Water-bearing fractured limestone and shale were recovered from the core barrel. Debris from the non-cased till interval (60-78.2) caved into the open core-hole after the core barrel was removed. A decision was made by the ERM field geologist to install a temporary 5-inch ID steel casing to 80 feet. The temporary casing successfully sealed the borehole from any further caving. Debris was cleared from the bottom of the boring utilizing a 4-3/4-tricone bit and compressed air for circulation. On September 25, 1991 the borehole was reamed to a total depth of 92.5 feet BGS.

Well Installation

The E-Lower Bedrock well was installed on September 25, 1991 to a total depth of 91.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 91.5 to 89 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 79 feet BGS to 2.54 feet AGS. The sand pack was installed to 77 feet BGS followed by a bentonite pellet seal to 72 feet BGS. The 5-inch temporary casing was removed slowly allowing the sand and bentonite to fill the annulus. The temporary casing was pulled to 71.3 feet BGS where it became lodged and could not be removed any further. Since the bottom of the temporary casing was above the saturated bedrock interval and the 6-inch casing sealed all saturated intervals above the bedrock, a decision was made to complete the well installation. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. Grout was also installed between the 6 inch and 5 inch casing annulus. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.6 *LOCATION F*

1.6.1 *F-Valley Fill-3*

The drilling of F-Valley Fill-3 began on October 19, 1991 by advancing the borehole through unconsolidated glacial sediments using a 7-7/8-inch tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water and aquagel to stabilize the borehole walls. The boring was advanced to 36 feet BGS into till. Information on this interval was available from samples collected in well F-Valley Fill-6. In order to seal the well from the above landfill, a 5-inch ID PVC casing was installed to 36 feet BGS.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened the F-Valley Fill-3 borehole was advanced utilizing a 4-7/8-tricone bit and rotary wash techniques. Circulation was

accomplished utilizing filtered water. The boring was then advanced to 58 feet to allow installation of the well materials within the proper interval. Information on this interval was available from samples collected in well F-Valley Fill-6.

Well Installation

The E-Valley Fill-4 well was installed on October 21, 1991 to a total depth of 53.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 53.5 to 51 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 41 feet BGS to 2.34 feet AGS. The sand pack was installed to 37 feet BGS followed by a bentonite pellet seal to 34.6 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1 foot BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.6.2 *F-Valley Fill-4*

The drilling of F-Valley Fill-4 began on October 19, 1991 by advancing the borehole through unconsolidated glacial sediments using a 11-7/8-inch tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water and aquagel to stabilize the borehole walls. The boring was advanced to 36 feet BGS into till. Information on this interval was available from samples collected in well F-Valley Fill-6. In order to seal the well from the above landfill, an 8-inch ID steel casing was installed to 35 feet BGS.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened the F-Valley Fill-4 borehole was advanced utilizing a 7-7/8 tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water. The boring was then advanced to 53 feet. To separate the Valley Fill-3 aquifer from the Valley Fill-4 aquifer, a 5 inch ID PVC casing with a PVC end cap was installed to 52.5 feet BGS. Information on this interval was available from samples collected in well F-Valley Fill-6.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened the F-Valley Fill-4 borehole was advanced utilizing a 4-7/8 tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water. The boring was then advanced to 70 feet to allow installation of the well materials within the proper interval. Information on this interval was available from samples collected in well F-Valley Fill-6.

Well Installation

The F-Valley Fill-4 well was installed on October 22, 1991 to a total depth of 69 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 69 to 66.5 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 56.5 feet BGS to 2.36 feet AGS. The sand pack was installed to 54 feet BGS followed by a bentonite pellet seal to 51 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1 foot BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.6.3 *F-Valley Fill-6*

Boring Advancement

The drilling of well F-Valley Fill-6 July 10, 1990 by continuously sampling with split-spoon samplers through 4-1/4-inch ID hollow stem augers (HSA) and augering to 38 feet BGS. A saturated zone was encountered from 21 to 31 feet BGS. In order to avoid any possible cross contamination in the borehole a permanent 10-inch ID PVC casing was be installed. The 4-1/4-inch ID HSA were pulled and the boring was enlarged with 12-1/4-inch ID HSA to a depth of 38 feet BGS.

On July 13, 1990, 38 feet of 10-inch ID PVC casing with an end cap was grouted in place. After pumping grout into the bottom of the 12-1/4 HSA, the grout was displaced in the annulus between the HSA and PVC casing by filling the PVC with filtered water. After the PVC seated, the augers were removed and the annulus was sealed with the bentonite/cement grout. The grout was pumped through a 3/4-inch ID tremie hose lowered

to the bottom of the boring to displace any water remaining in the annulus.

Continuous sampling with split spoons and augering resumed on July 14, 1990 after the grout hardened. The borehole was advanced with 4-1/4 HSA to 61.5 feet BGS. Two separate saturated zones were encountered so a decision was made to install 8-inch ID steel casing at a depth of 52.5 BGS.

On July 17, 1990 grout was pumped into the augers and then the augers were removed. By pumping in the grout before removing the augers, the borehole below the 10-inch ID PVC casing remained open while the 8-inch ID steel casing was welded together and lowered into position at a depth of 52 feet BGS.

Due to inclement weather conditions, access to the F-Valley Fill-6 location was not possible again until July 25, 1990. A temporary 4-inch OD casing with a drive shoe attached was lowered to the base of the 8-inch ID casing. The boring was sampled continuously with split-spoon samplers to a depth of 96 feet BGS. The boring was advanced by driving a split-spoon sampler and then driving the 4-inch OD temporary casing 2 feet and washing out the casing with a 3-1/2-inch tricone bit and filtered water. A water bearing zone was encountered at the bedrock/glacial sediment interface. Bedrock was encountered at a depth of 95.5 feet BGS.

Well Installation

On July 27, 1990 a well was installed in F-Valley Fill-6 to a total depth of 94.3 feet BGS. The well was constructed entirely of 304 stainless steel. A 2-foot sump was set at 94.3 to 92.3 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 82.3 feet BGS to 2.38 feet AGS. The sand pack was installed to 80 feet BGS followed by a bentonite slurry to 73 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite slurry seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.6.4 *F-Lower Bedrock*

The drilling of F-Lower Bedrock began on October 5, 1991 by advancing the borehole through unconsolidated glacial sediments using an 18-inch tricone bit and rotary wash techniques. Circulation was accomplished

utilizing filtered water and aquagel to stabilize the borehole walls. The boring was advanced to 36 feet BGS into till. Information on this interval was available from samples collected in well F-Valley Fill-6. In order to seal the well from the above landfill, a 16-inch ID steel casing with PVC end cap was installed to 34 feet BGS.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened, the F-Lower Bedrock borehole was advanced utilizing a 14-3/4-inch tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water. The boring was then advanced to 49 feet. To separate the Valley Fill-3 aquifer from the Valley Fill-4 aquifer, a 14-inch ID steel casing with a PVC end cap was installed to 47 feet BGS. Information on this interval was available from samples collected in well F-Valley Fill-6.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened, the F-Lower Bedrock borehole was advanced utilizing a 11-7/8 tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water and aquagel to stabilize the borehole walls. The boring was then advanced to 79.5 feet to separate the Valley Fill-4 aquifer from the Valley Fill-6 aquifer. Information on this interval was available from samples collected in wells F-Valley Fill-6.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened, the F-Lower Bedrock borehole was advanced utilizing a 7-7/8 tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water and aquagel to stabilize the borehole walls. The boring was then advanced to 94.5 feet to separate the Valley Fill-6 aquifer from the bedrock surface. Information on this interval was available from samples collected in well F-Valley Fill-6.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout through the use of 1-inch ID tremie pipe. The

casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened, the F-Lower Bedrock borehole was advanced utilizing a 4-7/8-inch tricone bit and air as circulating media. The borehole was advanced to 97 feet to prepare for rock coring. The borehole was then advanced utilizing a Christensen 94 millimeter core/drill system and compressed air as the circulating media. The core hole was cut from 97 to 130 feet BGS. Saturation was encountered at 120 feet originating from the Lower Bedrock Aquifer. Since the Christensen coring system cuts a 5-1/2-inch hole, no reaming was necessary prior to well installation.

Well Installation

The F-Lower Bedrock well was installed on October 20, 1991 to a total depth of 130 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 130 to 127.5 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 117.5 feet BGS to 2.78 feet AGS. The sand pack was installed to 115 feet BGS followed by a bentonite pellet seal to 109 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 3-foot BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.7 LOCATION G

1.7.1 G-Upper Bedrock

Boring Advancement

The drilling of G-Upper Bedrock began on June 26, 1990 by continuously sampling with split-spoon samplers through 6-1/4-inch ID hollow stem augers (HSA) and augering to a depth of 32 feet BGS. Saturated sands and gravels were encountered in the borehole between 28 and 31 feet BGS. Bedrock was encountered directly below the sand at 31 feet BGS. The unconsolidated glacial material was isolated from bedrock by installing an 8-inch ID steel casing.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout using a 3/4-inch ID tremie hose. Next, the augers

were removed from the borehole and the 8-inch ID steel casing with a PVC bottom plug was lowered to 31.9 feet BGS. The annulus was then filled with additional grout using a 3/4 inch ID tremie hose.

After the grout hardened, drilling resumed on G-Upper Bedrock using conventional coring methods and compressed air as the circulating media. Coring began at 32 feet BGS and continued to 37 feet BGS when water from the Upper Bedrock Aquifer (encountered at 32.5 feet BGS) mixed with the cuttings and clogged the borehole thus reducing circulation. Filtered water was then used for the remainder of the coring operations. The coring continued to a depth of 47.5 feet BGS. The corehole was then enlarged with a 5-1/2-inch tricone bit to 48 feet BGS to accomodate well materials.

Well Installation

The G-Upper Bedrock well was installed on June 29, 1990 to a total depth of 46 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 46 to 44 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 34 feet BGS to 2.3 feet AGS. The sand pack was installed to 33 feet BGS followed by a bentonite pellet seal to 31 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.8 Location H

1.8.1 H-Shallow

Boring Advancement

The drilling of well H-Shallow began on June 19, 1990 by augering to 14 feet BGS with 4-1/4-inch ID hollow-stem augers (HSA). Information on the unconsolidated glacial sediments was available from the split-spoon samples collected from H-Upper Bedrock. A saturated sand interval was encountered from 7 to 14 feet BGS.

Well Installation

On June 19, 1990 a well was installed in H-Shallow to a depth of 13 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 13 to 11 feet BGS, followed by a 5-foot long (10 slot) screen. Stainless steel riser pipe extended from 6 feet BGS to 2.4 feet AGS. The sand pack was installed to 5 feet BGS followed by a bentonite pellet seal to 3 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.8.2 *H-Valley Fill-1*

Boring Advancement

The drilling of well H-Valley Fill-1 began on June 20, 1990 by augering to 14 feet BGS with 12-1/4-inch ID HSA. Information on the unconsolidated glacial sediments was available from the split-spoon samples collected from H-Upper Bedrock. Split-spoon samples were collected from 14 to 18 feet BGS confirming the presence of till to 16 feet BGS. The shallow aquifer was sealed off from the Valley Fill-1 aquifer with a 10-inch ID PVC casing installed to 14 feet BGS.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. The augers were then pulled from the borehole and the 10-inch ID PVC casing, with bottom cap, was lowered to 14 feet BGS. The remaining annulus was then filled with grout.

Drilling could not be resumed due to the dispute over access to the Crane-Deming property. The location was secured and all equipment was removed and returned to Ruetgers-Nease property.

On September 10, 1991 drilling resumed on H-Valley Fill-1. The boring was advanced to 21 feet BGS using 4-1/4-inch ID HSA. Confirmatory spit spoon samples were collected from 18 to 24 feet BGS. The split spoons confirmed the presence of the Valley Fill-1 saturated interval.

Well Installation

On September 10, 1991 a well was installed in H-Valley Fill-1 to a depth of 23 feet BGS. The well was constructed entirely of 2 inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 46.5 to 44 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 34 feet BGS to 2.04 feet AGS. The sand pack was installed to 32 feet BGS followed by a bentonite pellet seal to 30 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.8.3 *H-Upper Bedrock*

Boring Advancement

The drilling of well H-Upper Bedrock began on June 19, 1990 by augering to 18 feet BGS with 12-1/4-inch ID HSA. Split-spoon samples were collected from ground surface to 20 feet BGS confirming the presence of till to 16 feet BGS. The shallow aquifer located between 6 and 9 feet BGS was sealed off from the remainder of the borehole with a 10-inch ID PVC casing installed to 17 feet BGS.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. The augers were then pulled from the borehole and the 10-inch ID PVC casing, with bottom cap, was lowered to 17 feet BGS. The remaining annulus was then filled with additional grout using a 3/4-inch ID tremie hose.

At this point, drilling could not be resumed due to the dispute over access to the Crane-Deming Property. The location was secured and all equipment was removed and returned to Ruetgers-Nease property.

On September 10, 1991 the borehole was re-entered and advanced utilizing 4-1/4 ID HSA to 24 feet BGS. Split spoons were collected to a depth of 28.5 feet BGS where the weathered bedrock surface was encountered. The boring was advanced to 30 feet BGS to facilitate the installation of 6-inch ID steel casing.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout using a 3/4-inch ID tremie hose. Next, the augers were removed from the borehole and the 6-inch ID steel casing with a

PVC bottom plug was lowered to 29.9 feet BGS. The annulus was then filled with additional grout using a 3/4-inch ID tremie hose.

After the grout hardened, drilling resumed on H-Upper Bedrock utilizing a Christensen 94 millimeter core/drill system and compressed air as the circulating media. The core hole was advanced cut from 31 to 50 feet BGS. Saturation was encountered at 32 feet originating from the Upper Bedrock Aquifer. Since the Christensen coring system cuts a 5-1/2-inch hole, no reaming was necessary prior to well installation.

Well Installation

On September 30, 1991 a well was installed in H-Upper Bedrock to a depth of 46.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 46.5 to 44 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 34 feet BGS to 2.04 feet AGS. The sand pack was installed to 32 feet BGS followed by a bentonite pellet seal to 30 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.9 *LOCATION I*

1.9.1 *I-Shallow*

Boring Advancement

The drilling of I-Shallow was initiated on May 5, 1990 by advancing the borehole with 4-1/4-inch ID hollow stem augers (HSA). Continuous samples were collected from 0 to 28 feet BGS using split-spoon samplers. The boring was advanced to a depth of 28 feet BGS when the bedrock surface was encountered.

Well Installation

The I-Shallow well was installed on May 5, 1990 to a total depth of 28 feet. The well was constructed entirely of 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 28.1 to 26.1 feet BGS, followed by a 10-foot long (10 slot)

screen. Stainless steel riser pipe extended from 16.1 to 6.1 feet BGS. Schedule 40 PVC riser extended from 6.1 feet BGS to 1.96 feet AGS. The sand pack was installed to 15 feet BGS followed by a bentonite pellet seal to 12 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.9.2 *I-Interface*

Boring Advancement

The drilling of I-Interface began on May 3, 1990 by augering through the unconsolidated glacial material to a depth of 31 feet with 4-1/4-inch ID hollow stem augers (HSA). Information on the unconsolidated glacial sediments was available from the split-spoon samples collected from the previously drilled I-Shallow and I-Upper Bedrock wells.

The augers were filled with grout by running the decontaminated 3/4-inch ID tremie hose to the bottom of the augers and then pumped. The augers were then pulled. A rubber end plug was placed on the 8-inch ID steel casing before lowering the casing into the boring to a depth of 31 feet BGS. During the casing installation the rubber end plug failed and grout entered the casing and came to equilibrium at a depth of 17 feet BGS.

After inspecting the rock core from I-Upper Bedrock and determining the weathered and fractured shale at the bedrock and glacial sediment interface was water-bearing, it was decided that a well should be set in this interval. The borehole was advanced with a 5-1/2-inch tricone bit. Initially the cuttings were circulated with air, but due to the size of the annulus between the 4-inch casing and the 8-inch steel casing the compressor could not generate enough air to move the rock cuttings. It was then decided that the water collected from the drilling of well I-Upper Bedrock from this interval would be used for establishing circulation. The borehole was advanced from 31 to 45 feet BGS. Well materials were then lowered into the boring but due to rock cuttings remaining in the bottom of the boring, the base of the sump was resting at 43.5 feet BGS. The well materials were removed from the boring. Temporary 4-inch OD casing with the drive shoe attached was then lowered into the borehole and driven to 45 feet BGS. A 3-1/2-inch tricone bit was then lowered into the temporary casing. The tricone bit was advanced to 45 feet BGS using compressed air as circulation media.

Well Installation

The I-Interface well was installed on May 9, 1990 to a total depth of 44.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 44.5 to 42.5 feet BGS followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 32.5 feet BGS to 2.2 feet AGS. The sand pack was installed to 31.4 feet BGS followed by a bentonite pellet seal to 28.2 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.9.3 *I-Upper Bedrock*

Boring Advancement

The drilling of I-Upper Bedrock began on May 3, 1990 by augering through the unconsolidated glacial material to a depth of 28 feet BGS with 4-1/4-inch ID hollow stem augers (HSA). Continuous split spoons were collected from 28 to 31 feet BGS. Information on the unconsolidated glacial sediments was available from the split-spoon samples collected from I-Shallow.

In order to isolate the borehole a permanent 8 inch ID steel casing was installed to a depth of 31 feet BGS. The augers were filled with bentonite/cement grout utilizing 3/4-inch ID tremie hose at the bottom of the augers and pumping grout to displace any standing water. The augers were then removed from the borehole. The 8-inch ID steel casing with a rubber end cap was then lowered into the boring. During the casing installation, the rubber end cap ruptured and grout entered the casing and came to equilibrium at a depth of 17 feet BGS inside the casing.

Drilling resumed on May 4, 1990 after the grout hardened. The grout remaining inside the casing was removed with 3-1/4-inch ID HSA. After the grout was removed, the 3-1/4 HSA were then pulled and the 4-inch OD temporary casing with a drive shoe was lowered to 31 feet BGS and driven into the shale. Shale lodged inside the casing during advancement was removed with a tricone bit.

A NX-Wireline coring system (NXW) was utilized to advance the boring to a depth of 60 feet BGS into a shale. The corehole was then enlarged with a 7-7/8-inch tricone bit from 31 to 60 feet BGS. The boring was

enlarged so that a 6-inch ID permanent steel casing could be installed. A 3/4-inch ID tremie hose was inserted to the bottom of the boring and grout was pumped into the boring, displacing any standing water present in the borehole. On May 7, 1990, 6-inch ID steel with a rubber end cap was lowered into the boring to a depth of 60 feet BGS, displacing the grout. The rubber end cap again ruptured and grout entered the 6-inch ID casing. The remaining annulus between the 8-inch ID and 6-inch ID casing (to 34 feet BGS) was filled with grout.

Temporary 4-inch OD casing used during the coring operation was driven into place at 60 feet BGS. The grout inside the casing was removed by rotary drilling with formation water and 3-1/2-inch tricone bit. After the grout was removed, the casing was reentered with the NXW and the standing water remaining in the temporary casing was removed with compressed air. The boring was advanced utilizing the NXW system to collect rock core to a total depth of 73.5 feet BGS. A 5-1/2-inch tricone bit was then used to enlarge the core hole to a total depth of 74.5 feet BGS. The corehole was enlarged to accommodate well materials.

Well Installation

On May 17, 1990 a well was installed in I-Upper Bedrock to a total depth of 74.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 74.5 to 72.5 feet BGS, followed by a 10-foot long (10 slot) screen with a stainless steel centralizer placed in the middle of the screen. The stainless steel riser pipe extended from 62.5 feet BGS to 2 feet AGS. The sand pack was installed from 74.5 to 60 feet BGS followed by bentonite pellets to 57.5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1.9 feet BGS. The grout was installed with a 3/4-inch ID tremie hose located at the top of the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.9.4 I-Lower Bedrock

Boring Advancement

The drilling of I-Lower Bedrock began on May 14, 1990 by augering through the unconsolidated glacial material and into the bedrock to a depth of 35 feet with 12-1/4-inch ID hollow-stem augers (HSA). The hole was initially advanced using 6-1/4-inch ID HSA to allow the 12-1/4-inch ID HSA to more readily penetrate the bedrock. The 10-inch ID PVC casing was then lowered into the augers. Due to the fact that the PVC

casing was only 21-feet long, two sections had to be used. The two sections were connected with a PVC collar that was fastened to the casing with stainless steel screws. A PVC bottom plug was placed onto the 10-inch ID PVC casing to displace the grout to the annulus. The bentonite/cement grout was installed into the 12-1/4-inch ID HSA with a 3/4-inch ID tremie hose discharging at the bottom of the boring and the casing was installed. After the casing was in place, the augers were then pulled.

After the augers were removed, bentonite/cement grout was installed in the annulus between the open hole and the casing. A 3/4-inch ID tremie hose was lowered to the bottom of the boring and the grout was pumped. This allowed the fluid in the hole to be displaced without affecting the character of the grout mix. The 10-inch ID PVC casing was installed on May 15.

On May 17, 4-1/4-inch ID HSA were lowered into the 10 inch ID PVC casing and advanced to a total depth of 50 feet. The 10-inch ID casing and open hole were flushed with carbon filtered water to remove cuttings that were present on the inside of the casing. This portion of the borehole was isolated from the 10-inch ID PVC casing with 8-inch ID steel casing. Grout was pumped using a 3/4-inch ID tremie hose that had been lowered to the bottom of the borehole. The 8-inch ID steel casing with a PVC end cap to displace the grout into the annulus of the 10-inch ID and the 8-inch ID casings was lowered into the borehole. The casing became difficult to advance at 36 feet BGS and had to be driven to 49 feet BGS.

On May 18 1990, the 8-inch ID casing was reentered with a 7-7/8-inch tricone bit. The hole was advanced to a depth of 73 feet using carbon filtered water as circulation media. The 4-inch OD flush joint casing was then used as a temporary casing.

The NX-Wireline coring system was set up and advanced from 73 feet BGS to a depth of 88 feet BGS using compressed air as circulation media. The cuttings generated were not being returned properly so formation water and carbon filtered water were then used. Continuous core was collected to a depth of 116 feet. This interval was then enlarged with a 7-7/8-inch tricone bit to 116.5 feet BGS.

A 3/4-inch ID tremie hose was lowered to the bottom of the borehole and the bentonite/cement grout was installed. At this time, 6-inch ID steel with a PVC end cap was lowered to a depth of 116.5 feet BGS, displacing the grout to the annulus.

After the grout hardened, the boring was advanced by means of NX-Wireline Core to a depth of 222.4 feet BGS, and then the corehole enlarged with a 5-1/2-inch tricone bit to a depth of 190 feet BGS.

Well Installation

Based on discussions between ERM and the Agencies' on-site represenative, ERM decided to install the well to monitor the uppermost waterbearing zone found below the Upper Bedrock Aquifer, present at a depth of 144 to 134 feet BGS. On June 6, 1990 the borehole was sealed with grout from 222.4 to 150 feet BGS. On June 11, 1990 the well materials were installed. A base of bentonite pellets was installed from 150 feet 146.7 feet BGS. This base served to isolate the screened interval from the grout in the lower portions of the borehole. The well was constructed entirely of 2-inch ID 304 stainless steel except for a section of Schedule 40 2-inch ID PVC riser at the ground surface. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 146 to 144 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 134 feet BGS to 4 feet BGS, then PVC riser was installed from 4 feet BGS to 2.56 feet AGS. The sand pack was installed to 131.8 feet BGS followed by a bentonite pellet seal to 128.4 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.10 LOCATION J

1.10.1 J-Valley Fill-2

Boring Advancement

The drilling of well J-Valley Fill-2 began on June 13, 1990 by advancing 4-1/4-inch ID HSA to 18.5 feet BGS. Information on this interval was available from J-Lower Bedrock. Split-spoon samples were collected from 13 to 15 feet BGS and from 16.5 to 18.5 feet BGS confirmed the presence of the Valley Fill-2 aquifer.

Well Installation

The well J-Valley Fill-2 was installed on June 13, 1990 to a total depth of 17 feet BGS. Prior to the installation of well materials, the augers were pulled

back from 18.5 to 17 feet BGS allowing this zone to collapse naturally. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 17 to 15 feet BGS, followed by a 5-foot long (10 slot) screen. Stainless steel riser pipe extended from 10 feet BGS to 3 feet AGS. The sand pack was installed to 8 feet BGS followed by a bentonite pellet seal to 5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.10.2 *J-Valley Fill-3*

Boring Advancement

The drilling [illegible] ell J-Valley Fill-3 began on June 14, 1990 by advancing 6-1/4-inch ID [illegible] to a total depth of 18.5 feet BGS. Split-spoon samples were collected from 14.5 to 18.5 feet BGS to confirm the presence till. Information on the unconsolidated glacial sediments was available from the split-spoon samples collected from J-Lower Bedrock.

Permanent casing was installed to separate the Valley Fill-2 and the Valley Fill-3 Aquifers. The casing was installed by filling the augers with bentonite/cement grout through 3/4-inch ID tremie hose, then removing the augers, and lowering the 6-inch ID steel casing, with a PVC bottom cap to a total depth of 18 feet BGS. The remaining annulus was then filled with grout.

After the grout hardened, drilling resumed on J-Valley Fill-3 using a 5-1/2-inch tricone bit. The borehole was advanced to 22 feet BGS and split-spoon samples were collected from 22 to 26 feet BGS to confirm the presence of the saturated sand observed during the drilling of J-Lower Bedrock. The saturated interval extended from about 21 to 27.5 feet BGS. After the presence of the Valley Fill-3 aquifer was confirmed, the borehole was advanced to a total depth of 32 feet BGS to accommodate well materials.

Well Installation

The J-Valley Fill-3 well was installed on June 17, 1990, to a total depth of 32 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to

installation. A 2-foot sump was set at 32 to 30 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 20 BGS to 1-foot AGS. The sand pack was installed to 18.5 feet BGS followed by a bentonite pellet seal to 15.5 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole.

1.10.2 *J-Valley Fill-4*

Boring Advancement

The drilling of well J-Valley Fill-4 began on September 22, 1991 by advancing 12-1/4-inch ID HSA to a total depth of 18 feet BGS. Split-spoon samples were collected from 18 to 22 feet BGS to confirm the presence of till located at this depth in well J-Lower Bedrock. The borehole was then advanced to 23 feet to accommodate a 16-inch steel casing.

Permanent casing was installed to separate the Valley Fill-2 and the Valley Fill-3 Aquifers. The casing was installed by filling the augers with bentonite/cement grout through 3/4-inch ID tremie hose, then removing the augers, and lowering the 16-inch ID steel casing, with a steel bottom cap to a total depth of 23 feet BGS. The remaining annulus was then filled with grout.

After the grout hardened, drilling resumed on J-Valley Fill-4 using a 10-1/4-inch ID HSA. The borehole was advanced to 28 feet BGS where a split-spoon sample was collected from 28 to 30 feet BGS to confirm the presence of the till observed in J-Lower Bedrock. The borehole was advanced to 29 feet BGS to accommodate a 10-inch ID steel casing. was installed with a steel end cap to 29 feet BGS to separate the Valley Fill-3 and Valley Fill-4 aquifers.

Prior to installing the casing, the augers were filled with bentonite/cement grout through 3/4-inch ID tremie hose. The augers were removed and the 10-inch ID steel casing, with a steel bottom cap, was installed to a total depth of 29 feet BGS. The remaining annulus was then filled with grout.

After the grout hardened, drilling resumed on J-Valley Fill-4 using a 4-1/4-inch ID HSA. The borehole was advanced to 48 feet BGS. Split-spoon samples were collected from 30 to 46 feet BGS to confirm the presence of the Valley Fill-4 aquifer. Saturation was encountered at 38 feet BGS. The augers were advanced to 48 feet to accommodate the well materials.

Well Installation

The J-Valley Fill-4 well was installed on October 25, 1991 to a total depth of 48 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 48 to 46 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 36 feet BGS to 2.41 feet AGS. The sand pack was installed to 34 feet BGS followed by a bentonite pellet seal to 32 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 3-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.10.3 *J-Lower Bedrock*

Boring Advancement

The drilling of J-Lower Bedrock began on June 11, 1990 by continuously sampling with split-spoon samplers through 4-1/4-inch ID HSA to 36 feet BGS. Saturated sands were encountered between 13 and 15 feet BGS and also between 21 and 26 feet BGS. A pump test was performed on the lower saturated interval at 21 to 26 feet BGS which showed that this zone did not have a flow rate of 1 gpm. However, it was determined that sand had heaved up into the augers and may have reduced the flow of water. The augers were pulled up to 21-feet BGS and another pump test was performed. Results, again, showed a flow rate of less than 1 gpm, but there was also 3 feet of sand inside of the augers.

During the second pump test approximately 35 gallons of water was pumped out of the borehole in 8 minutes. This indicates a flow rate of about 4.3 gpm. In a discussion between the ERM-Midwest geologist on-site and the Agencies' on-site representative, it was concluded that the 4.3 gpm flow rate was more realistic. The borehole was then further advanced to 36 feet BGS.

The 4-1/4-inch ID HSA were removed and the borehole re-entered with 12-1/4-inch ID HSA. The augers were advanced to 18.5 feet BGS so that 10-inch ID PVC casing could be installed to isolate the saturated zone encountered between 13 and 15 feet BGS.

Prior to installing the casing, the augers were filled with bentonite/cement grout through a 3/4-inch ID tremie hose located at the

bottom of the borehole. The 10-inch PVC casing, with bottom cap, was lowered through the augers to 18.5 feet BGS. The augers were then removed and the remaining annulus filled with additional grout.

After the grout hardened, drilling resumed on J-Lower Bedrock using 4-1/4-inch ID HSA. The borehole was advanced to 36 feet BGS where continuous sampling resumed. Saturated sand was encountered at 36 feet BGS. The borehole was further advanced to 40 feet BGS to delineate the thickness of this sand unit which extended to approximately 37.5 feet BGS.

A pump test performed on this saturated interval revealed a flow rate of less than 1 gpm. After the pump test was completed, there was several feet of sand inside of the augers. The augers were then pulled up to 32 feet BGS and another pump test was performed. Results from the second pump test again proved inconclusive. Sands were measured to be present 10 feet inside of the augers. Because of the extreme difficulty in trying to get satisfactory results from pump testing in this interval, it was decided to set casing to seal off the saturated zone between 21 and 26 feet BGS.

After the borehole was advanced to 30 feet BGS, the augers were filled with bentonite/cement grout. The augers were removed from the borehole and 8-inch ID steel casing with a PVC bottom cap was lowered into the borehole. While the casing was being inserted, it had to be advanced with a 300 pound hammer. The casing was set at a depth of 28.9 feet BGS which is 1.1 feet short of the proposed target depth. However, the bottom of the casing was set in a non-saturated zone.

After the grout hardened, drilling resumed on J-Lower Bedrock using a 5-1/2-inch tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water. The borehole was advanced to a depth of 35 feet BGS when the drill rig broke down. When the rig was repaired, drilling could not be resumed because of withdrawal of permission to access Crane-Deming Property. The location was secured and all equipment was removed from the site and returned to Ruetgers-Nease property.

Drilling resumed on J-Lower Bedrock on September 19, 1991 by re-entering the 8-inch steel casing using a 7-7/8-inch tricone bit and rotary wash techniques. Circulation was accomplished utilizing filtered water. The boring was advanced to 40 feet; however, a 1.5-foot sand seam caved into the boring causing a loss of circulation. Aquagel was added to the filtered water to stabilize the borehole and drilling resumed. The boring was then advanced to the bedrock surface at 53 feet while continuously sampling with split spoons. A 6-inch ID steel casing with a PVC end cap

was installed to 53 feet BGS to separate the unconsolidated sediment from the bedrock.

Prior to the installation of the casing, the borehole was filled with bentonite/cement grout using a 3/4-inch ID tremie hose. Next, the 6-inch ID steel casing with a PVC bottom plug was lowered to 53 feet BGS. The annulus was then filled with additional grout using a 3/4-inch ID tremie hose.

After the grout hardened, drilling resumed on J-Lower Bedrock using a 4-7/8-inch tricone bit and air as circulating media. The borehole was advanced to 54.5 feet to prepare for rock coring. The borehole was then advanced utilizing a Christensen 94 millimeter core/drill system and compressed air as the circulating media. The core hole was cut from 54.5 to 79 feet BGS. Saturation was encountered at 59 feet originating from the Lower Bedrock Aquifer. Since the Christensen coring system cuts a 5-1/2-inch hole, no reaming was necessary prior to well installation.

Well Installation

The J-Lower Bedrock was installed on October 1, 1991 to a total depth of 76.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 76.5 to 74 feet BGS, followed by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 64 feet BGS to 2.51 feet AGS. The sand pack was installed to 62 feet BGS followed by a bentonite pellet seal to 58 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 3-foot BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.11 *LOCATION L*

1.11.1 *L-Valley Fill-1*

Boring Advancement

The drilling of well L-Valley Fill-1 began on October 11, 1991 by augering to 22 feet BGS with 4-1/4-inch ID HSA. The borehole was continuously sampled with split-spoon samplers from ground surface to 21 feet BGS. The Valley Fill-1 aquifer was encountered at 17 feet BGS. The borehole was advanced to 22 feet BGS to accommodate well materials.

Well Installation

The L-Valley Fill-1 well was installed on October 11, 1991 to a total depth of 22 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 22 to 20 feet BGS, followed by a 5-foot long (10 slot) screen. Stainless steel riser pipe extended from 15 feet BGS to 2.83 feet AGS. The sand pack was installed to 13-feet BGS followed by a bentonite pellet seal to 11-feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.11.2 *L-Valley Fill-2*

Boring Advancement

The drilling of well L-Valley Fill-2 began on October 12, 1991 by augering to 24 feet BGS with 12-1/4-inch ID HSA. Information on this interval was available from split-spoon samples collected in L-Lower Bedrock borehole. A 10-inch ID steel casing, with a steel end cap, was installed to 24 feet BGS to separate the Valley Fill-1 aquifer from the Valley Fill-2 aquifer.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened the L-Valley Fill-2 borehole was advanced utilizing 4-1/4-ID HSA. The boring was advanced to 34 feet where split spoons were collected from 34 to 40 feet confirming the location of the Valley Fill-2 aquifer. Information on this interval was available from samples collected in the L-Lower Bedrock boring. The boring was then advanced to 45 feet to allow installation of the well materials.

Well Installation

The L-Valley Fill-2 well was installed on October 17, 1991 to a total depth of 45 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2-foot sump was set at 45 to 43 feet BGS, followed

by a 10-foot long (10 slot) screen. Stainless steel riser pipe extended from 33 feet BGS to 2.2 feet AGS. The sand pack was installed to 31-feet BGS followed by a combination of bentonite pellet and bentonite slurry seal to 26-feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1-foot BGS. The grout was installed through a 3/4-inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.11.3 *L-Lower Bedrock*

Boring Advancement

The drilling of well L-Lower Bedrock began on July 10, 1990 by continuously sampling with split-spoon samplers through 12-1/4-inch ID hollow-stem augers (HSA) and augering to 24 feet BGS. A saturated zone (Valley Fill-1) was encountered from 18 to 20 feet BGS. A 16-inch ID steel casing, with a steel end cap was installed to 24 feet BGS to isolate the Valley Fill-1 aquifer from the Valley Fill-2 aquifer.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. The augers were then removed and the casing inserted into the borehole. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened, the borehole was advanced by continuously sampling with split-spoon samplers and augering with 12-1/4 HSA to 46 feet BGS. The Valley Fill-2 aquifer was encountered from 35 to 41 feet BGS. A 10-inch ID steel casing, with a steel end cap, was installed to 46 feet BGS to isolate the Valley Fill-2 aquifer from the remainder of the borehole.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. The casing was loaded with filtered water and the remaining annulus filled with additional grout after removal of the augers.

After the grout hardened, the borehole was advanced by continuously sampling with split-spoon samplers and augering with 4-1/4 HSA to 70 feet BGS. Bedrock was encountered at 68 feet BGS. A 6-inch ID steel casing, with a PVC end cap, was installed to 70 feet BGS to isolate the unconsolidated glacial material from the bedrock surface.

Prior to the installation of the casing, the augers were filled with bentonite/cement grout through the use of 3/4-inch ID tremie hose. The augers were then removed and the casing inserted into the borehole. The casing was loaded with filtered water and the remaining annulus filled with additional grout.

After the grout hardened, drilling resumed on L-Lower Bedrock utilizing a 4-7/8-inch tricone bit and air as circulating media. The borehole was advanced to 71 feet to prepare for rock coring. The borehole was then advanced utilizing a Christensen 94 millimeter core/drill system and compressed air as the circulating media. The core hole was cut from 71 to 101 feet BGS. Saturation was encountered at 81 feet originating from the Lower Bedrock Aquifer. After removal of the coring equipment the core hole caved in to 94 feet BGS. The core hole was re-entered with a 5-7/8-inch tricone bit and reamed to 104 feet to accommodate well materials. Circulation was accomplished utilizing compressed air.

Well Installation

The L-Lower Bedrock was installed on October 3, 1991 to a total depth of 99.5 feet BGS. The well was constructed entirely of 2-inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2.5-foot sump was set at 99.5 to 97 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 87 feet BGS to 2.21 feet AGS. The sand pack was installed to 85 feet BGS followed by a bentonite pellet seal to 82 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 3-foot BGS. The grout was installed through a 1-inch ID tremie pipe that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.12 Location K

1.12.1 K-Valley Fill 2

The drilling of K-Valley Fill 2 began on May 15, 1990 by continuously sampling with split spoon samplers through 4-¬ inch ID HSA to a depth of 38 feet BGS. Wet silts and sands were encountered in the borehole at 4.5 feet BGS. The borehole was further advanced to a total depth of 38 feet BGS to delineate the thickness of the saturated zone which extended to 26 feet BGS.

On May 17, 1990 well K-Valley Fill 2 was installed to a total depth of 17 feet BGS. Prior to its installation, the augers were pulled back to 17 feet BGS to accommodate the well installation. While pulling back on the augers, the formation collapsed from 27 to 38 feet BGS. Because it would not completely collapse, bentonite pellets were added to the borehole from 22.5 to 27 feet BGS. Sand was then used to fill the annulus to 17 feet BGS.

The well was constructed entirely of 2 inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2 foot sump was set at 17 to 15 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 5 feet BGS to 1.7 feet AGS. The sand pack was installed to 3 feet BGS followed by a bentonite pellet seal to 2 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 1 foot BGS. The grout was installed through a 3/4 inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.12.2 K-Valley Fill 4

The drilling of K-Valley Fill 4 began on May 17, 1990 by advancing 12-¬ inch ID HSA to 26 feet BGS. Information on this interval was available from K-Valley Fill 2. A split spoon sample was collected from 26 to 28 feet BGS to confirm that this interval was not saturated. Permanent casing was installed to isolate the shallow aquifer.

The borehole was advanced to 28 feet BGS and casing was installed. Prior to the installation of the casing, the augers were half filled with bentonite/cement grout with a 3/4 inch ID tremie hose. A 10 inch ID PVC casing with a PVC bottom cap, was lowered through the augers to 28 feet BGS. The augers were then removed from the borehole and the remaining annulus with additional grout. Potable water was added to the casing to displace the grout.

After the grout hardened, the water inside of the casing a K-Valley Fill 4 was pumped out except for approximately 16 gallons which the pump could not lift. Drilling resumed on K-Valley Fill 4 using 4-¬ inch ID HSA. The borehole was advanced to 34 feet BGS where split spoons were driven from 34 to 36 feet BGS and from 36 to 38 feet BGS to confirm the presence of a saturated unit. A pump test was performed on this interval, which indicated a flow rate of approximately 2.6 gpm. The borehole was further advanced to a total depth of 46 feet BGS to delineate the thickness of the saturated zone which extends to 38 feet BGS.

Bedrock (coal) was encountered at 43 feet BGS, which extended to about 45.5 feet BGS to where an underclay was encountered.

Well K-Valley Fill 4 was installed on May 23, 1990 to a total depth of 46 feet BGS. Prior to well installation, the bottom of the borehole had to be built up several feet to ensure that the screen would monitor the correct zone. Therefore, with approval from the Agencies on-site represenative, the borehole was filled with bentonite pellets from 42 to 46 feet BGS. The interval from 42 to 43 feet BGS had natural sand mixed with it also.

The well was constructed entirely of 2 inch ID 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2 foot sump was set at 46 to 44 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 34 feet BGS to 3.7 feet AGS. The sand pack was installed to 29 feet BGS followed by a bentonite pellet seal to 26 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4-inch I.D. tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

1.12.3 Well K-Lower Bedrock

The drilling of K-Lower Bedrock began on May 29, 1990 by augering through the unconsolidated glacial sediments to a depth of 30.5 feet BGS with 12-¬ inch ID hollow stem augers (HSA). A split spoon sample was collected from 28.5 to 30.5 feet BGS. The split spoon sample confirmed that the augers were not in a saturated zone. Information on the unconsolidated glacial sediments was available from the split spoon samples collected from K-Valley Fill 2 and K-Valley Fill 4 wells.

On May 30, 1990 a 10 inch ID PVC casing was installed in K-Lower Bedrock to a depth of 30 feet BGS in order to isolate the shallow aquifer zone from the rest of the boring. Prior to the installation of the casing, the augers were half filled with bentonite/cement grout by using a 3/4 inch ID 3/4 inch ID tremie hose. Next, the 10 inch ID PVC casing, with bottom cap, was lowered through the augers to 30 feet BGS. The augers were then pulled from the borehole and the annulus topped off with additional grout. Potable water was added to the casing to add extra weight to displace the grout in the borehole.

On June 1, 1990 4-¬ ID HSA were lowered into the 10 inch PVC casing and advanced to a depth of 52 feet BGS. The weathered bedrock surface was encountered at a depth of 43 feet BGS. Continuous split spoon samples were collected from 48 to 52.5 feet BGS. Unweathered shale was recovered from the split spoon at a depth of 52 feet BGS. In order to isolate the Valley Fill 4 Aquifer from the rest of the boring, an 8 inch ID steel casing was installed to a depth of 43 feet BGS. Originally, the 8 inch ID casing was to be set at a depth of 52 feet BGS, however during installation the casing became lodged in the coal seam present at 43 feet BGS and could not be advanced to the anticipated total depth. The grout was installed with a 3/4-inch ID tremie hose to the base of the 4-¬ ID HSA and installing the bentonite/cement grout. The augers were then removed and the 8 inch ID casing installed.

On June 17, 1990 4 inch OD temporary casing with drive shoe was lowered to the bottom of the 8 inch ID casing. The NX-Wireline coring system was setup and advanced through the cement plug using compressed air as the circulation media. After the cement plug was penetrated, the coring system was removed and the 4 inch OD temporary casing driven into the bedrock at 52.1 feet BGS. The material remaining inside the temporary casing was removed with a small tricone bit and compressed air. The cuttings were not returning properly with compressed air, so carbon filtered water was then utilized as the circulation media. After the temporary casing was cleared of debris, the NX-Wireline coring system was set up and the boring advanced to a depth of 67.2 feet BGS. A water-bearing zone, equivalent in elevation to the Lower Bedrock Aquifer, was encountered at a depth of 53 to 60 feet BGS. After the NX-Wireline coring system was removed, the corehole was enlarged with a 5-« inch tricone bit to a depth of 57 feet BGS. The circulation system became clogged with cuttings due to the large annulus created by the hollow stem augers below the 8 inch ID steel casing. The 5-« inch tricone bit was replaced with a 7-7/8 inch tricone bit and the borehole was advanced to a total depth of 70.5 feet BGS using carbon filtered water and formation water as the circulation media.

On June 18, 1990 a well was installed in K-Lower Bedrock to a depth of 66 feet BGS. The well was constructed entirely of 304 stainless steel. Teflon tape was applied to the threads of the well materials prior to installation. A 2 foot sump was set at 66 to 64 feet BGS, followed by a 10 foot long (10 slot) screen. Stainless steel riser pipe extended from 54 feet BGS to 4.29 feet AGS. The sand pack was installed to 51.5 feet BGS followed by a bentonite pellet seal to 48.2 feet BGS. The remainder of the annulus was sealed with a bentonite/cement grout to within 2 feet BGS. The grout was installed through a 3/4 inch ID tremie hose that was lowered to the bentonite seal. The installation of the grout displaced any standing water in the borehole. A permanent locking cover was installed with a cement pad, after the grout hardened.

Well 1S19

Coordinates: 1599, H'45
Ground Surface Elevation: 1154.6 (MSL)
Top of Casing Elevation: 1157.08 (MSL)
Geologic Log:

Till

0 - 9.5	Clay till. Gravelly clay with silt and sand. Brown, slightly moist. Very wet at 8ft. Grading to silty clay at 9.5 ft.
9.5 - 16'	Silty clay, dark grey.
16 - 17.5'	Clayey sand with fine gravel. Sand is medium to coarse.
17.5 - 26'	Gravelly clay. Some sand. Sand and gravel are composed of shale fragments. Some clayey sand at 17.5 (2" interval).
26 - 27'	Sand, medium. Rounded quartz grains.
27 - 29'	Clay till. Gravelly clay with sand. Sand and gravel composed of shale pieces.
29 - 35'	Sandy gravel, fine to coarse, angular fragements Took on drilling mud. Sediments are composed of sand and shale pieces. Water at 34 ft. Dry at 35 ft.

Bedrock

35 -	Bedrock gray sandstone, quartz grains, medium, rounded.

Specifications:

Well Completion:

Casing	0-29
Screened Int.	29-34
Aquifer:	interface
Sand Pack	27-34
Bentonite	24-27
Grout	0-24
Date Drilled:	3/3/86
Driller:	~~Empire Soils, Inc.~~ ATEC

EBS:ts
9081:EBSWLT

Well #D17

Coordinates: 1569, A49
Ground Surface Elevation: 1163.50 (MSL)
Top of Casing Elevation: 1164.01 (MSL)
Geologic Log:

Till

0 - 1.5'	Sandy clay with gravel. Brown roots, stems to 6". Gravel composed of shale fragment. Sand is fine grained. Very dry, tight. Sandier at 1.5 ft.
1.5 - 3.5'	Silty sand with gravel. Brown and fine sand, gravel- shale fragment, moist.
3.5 - 5.5'	Silty sand, fine. Very wet.
5.5 - 7.5'	Silty sand, gray, tight and wet. Gravel at 6 ft.
7.5 - 9.5'	Silty clay with fine sand, moist.
9.5 - 13'	Clay, gray, and moist.

Bedrock

13' - 18'	Weathered sandstone, gray and brown lenses, very wet. Grading to fresh sandstone, gray.

Specifications:

Casing	0-9'
Screened Interval:	9-14'
Aquifer:	upper bedrock
Sand pack:	7-14'
Bentonite:	5-7'
Grout:	0-5'
Date Drilled:	3/6/86
Driller	~~Empire Soils Inc.~~ ATEC

EBS:ts
9081:EBSWL2T

E: MONITOR WELL DRILLING LOGS

APPENDIX E

MONITORING WELL LOGS

CATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ▶ A-Shallow	LOCATION ▶ Ruetgers Nease, Salem Ohio
DATE ▶ 6/5/90	WEATHER ▶ Clear, Sunny
LOGGED BY ▶ DLF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4 IN. Hollow Stem Auger	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶ 1193.90 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

ASING ▶ TYPE DIAMETER LENGTH

WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.

HOLE DIA. 8.25 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT

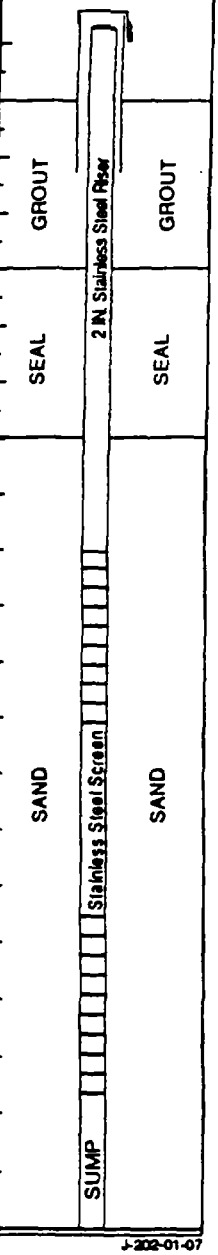
WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 21 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Damp		Med. to Soft	Non to Slight	1	0	0–1	2.0'	0, 3, 4, 5	Brown-reddish brown SILTY CLAY, going to reddish brown clay till with sand and gravel; mottled.
Damp		Stiff	Plast.	2	0	2–3	1.1'	5, 10, 18, 15	As above with less sand and gravel.
Damp		Stiff	Plast.	3	0	4–5	1.0'	5, 10, 13	As above.
Sat.	Poor	Stiff	Slight	4	0	6–7	1.5'	0, 4, 9, 13, 13	As above interbedded with medium brown very fine grain sand, with silt and clay.
Damp to Sat.	Poor	Stiff	Plast.	5	0	8–9	1.0'	5, 10, 14, 14	Medium brown Silty Sandy Clay till, as above, some cobbles.
Sat.	Poor	Stiff	Non.	6	>10	10–11	1.4'	8, 8, 12	SANDY SILTY clay till with 0.8 FT. saturated. Clay rich silty sand, fine grained but coarser at base.
Moist to Sat.	Poor	Stiff	Slight to Non	7	2	12–13	1.8'	12, 5, 10, 17, 15	Medium brown clay till. Very Sandy SILTY CLAY till.
Sat.	Poor	Very Loose		8	8.5	14–15	2.0'	0, 2, 4, 4	Medium gray Silty SAND, some clay, becomes very fine grain SAND with more clay at base.
Sat. to Wet		Loose to Stiff		9	3	16–17	1.7'	1, 4, 12, 11	Medium brown coarse grain silty SAND. Medium brown SILTY CLAY till.
Moist to Sat.		Soft		10	0	18–19	1.9'	0, 5, 5, 4	
						20–21		0, 0	Medium brown silty SAND, fine to very fine grain, some clay. End of Boring 21.0 FT.

GRAPHIC LOG

WELL COMPLETION



LOCATION MAP

ERM—MIDWEST WELL LOG

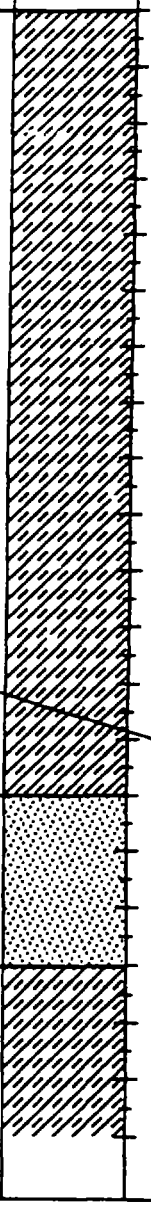
BORE NUMBER ▶ AUB	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 6/3/90	WEATHER ▶ Clear, Sunny
LOGGED BY ▶ DLF/RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA and Rotary: Air and Fluid	SAMPLING METHOD ▶ Split Spoon and NX-Wire Line
ELEVATION ▶ 1194.1 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE PVC DIAMETER 10 IN. LENGTH 45 FT. | WATER LEVEL INITIAL 29.19 FT. ☐ B.G.S. ■ B.M.P. | HOLE DIA. 5.25 IN.

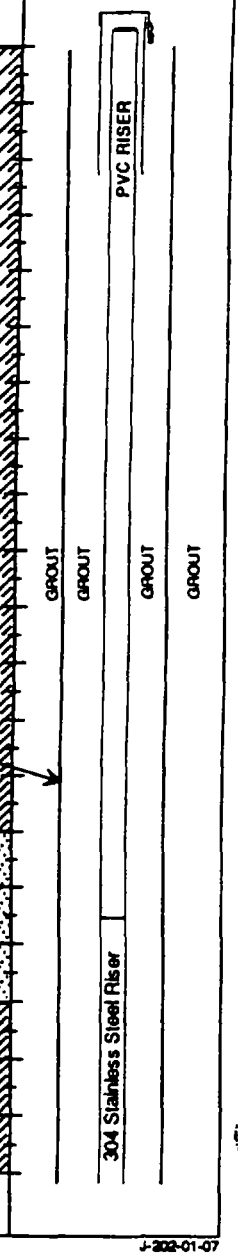
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 28.4 FT. H.M.P. 2.21 FT. | TOTAL DEPTH 58.8 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Damp		Med. to Soft	Non to Slight	1	0	0–2	2.0'	3, 4, 5	Brown-reddish brown SILTY CLAY, going to reddish brown clay till.
Damp		Stiff	Plast.	2	0	2–4	1.1'	5, 10, 18, 15	
Damp		Stiff	Plast.	3	0	4–6	1.0'	5, 10, 13	As above.
Sat.	Poor	Stiff	Slight	4	0	6–8	1.5'	0, 4, 9, 13, 13	As above interbedded with very fine grain sand, with silt and clay.
Damp to Sat.	Poor	Stiff	Plast.	5	0	8–10	1.0'	5, 10, 14, 14	Medium brown Silty Sandy Clay till, as above, some cobbles.
Sat.	Poor	Stiff	Non.	6	>10	10–12	1.4'	8, 8, 12, 12	
Moist to Sat.	Poor	Stiff	Slight to Non	7	2	12–14	1.8'	5, 10, 17, 15	Very Sandy SILTY CLAY till.
Sat.	Poor	Very Low		8	8.5	14–16	2.0'	2, 4, 4	Medium gray Silty SAND, some clay, becomes very fine grain SAND.
Sat. to Moist		Low to Stiff		9	3	16–18	1.7'	1, 4, 12, 11	Medium brown coarse grain silty SAND. Medium brown SILTY CLAY till.
Sat.		Stiff		10	0	18–20	1.9'	5, 5	

GRAPHIC LOG



WELL COMPLETION



BER ▶ AUB

ERM–MIDWEST WELL LOG

SF	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					20			
Mod.	Loose		11	2	21	1.5'	4, 4	Medium brown silty SAND, some clay.
					22		4	As above.
Poor	Loose		12	1	23	2.0'	4, 12	
					24		12, 6	Silty SANDY CLAY till. Medium brown silty SANDY CLAY, with some gravel.
	Stiff	Slight	13	0	25	1.3'	12, 12, 16	
					26		9	Interbedded silty SANDY CLAY till, with gravel and sand, fine to coarse grain.
	Stiff	Plast.	14	0.2	27	1.5'	11, 15, 14	
					28		6	No Recovery.
	Very Stiff		15		29	0'	12, 19, 20	
					30		4	Medium brown Silty SANDY CLAY gravel till.
	Stiff	Plast.	16	0	31	1.4'	8, 10, 12	
					32		6	Same as above.
	Stiff	Plast.	17	0	33	1.0'	7, 20, 40	
	Stiff to Very Stiff	Very Plast.	18	0	34		8	Medium brown Silty SANDY CLAY gravel till.
					35	1.4'	11, 16, 20	
					36		8	Medium brown Silty SANDY CLAY gravel till, much gravel, some gravels are poorly cemented sandstone.
	Stiff	Plast.	19	0.1	37	0.8'	9, 14, 19	
					38		5	As above, less gravel.
	Stiff	Plast.	20	0.1	39	1.5'	10, 10, 12	
					40		5	As above.
	Stiff	Plast.	21	0.1	41	0.2'	8, 9, 9	Base of 10 IN. PVC
					42		6	As above, some gravel.
	Stiff	Plast.	22	0.2	43	1.4'	9, 12, 15	
					44		100/63	
			23		45			Light gray SHALE

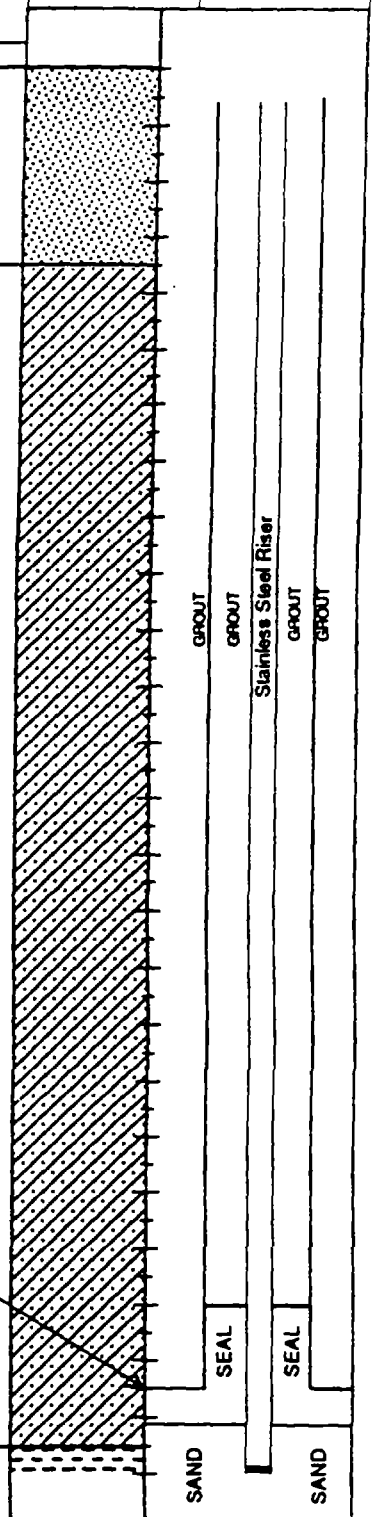
GRAPHIC LOG

WELL COMPLETION

GROUT GROUT Stainless Steel Riser GROUT GROUT

SEAL SEAL

SAND SAND

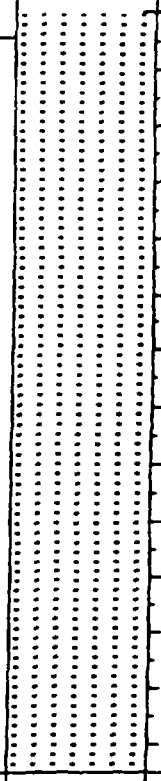


WELL NUMBER ▶ **AUB**

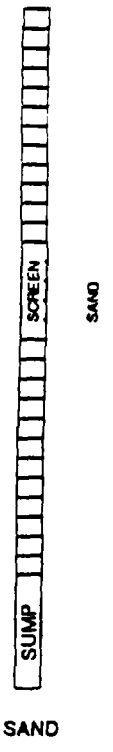
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry				24	OVA / Hnu	45			Medium-light gray SHALE
Wet				Core 1	0 / 0	46			Medium-dark gray silty SANDSTONE, fine grain-very fine grain, fractured.
						47	3.05'		
						48			R.Q.D. 0.7 FT.
Wet				Core 2		49			Silty SANDSTONE, as above.
						50			Fractured, fine-very fine grain clay in matrix.
Wet						51			Coarse SANDSTONE, light gray-white micaceous.
						52			
Dry / Wet					0 / 0	53	9.5'		
Dry						54			Silty SANDSTONE, fine-very fine grain, as above.
Wet						55			Coarse SANDSTONE, iron stained in places.
Dry						56			R.Q.D. 6.45 FT.
Wet						57			
						58			
						59			Total Depth 58.5 FT.
						60			
						61			
						62			
						63			
						64			
						65			
						66			
						67			
						68			
						69			
						70			

GRAPHIC LOG



WELL COMPLETION



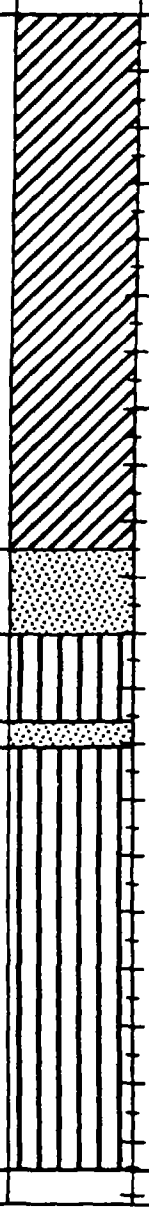
CATION MAP

ERM–MIDWEST WELL LOG

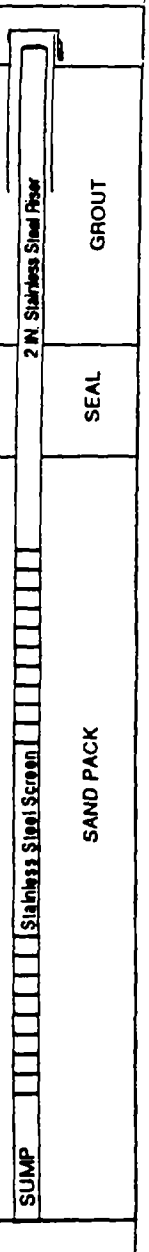
BORE NUMBER ▶ B-Shallow		LOCATION ▶ Ruetgers Nease, Salem Ohio	
DATE ▶ 6/02/90		WEATHER ▶ Overcast, Wind from the South	
LOGGED BY ▶ DLF		DRILLED BY ▶ Mathes	
DRILLING METHOD ▶ 4 1/4 Hollow Stem Auger		SAMPLING METHOD ▶ 24 IN. Split Spoon	
ELEVATION ▶ 1196.20 FT.	GRAVEL PACK ▶ #5 Sand	SEAL ▶ Bentonite	
CASING ▶ TYPE Stainless Steel DIAMETER 2 IN. LENGTH 10 FT.	WATER LEVEL INITIAL 9.95 FT. ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 8.25 IN.	
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT	WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 20.5 FT.	

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		1	Dark brown soil with roots; turning into reddish brown CLAY.
Moist		Very Soft	Plast.	1	0/0	1	1.9'	1	
								3	
						2		5	
								6	Reddish brown, silty, sandy CLAY with some fine gravel.
Moist		Stiff	Non	2	0/0	3	1.0'	12	
								13	
						4		13	
								6	Reddish brown-red, silty, sandy CLAY with few cobbles.
Damp		Stiff	Slight	3	0/0	5	1.1'	15	
								15	
						6		15	
								6	Brown, silty, sandy, gravel, CLAY till.
amp		Stiff	Non	4	0.1/0	7	2.0'	10	
								12	
						8		20	
								4	Till as above.
Damp to Wet		Stiff	Non	5	0.4/0	9	1.1'	9	
								8	
						10		6	Reddish brown SAND with silt and clay.
Damp to Sat.		Soft	Non	6	16/8.8	11	1.2'	3	Medium-dark brown, fine-very fine grain SAND.
								3	
						12		3	Brown SILTY till.
								5	
								4	
amp to Sat.		Med.	Plast.	7	0.2/0	13	1.7'	8	Brown, fine grain, SAND.
								7	Brown silty till.
						14		5	
								4	Brown, sandy, silty, CLAY, few fine gravels.
Damp		Med. to Stiff	Plast.	8	0/0	15	1.2'	5	
								8	
						16		8	
								6	Medium-dark brown, clayey, sandy, silty till, some gravel.
Damp		Stiff	Plast.	9	0/0	17	1.3'	9	
								15	
						18		14	
								4	As above, more large cobbles.
Dam		Stiff	Plast.	10	0/0	19	1.5'	10	
								12	
						20		10	
									End of Boring 20.5 FT.

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM–MIDWEST WELL LOG

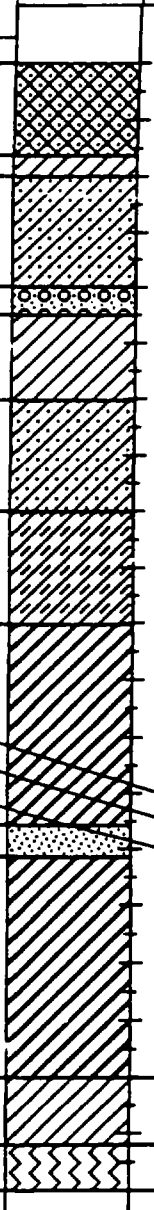
BORE NUMBER ▶ C-Lower Bedrock	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 6/26/90	WEATHER ▶ Clear, Warm
LOGGED BY ▶ RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA 4.25 to 31 FT. Rotary: Air and Fluid	SAMPLING METHOD ▶ NX-Wire Line Core
ELEVATION ▶ 1189.5 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE 8 IN. Steel 6 IN. Steel DIAMETER 8"/6" LENGTH 39.5"/105' | WATER LEVEL INITIAL ☐ B.G.S. ■ B.M.P. | HOLE DIA. 5 1/2 IN.

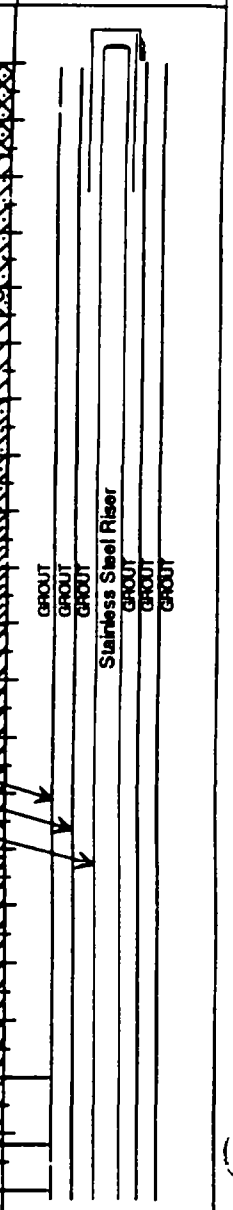
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. 2.3 FT. | TOTAL DEPTH 126.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry		Med.	Non	1	OVA/Hnu 0/0	0–1	0.5'	2, 9, 3	Red brown TOPSOIL, clayey.
						1–2		4	Blue CLAY, oxidized mottles.
Moist		Med.	Non	2	0.3/0.7	2–4	1.1'	3, 6, 7, 7	Brown-light gray SANDY CLAY, pebbles(oxidized).
						4–5		1	Brown SANDY GRAVEL, some clay
Very Moist		Low to Stiff	Non	3	0.1/0	5–6	1.35'	3, 6, 5	Brown CLAY, some pebbles, sandy.
Moist to Wet		Med.	Non	4	0/0	6–8	1.35'	1, 3, 3, 4	Silty SANDY CLAY, with brown pebbles. Medium to coarse sand and pebbles.
Moist		Stiff	Slight	5	0/02	8–10	1.6'	2, 2, 4, 5	Brown SILTY CLAY at top, grades into medium-dark gray SILTY CLAY. At base dark gray shale fragments.
Moist		Stiff	Mod.	6	0/0	10–12	1.5'	2, 4, 5, 5	Gray TILL, silty, some pebbles.
Moist to Wet		Stiff to Low	Mod. to Non	7	0/0	12–14	1.5'	0, 3, 4, 7	Becomes sandy. 8 IN. Steel, 6 IN. Steel, 2 IN. Riser. Medium coarse SAND.
Wet to Moist		Low to Stiff	Non to Mod.	8	0/0	14–16	1.5'	1, 1, 3, 4	Gray clay TILL, slightly silty, no pebbles.
Moist to Wet		Stiff	Mod.	9	0/0	16–18	1.9'	1, 1, 5, 4	Same, with medium-coarse sand zones
Wet to Very Moist		Low to Med.	Non to Mod.	10	0/0	18–20	1.75'	0, 1, 2, 3	Gray CLAY. CLAYEY SAND, very coarse(fine gravel).

GRAPHIC LOG



WELL COMPLETION

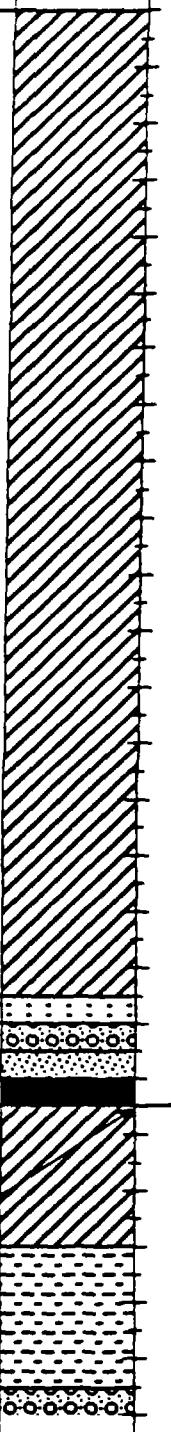


WELL NUMBER ▶ **C-Lower Bedrock**

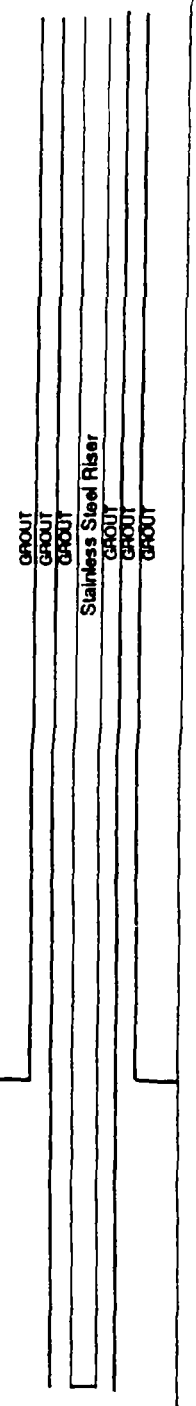
ERM—MIDWEST WELL LOG

Moisture	USCS	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Wet		Loose to Stiff	Non to Mod.	11	0/0	20–21	1.6'	2, 2, 4, 6	As above, CLAY TILL, pebbles.
Very Moist to Moist		Stiff	Mod.	12	0/0	22–23	1.35'	0, 2, 3, 5	Gray CLAY TILL
Moist		Stiff	Mod.	13	0/0	24–25	1.5'	1, 4, 5, 5	
Moist		Stiff	Mod.	14	0/0	26–27	1.7'	4, 3, 5, 7	
Moist		Stiff	Mod.	15	0/0	28–29	1.5'	1, 4, 5, 7	
Moist		Stiff	Mod.	16	0/0	30–31	2.0'	1, 3, 4, 6	
Moist		Stiff	Mod.	17	0/0	32–33	1.9'	0, 1, 3, 6	
Moist		Stiff	Mod.	18	0/0	34–35	1.25'	6, 8, 8, 8	Same as above, more sandy than silty, more pebbles, approximately 1 IN. sandstone pebbles.
Very Moist		Stiff to Low	Mod. to Non	19	0/0	36–37	1.55'	8, 8, 9	
Wet to Moist		Low	Non	20	0/0	38–39	1.3'	10, 6, 6, 50/2	Highly weathered, orange SANDSTONE(oxidized). Gray Silty SAND AND GRAVEL. Oxidized, orange SAND. COAL.
Dry				Core #1	0/0	40–41	1.3'		Under CLAY. R.Q.D. 0.5 FT. Base of 6 IN. PVC
Wet				Core #2	0/0	42–44	2.8'		1.45 FT. of highly fractured silty SHALE, medium gray. 0.7 FT. of moderately fractured silty SHALE as above.
						45			0.65 FT. of fine-medium grain SANDSTONE, oxidized in some places. R.Q.D. 0.87 FT.

GRAPHIC LOG



WELL COMPLETION



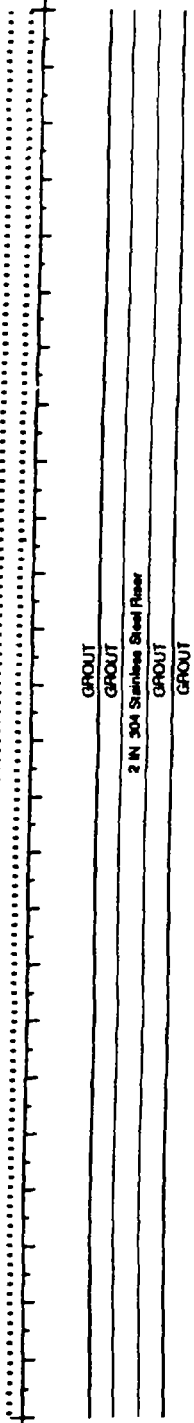
WELL NUMBER ▶ **C-Lower Bedrock**

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	45			Fine to medium grain SANDSTONE, oxidized in some places.
Wet					0	46			Fine to medium silty SANDSTONE.
				Core #3		47			Coarsed grained SANDSTONE, massive with some areas of distinct cross-bedding, medium-light gray, micaeous, trace of black organic debris(naturally occuring).
						48			
						49	7.0'		R.Q.D. 5.1 FT.
						50			
						51			
						52			
						53			
Wet						54			
					0	55			SANDSTONE, as above.
						56			
						57			
				Core #4		58	8.35'		R.Q.D. 5.5 FT.
						59			
						60			
						61			
						62			
						63			
Wet					0	64			SANDSTONE, as above.
						65			
				Core #5		66	4.9'		R.Q.D. 3.9 FT.
						67			
						68			
Wet					0	69	10.17'		SANDSTONE, as above.
				Core #6		70			

GRAPHIC LOG

WELL COMPLETION



MBER ▸ **C-Lower Bedrock**

ERM–MIDWEST WELL LOG

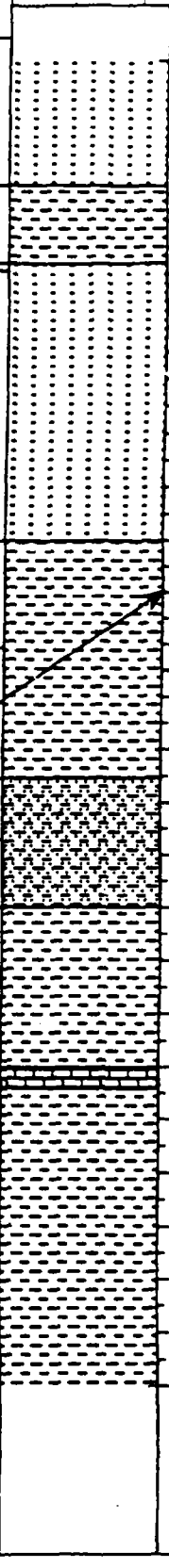
SC	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
				OVA/Hnu 0	70			Coarsed grained SANDSTONE, massive with some areas of distinct cross-bedding, medium-light gray, micaceous, trace of black organic debris(naturally occuring).		GROUT
					71					GROUT
					72					2 IN. 304 Stainless Steel Riser
					73					
					74			R.Q.D. 8.1 FT.		GROUT
					75					GROUT
					76					
					77					
					78					
			Core #7	0	79			SANDSTONE, as above.		
					80					
					81			R.Q.D. 8.42 FT.		
					82					
					83					
					84	10.02'				
					85					
					86					
					87					
					88					
					89					
			Core #8	0	90			SANDSTONE, as above, flaser bedding present, cross-bedding apparent, some pyrite associated with flaser beds.		
					91					
					92	10.05'		R.Q.D. 8.43 FT.		
					93					
					94					
					95					

WELL NUMBER ▶ C-Lower Bedrock

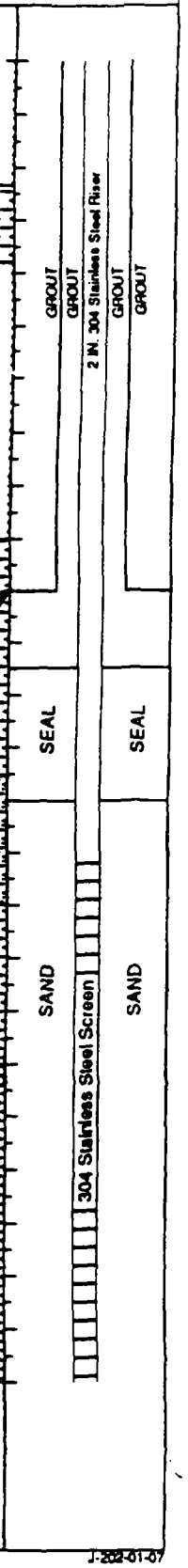
ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						95			SANDSTONE as above, coal stringers.
						96			
						97			
Damp						98			Black SHALE, massive.
						99			Fine grain silty SANDSTONE.
Wet				Core #9	0	100	7.3'		Coarse grain Medium-light gray SANDSTONE, flaser bedding, pyrite micaceous.
						101			R.Q.D. 3.8 FT.
						102			
						103			
						104			Light gray SHALE, clay SHALE laminar beds.
Damp						105			
						106			Same as above.
						107			
						108			Base of 6 IN. Steel
						109			Alternating wavy bedded, very fine grain sand and silty shale, medium-light gray, sand white.
Damp				Core #10	0	110	2.35'		R.Q.D. 1.6 FT.
Wet						111			Medium gray SHALE, highly fractured, some carbonate, cement in places.
Wet						112			
Damp						113			
Wet						114			Brown LIMESTONE, massive.
Damp						115			SHALE bedding.
Wet				Core #11	0	116			R.Q.D. 3.65 FT.
						117			
Damp						118			
						119			
						120			

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ C-Lower Bedrock

ERM–MIDWEST WELL LOG

CONTENT	SI	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
						120			SHALE bedding.		SAND / SUMP / SAND
						121					
				Core #12	0	122			Light gray silty SANDY SHALE, massive bedding, fractured, light-dark gray banding.		
						123	5.0'				
						124			R.Q.D. 2.2 FT.		SAND
						125					
						126					
						127			Total Depth 126.5 FT.		
						128					
						129					
						130					
						131					
						132					
						133					
						134					
						135					
						136					
						137					
						138					
						139					
						140					
						141					
						142					
						143					
						144					
						145					

LOCATION MAP

ERM–MIDWEST WELL LOG

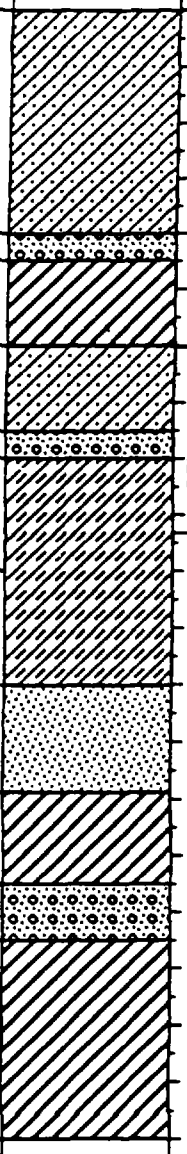
BORE NUMBER ▶ C-SHALLOW	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 6/29/90	WEATHER ▶ Hot, Clear
LOGGED BY ▶ RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4 In. Hollow Stem Auger	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶ 1189.6 FT.	GRAVEL PACK ▶ #5 Quartz Sand / SEAL ▶ Bentonite

CASING ▶ TYPE 304 Stainless Steel DIAMETER 2 IN. LENGTH | WATER LEVEL INITIAL 4.32 FT. ■ B.G.S. □ B.M.P. | HOLE DIA. 9.25 IN.

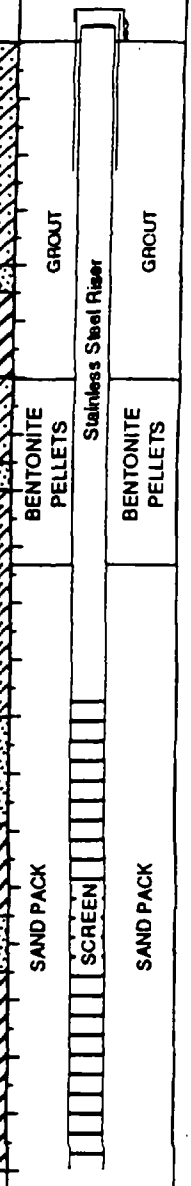
SCREEN ▶ TYPE 304 Stainless Steel SLOT DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 6.57 FT. H.M.P. 2.25 FT. | TOTAL DEPTH 24 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	0		2 9	Red brown Loam(clayey).
Dry		Mod.	Non	1	0 / 0	1	0.5'	3 4	Blue clay, oxidized mottles.
						2		3 6	Brown-light gray SANDY CLAY, pebbles(oxidized).
Moist		Mod.	Non	2	0-.3 / 0-7	3	1.1'	7 7	Light brown SANDY CLAY, pebbles.
						4		1	Brown SANDY GRAVEL, some clay.
Very Moist		Stiff	Non	3	0-.1 / 0	5	1.35'	3 5 5	Brown CLAY, some pebbles, sandy.
						6		1	
Moist to Wet		Mod.	Non	4	0 / 0	7	1.35'	3 3	Silty SANDY CLAY, brown pebbles.
						8		4	Medium coarse SAND and PEBBLES,clay.
Moist		Stiff	Non	5	0 / 0.2	9	1.6'	2 2 4 5	Brown SILTY CLAY grades into medium-dark SILTY CLAY.
						10			
Moist		Stiff	Mod.	6	0 / 0	11	1.5'	2 4 5	Gray TILL, silty, some pebbles.
						12		5	
Wet		Med.	Mod.	CS1	0 / 5.8	13	1.6'	3 5 6	Medium coarse SAND, silty some clay and pebbles.
						14		3	
Moist to Wet		Stiff	Plast.	CS2	0 / 5.8	15	1.75'	1 3 5	Gray CLAY pure.
						16		6	SAND and GRAVEL, as above.
Wet to Moist		Dense	Plast.	CS3	0 / 6.2	17	1.5'	0 2 3	Gray CLAY till, pure.
						18		4	Same.
Moist		Dense	Plast.	CS4	0 / 3.2	19	1.6'	2 4 5	
						20		6	

GRAPHIC LOG



WELL COMPLETION

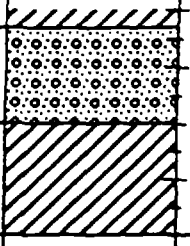


BER ▶ C-SHALLOW

ERM–MIDWEST WELL LOG

DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
			OVA/Hnu	20			
Stiff	Non	CS5	0/0	21	0.8'	1, 4, 4, 8	SAND and GRAVEL, some clay.
				22			
Stiff	Mod.	CS6	0/0	23	1.6'	4, 5, 6, 9	Gray CLAY till, slightly silty pebbles.
				24			TOTAL DEPTH 24 FT.
				25			
				26			
				27			
				28			
				29			
				30			
				31			
				32			
				33			
				34			
				35			
				36			
				37			
				38			
				39			
				40			
				41			
				42			
				43			
				44			
				45			

GRAPHIC LOG



WELL COMPLETION

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ▶ C-Upper Bedrock	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 6/28/90	WEATHER ▶ Warm, Overcast
LOGGED BY ▶ RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA Rotary, Air and Fluid	SAMPLING METHOD ▶ NX-Wireline Core
ELEVATION ▶ 1189.1 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

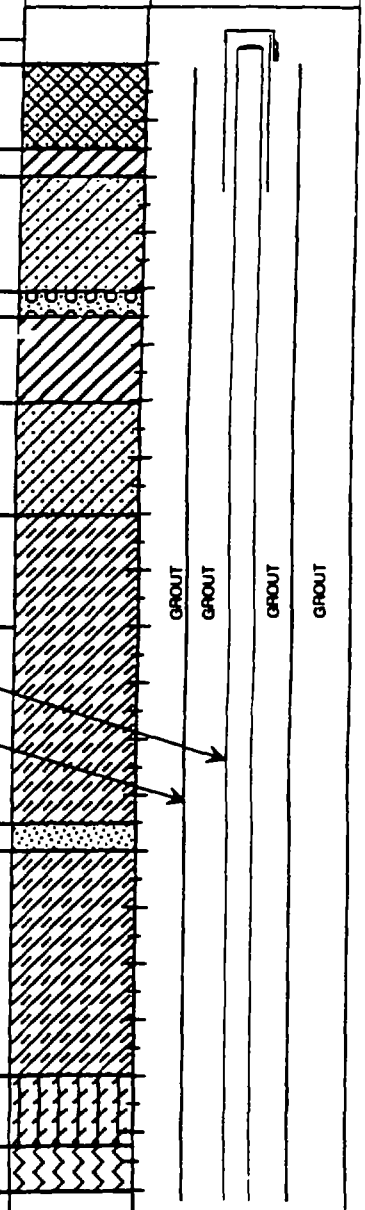
CASING ▶ TYPE Steel DIAMETER 8 IN. LENGTH 40 FT. | WATER LEVEL INITIAL 9.57 FT. ☐ B.G.S. ■ B.M.P. | HOLE DIA. 5.25 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 6.57 FT. H.M.P. 2.3 FT. | TOTAL DEPTH 56.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry		Med.	Non	1	OVA/Hnu 0/0	0–1	0.5'	2, 9, 3	Red brown TOPSOIL, clayey.
								4	Blue CLAY, oxidized mottles.
Moist		Med.	Non	2	0.3/0.7	2–3	1.1'	3, 6, 7, 7	Brown-light gray SANDY CLAY, pebbles (oxidized).
						4		1	Brown SANDY GRAVEL, some clay.
Very Moist		Low to Stiff	Non	3	0.1/0	5	1.35'	3, 6, 5	Brown CLAY, some pebbles, sandy.
Moist to Wet		Med.	Non	4	0/0	6–7	1.35'	1, 3, 3, 4	Brown silty SANDY CLAY, with pebbles. Medium to coarse sand and pebbles.
Moist		Stiff	Slight	5	0/02	8–9	1.6'	2, 2, 4, 5	Brown SILTY CLAY at top, grades into medium-dark gray SILTY CLAY. At base dark gray shale fragments.
Moist		Stiff	Mod.	6	0/0	10–11	1.5'	2, 4, 5	Gray TILL, silty, some pebbles.
Moist to Wet		Stiff to Low	Mod. to Non	7	0/0	12–13	1.5'	5, 0, 3, 4	Becomes sandy.
								7	Medium coarse SAND.
Wet to Moist		Low to Stiff	Non to Mod.	8	0/0	14–15	1.5'	1, 1, 3, 4	Gray clay TILL, slightly silty, no pebbles. Same, with medium-coarse sand zone.
Moist to Wet		Stiff	Mod.	9	0/0	16–17	1.9'	1, 1, 5, 4	
Wet to Very Moist		Low to Med.	Non to Mod.	10	0/0	18–19	1.75'	0, 1, 2	Gray CLAY. TILL.
								3	CLAYEY SAND, very coarse(fine gravel).

GRAPHIC LOG

WELL COMPLETION

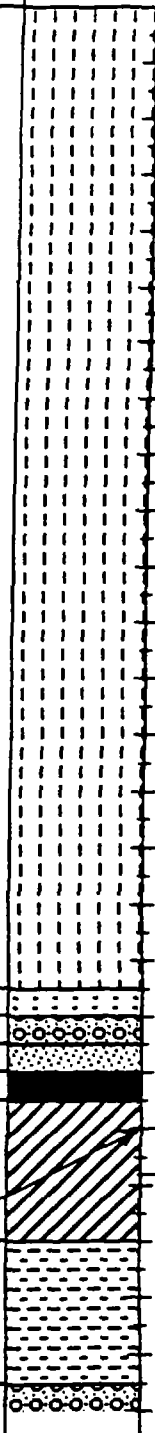


WELL NUMBER ▶ C-Upper Bedrock

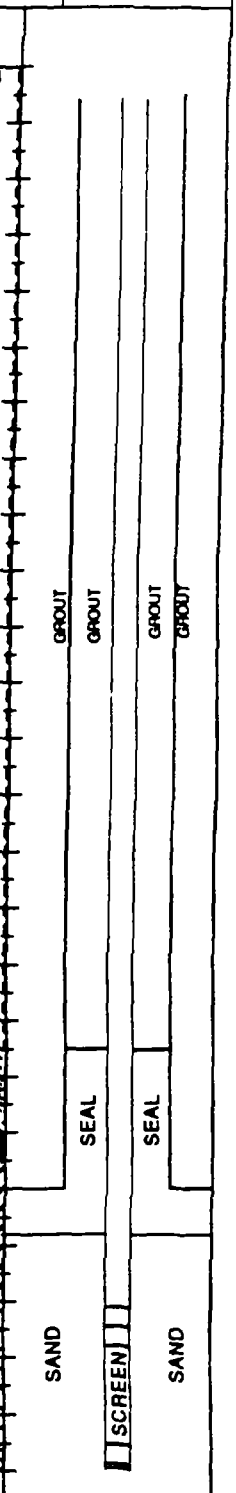
ERM–MIDWEST WELL LOG

CONTENT	SI	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Wet to Moist		Low to Stiff	Non to Mod.	11	0/0	20–21	1.6'	2, 2, 4, 6	As above, CLAY TILL, pebbles.
Very Moist to Moist		Stiff	Mod.	12	0/0	22–23	1.35'	0, 2, 3, 5	Gray CLAY TILL
Moist		Stiff	Mod.	13	0/0	24–25	1.5'	1, 4, 5, 5	
Moist		Stiff	Mod.	14	0/0	26–27	1.7'	4, 3, 5, 7	
Moist		Stiff	Mod.	15	0/0	28–29	1.5'	1, 4, 5, 7	
Moist		Stiff	Mod.	16	0/0	30–31	2.0'	1, 3, 4, 6	
Moist		Stiff	Mod.	17	0/0	32–33	1.9'	0, 1, 3, 6	
Moist		Stiff	Mod.	18	0/0	34–35	1.25'	6, 8, 8, 8	Same as above, more sandy than silty, more pebbles, approximately 1 IN. sandstone pebbles.
Very Moist		Stiff to Low	Mod. to Non	19	0/0	36–37	1.55'	8, 8, 9	
Wet to Moist		Low	Non	20	0/0	38–39	1.3'	10, 6, 6, 50/2	Highly weathered, orange SANDSTONE(oxidized). Gray Silty SAND AND GRAVEL. Oxidized, orange SAND. COAL.
Damp				Core #1	0/0	40–41	1.3'		Under CLAY. R.Q.D. 0.5 FT. Base of 8 IN. PVC
Wet				Core #2	0/0	42–44	2.8'		1.45 FT. of highly fractured silty SHALE, medium gray. 0.7 FT. of moderately fractured silty SHALE as above. R.Q.D. 0.87 FT.
						45			0.65 FT. of fine-medium grain SANDSTONE, oxidized in some places.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ **C-Upper Bedrock**

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA / Hnu	45			Fine to medium grain SANDSTONE, oxidized in some places.		
Wet					0	46			Fine to medium silty SANDSTONE.		
						47			Coarsed grained SANDSTONE, massive with some areas of distinct cross-bedding, medium-light gray, micaeous, trace of black organicdebris(naturally occuring).		
						48					
				Core #3		49	7.0'		R.Q.D. 5.1 FT.		SAND / SCREEN / SUMP / SAND
						50					
						51					
						52					
						53					
						54					
Wet					0	55			SANDSTONE, as above.		
						56					
						57			Total Depth 56.5 FT.		
						58					
						59					
						60					
						61					
						62					
						63					
						64					
						65					
						66					
						67					
						68					
						69					
						70					

CATION MAP

ERM–MIDWEST WELL LOG

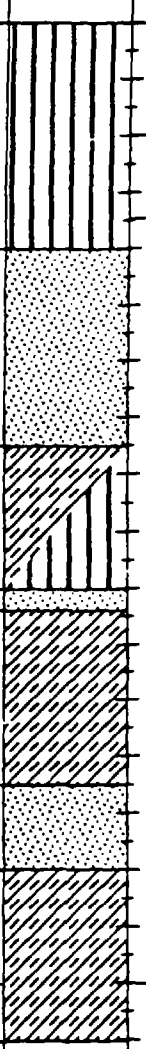
BORE NUMBER ▶ D-VF2	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 7/01/90	WEATHER ▶ Partly Cloudy, 65F.
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4 Hollow Stem Auger	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1137.10 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE 304 Stainless Steel DIAMETER 2 IN. LENGTH 4.5 FT. | WATER LEVEL INITIAL ☐ B.G.S. ■ B.M.P. | HOLE DIA. 8.25 IN.

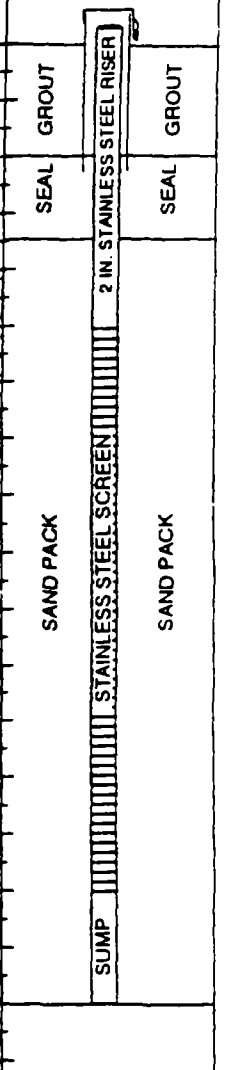
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. 2.21 FT. | TOTAL DEPTH 17 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	Well	Soft	Non	1	OVA/Hnu 5.0/0	0–1	0.3'	1, 3, 2, 2	Medium brown SILT with some clay, wood fragments and roots.
Very Moist to Wet	Mod.	Soft	Non	2	9.5/0	2–3	0.8'	2, 2, 2, 3	Brown-orange brown (rust) SILT with some clay and gray mottles, becomes wetter and sandier with depth (fine sand).
Wet	Mod.	Soft	Non	3	5.0/0	4–5	0.9'	1, 1, 1, 9	Gray SAND, fine to medium grain with minor clay, some rock fragments at bottom.
Wet	Mod.	Soft	Non	4	1.0/0	6–7	1.5'	8, 9, 9	Gray SAND, silt, wet, fine to medium grain.
Dry to Wet	Mod.	Stiff	Slight	5	0/0	8–9	1.0'	14, 9, 20, 20, 25	Gray SILT and SILTY CLAY, alternating.
Wet to Dry	Poor	Soft	Slight	6	0.8/0	10–11	1.2'	7, 8, 8, 10	Gray, fine to coarse SAND, wet. Gray SILTY CLAY(till), dry with small pebbles.
Damp to Wet	Poor	Stiff	Non	7	0/0	12–13	1.6'	12, 20, 11	Progressively becomes wet silt with depth.
Wet to Dry	Poor	Stiff	Slight	8	1.0/0	14–15	2.0'	10, 6, 15, 20, 20	Gray SAND, fine to coarse grain, wet. Gray SILTY CLAY(till), dry with some wet silt stringers throughout, some till is red.
Dry to Very Moist	Mod.	Hard	Slight	9	0/0	16–17	1.5'	-, 20, 40, 37	Grades into dry gray till.
						18			End of Boring 20.5 FT.
						19			
						20			

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ▶ D-VF3	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 7/10/90, 7/13/90	WEATHER ▶ Partly Cloudy, 75F.
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ Hollow Stem Auger	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1137.00 FT.	GRAVEL PACK ▶ #5 Sand
	SEAL ▶ Bentonite

CASING ▶ TYPE PVC\S.S. DIAMETER 10"\2" LENGTH 19'\22'

WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.

HOLE DIA. 8.25 IN.

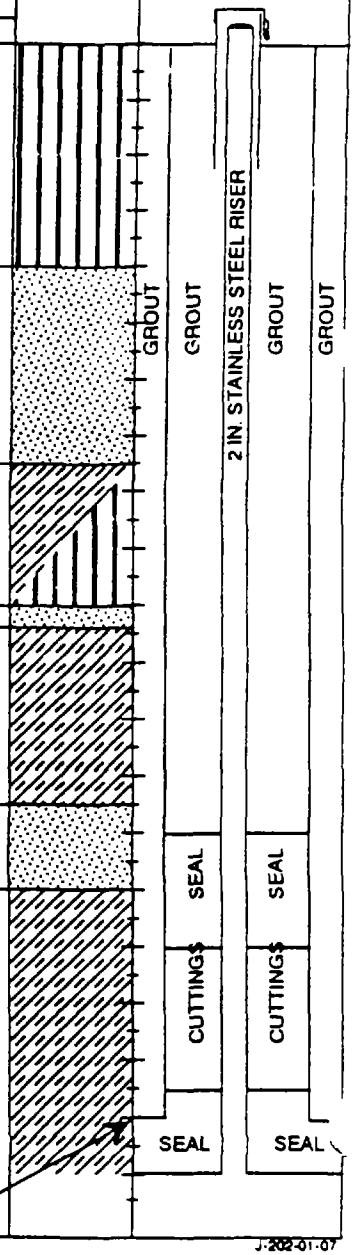
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 5 FT.

WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 29 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	Well	Soft	Non	1	OVA/Hnu 5.0/0	0–1	0.3'	1, 3, 2, 2	Medium brown SILT with some clay, wood fragments and roots.
Very Moist to Wet	Mod.	Soft	Non	2	9.5/0	2–3	0.8'	2, 2, 2, 3	Brown-orange brown(rust) SILT with some clay and gray mottles, becomes wetter and sandier with depth (fine sand).
Wet	Mod.	Soft	Non	3	5.0/0	4–5	0.9'	1, 1, 1	Gray SAND, fine to medium grain with minor clay, some rock fragments at bottom.
Wet	Mod.	Soft	Non	4	1.0/0	6–7	1.5'	9, 8, 9, 9	Gray SAND, silt, wet, fine to medium grain.
Dry to Wet	Mod.	Stiff	Slight	5	0/0	8–9	1.0'	14, 9, 20, 20, 25	Gray SILT and SILTY CLAY, alternating.
Wet to Dry	Poor	Soft	Slight	6	0.8/0	10–11	1.2'	7, 8, 8, 10	Gray, fine to coarse SAND, wet. Gray SILTY CLAY(till), dry with small pebbles.
Damp to Wet	Poor	Stiff	Non	7	0/0	12–13	1.6'	12, 20, 11	Progressively becomes wet silt with depth.
Wet to Dry	Poor	Stiff	Slight	8	1.0/0	14–15	2.0'	10, 6, 15, 20, 20	Gray SAND, fine to coarse grain, wet. Gray SILTY CLAY(till), dry with some wet silt stringers throughout, some till is red.
Dry to Very Moist	Mod.	Hard	Slight	9	1.2/0	16–17	1.25'	-, 20, 35, 40	Gray to red SILT and till, grades into SILTY CLAY (till), damp to dry with some gravels.
Wet to Dry	Mod.	Hard	Non	10	2.5/0	18–19	1.5'	7, 30, 30, 30	Top 1.5 IN. gray SILT and sand, fine to medium grain, wet, underlain by gray till, dry with some rock fragments, bottom 2 IN. gray sand, fine to medium grain, wet.

Base of 10 IN. PVC Casing.

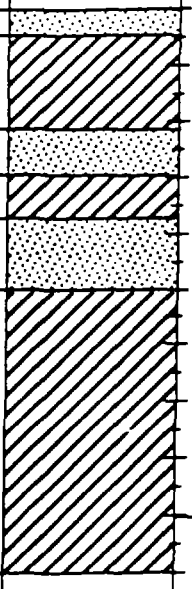


WELL NUMBER ▶ D-VF3

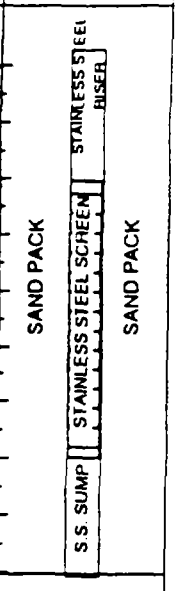
ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	20		14	Top 3 IN. gray SAND., fine to medium grain, wet.
Wet to Dry	Mod.	Stiff	Slight	11	0.1/0.4	21	1.3'	15	
								20	Gray TILL, dry, with some rock rock fragments.
								30	
						22		16	
Wet to Dry	Poor	Very Stiff	Slight	12	0.4/0.2	23	1.6'	25	8 IN. gray SAND, wet, fine to coarse grain.
								25	7 IN. gray TILL with some fine sand, dry.
								30	
						24		15	Bottom 2 IN. gray SAND, fine to coarse grain, becomes coarser with depth to small gravel.
Wet to Dry	Poor	Very Stiff	Non	13	2.0/0.4	25	1.4'	20	
								45	Gray TILL, dry, several minor silt seams.
								25	
						26		40	
								45	Same, with some rock fragments, very tight (silt seams are damp to wet).
Dry	-	Hard	Non	14	0.3/0	27	1.25'	20	
								50	
						28		45	Gray till, very tight with gravels.
								50	
Dry	-	Hard	Non	15	0.4/0.2	29	1.2'	50	
								50	
						30			End of Boring 30.0 FT.
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			
						41			
						42			
						43			
						44			
						45			

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ► D-Lower Bedrock	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 7/10/90, 7/13/90	WEATHER ► Partly Cloudy, 75F.
LOGGED BY ► JDK	DRILLED BY ► Mathes
DRILLING METHOD ► Hollow Stem Auger and 5 1/2 IN. Roller Cone	SAMPLING METHOD ► 24 IN. Split Spoon and NX-Convential Core
ELEVATION ► 1137.00 FT.	GRAVEL PACK ► #5 Sand / SEAL ► Bentonite

CASING ► TYPE PVC / Steel DIAMETER 10 IN. / 6 IN. LENGTH 19 FT. / 46.5 FT.

WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.

HOLE DIA. 5.5 IN.

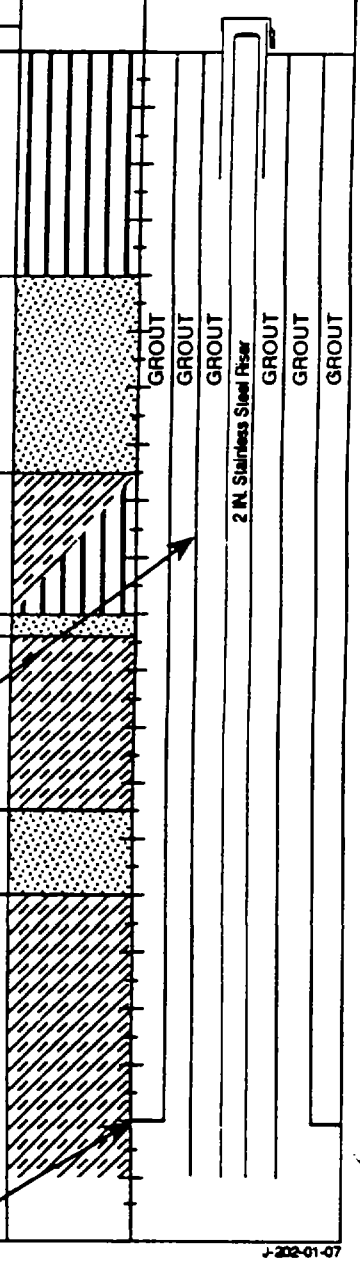
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT.

WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 61 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	Well	Soft	Non	1	OVA/Hnu 5.0/0	0–1	0.3'	31, 23, 2, 2	Medium brown SILT with some clay, wood fragments and roots.
Very Moist to Wet	Mod.	Soft	Non	2	9.5/0	2–3	0.8'	2, 2, 2, 3	Brown-orange brown (rust) SILT with some clay and gray mottles, becomes wetter and sandier with depth (fine sand).
Wet	Mod.	Soft	Non	3	5.0/0	4–5	0.9'	1, 1, 1, 9	Gray SAND, fine to medium grain with minor clay, some rock fragments at bottom.
Wet	Mod.	Soft	Non	4	1.0/0	6–7	1.5'	8, 9, 9	Gray SAND, silt, wet, fine to medium grain.
Dry to Wet	Mod.	Stiff	Slight	5	0/0	8–9	1.0'	14, 9, 20, 20, 25	Gray SILT and SILTY CLAY, alternating.
Wet to Dry	Poor	Soft	Slight	6	0.8/0	10–11	1.2'	7, 8, 8, 10	Gray, fine to coarse SAND, wet. Gray SILTY CLAY(till), dry with small pebbles. 6 IN. Steel Casing
Damp to Wet	Poor	Stiff	Non	7	0/0	12–13	1.6'	12, 20, 11	Progressively becomes wet silt with depth.
Wet to Dry	Poor	Stiff	Slight	8	1.0/0	14–15	2.0'	10, 6, 15	Gray SAND, fine to coarse grain, wet.
Dry to Very Moist	Mod.	Hard	Slight	9	1.2/0	16–17	1.25'	20, 20, - , 20, 35, 40	Gray SILTY CLAY(till), dry with some wet silt stringers throughout, some till is red. Gray to red SILT and till, grades into SILTY CLAY (till), damp to dry with some gravels.
Wet to Dry	Mod.	Hard	Non	10	2.5/0	18–19	1.5'	7, 30, 30, 30	Top 1.5 IN. gray SILT and sand, fine to medium grain, wet, underlain by gray till, dry with some rock fragments, bottom 2 IN. gray sand, fine to medium grain, wet. Base of 10 IN. PVC Casing.

GRAPHIC LOG / WELL COMPLETION

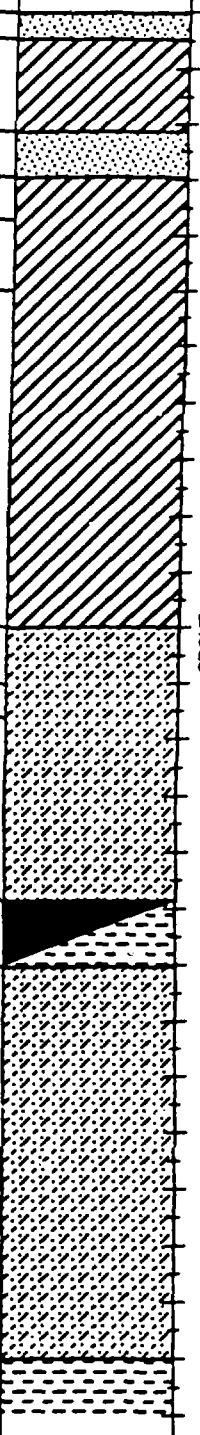


WELL NUMBER ▶ D-Lower Bedrock

ERM—MIDWEST WELL LOG

CONTENT	S	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	20		14	Top 3 IN. gray SAND., fine to medium grain, wet.
Wet to Dry	Mod.	Stiff	Slight	11	0.1 / 0.4	21	1.3'	15, 20, 30	Gray till, dry, with some rock rock fragments.
						22		16	8 IN. gray SAND, wet, fine to coarse grain.
Wet to Dry	Poor	Very Stiff	Slight	12	0.4 / 0.2	23	1.6'	26, 26	7 IN. gray till with some fine sand, dry.
						24		30, 15	Bottom 2 IN. gray sand, fine to coarse grain, becomes coarser with depth to small gravel.
Wet to Dry	Poor	Very Stiff	Non	13	2.0 / 0.4	25	1.4'	20, 45	Gray till, dry, several minor silt seams.
						26		25, 40	Same, with some rock fragments, very tight (silt seams are damp to wet).
Dry	-	Hard	Non	14	0.3 / 0	27	1.25'	45, 20	
						28		50, 45	Gray till, very tight with gravels.
Dry	-	Hard	Non	15	0.4 / 0.2	29	1.2'	50, 50	
						30		50, 17	
Dry to Wet	-	Hard	Non	16	0.4 / 0.2	31	1.6'	35, 45	Gray-brown till. Gray-brown SILT, wet with a thin sand lense, fine to coarse grain.
Very Moist to Dry	-	Hard	Non	17	0 / 0.2	32	0.75'	50, 30, 110/4	SILTY till with some fine sand.
Dry Very Moist to Damp	Poor	Hard	Non	18	0.2 / 0	33	0.8'	50, 110/4	Gray-brown CLAYEY sand, fine to medium coal fragments, some oxidation.
						34		50, 100	Same, but with oxidized sandstone fragments.
	Poor	Hard	Non	19	0.2 / 0	35	1.25'	110/4, -	Black shale bottom.
Very Moist	-	Hard	Non	20	0.6	36	0.25'	70, 110/5	Black SHALE/COAL.
Dry to Wet	Poor	Hard	Non	21	1.0	37	0.8'	100, 110/5	Top 7 IN. gray till as above, underlain by rock fragments. Orange, fine grain sand at very bottom, sandstone fragments, micacious.
Moist to Dry	-	Hard	Non	22 / 23	0.6 / 10	38	0.4'	110/5, 100	
						39	0.1'	100, 110/5	Gray till with black rock fragments and orange sandstone fragments.
Dry to Moist	Poor	Hard	Non	24	1.0	40	0.5'	16, 110/4	Gray till with gravels and rock fragments, as above.
Dry to Moist	Poor	Hard	Non	25 / 26		41	0.3'	120/5	Till.
							0.08'	150/2	Till, rock fragments.
Dry	Poor	Hard	Non	27	1.0	42	0.6'	130, 110/3	Gray till with sandstone fragments.
Dry	Poor	Hard	Non	28	0.0	43	0.3'	120/5	Sams as above.
Dry	Poor	Hard	Non	29	0.0	44	0.5'	20	Till with bottom 2.5 IN. black shale.
								16	Bedrock.
						45		30	Black weathered shale with bedding planes.

GRAPHIC LOG



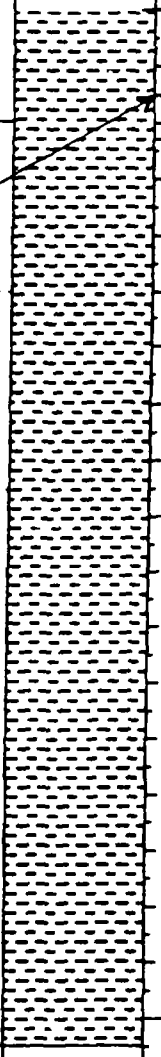
WELL COMPLETION: GROUT, GROUT, STAINLESS STEEL RISER, GROUT, GROUT

WELL NUMBER ▶ **D-Lower Bedrock**

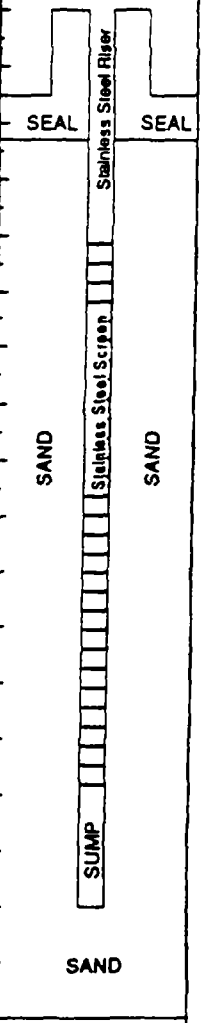
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	-	Hard	Slight	22	0	45	0.75'	80 / 110/5	Black weathered SHALE with bedding planes.
Dry	-	Hard	Slight	23	0	46	0.42'	150/3 / 112/2	Not as weathered.
				Run 1 (47 - 49 FT.)	0	47	0.4'		Black SHALE. Recover 1 IN. R.Q.D. = 0.0
						48			**Base of 6 IN. Steel Casing.**
Dry on fresh cracks				Run 2 (49 - 58.5 FT.)		49			R.Q.D. = 19 IN. Recover 7.5/9.5 FT.
						50			This black shale appears to grade into a somewhat dark gray SHALE, underlain with some woody material, soft, weathered.
						51			
						52			
						53			
					0	54			Grades into a greenish-gray SHALE which becomes very crumbled with depth, harder than the SHALE between 50 and 53.5 FT.
						55			
						56			
						57			
						58			
Dry, fractured				Run 3 (58.5 - 63.5 FT.)		59			Recover approximately 2 IN. R.Q.D.=0.0 Broken up gray SHALE, hard. Bottom 2 IN. softer SHALE.
						60			
					0	61			
						62			
						63			
						64			End Of Boring 63.5 FT.
						65			
						66			
						67			
						68			
						69			
						70			

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM—MIDWEST WELL LOG

BORE NUMBER ► E-VF1	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/03/90	WEATHER ► Partly Cloudy, 50F.
LOGGED BY ► JDK	DRILLED BY ► Mathes
DRILLING METHOD ► 4 1/4 Hollow Stem Auger	SAMPLING METHOD ► 24 IN. Split Spoon
ELEVATION ► 1146.70 FT.	GRAVEL PACK ► #5 Sand / SEAL ► Bentonite

CASING ► TYPE 304 Stainless Steel DIAMETER 2 IN. LENGTH 6 FT. | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 5 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 14 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry to Moist		Soft	Slight	1	OVA/Hnu 0/0	0–1	1.4'	3, 3, 5, 3	Medium brown SILTY CLAY with very fine sand, minor roots.
Dry		Soft	Non	2	0/0	2–3	2.0'	4, 10, 15, 15	Orange-brown SILTY CLAY with fine sand, minor gravel and rock fragments.
Very Mo	Poor	Soft	Slight	3	0/0	4–5	1.3'	4, 8, 8	Brown, fine to medium grain SAND with some gravels. Very moist.
Dry to Wet	Mod.	Soft	Non	4	0/0	6–7	1.3'	7, 6, 10, 10	Orange-brown SILTY CLAY with gray mottles.
Sat.	Poor	Soft	Non	5	0/0	8–9	1.6'	6, 3, 5, 8, 8	Brown fine to medium grain SAND, minor gravels. Brown fine-coarse grain SAND with small gravels.
Dry		Soft	Very	6	0/0	10–11	0.9'	3, 5, 7	Bottom 1 IN. orange-brown SILTY CLAY plug. Gray CLAY, very plastic, minor SILT.
Dry		Soft	Slight	7	0/0	12–13	1.5'	10, 8, 10, 10, 12	Same as above.
						14			End of Boring 14.0 FT.

GRAPHIC LOG

WELL COMPLETION: GROUT; SEAL; SAND PACK; 2 IN STAINLESS STEEL RISER; STAINLESS STEEL SCREEN; SUMP

LOCATION MAP

ERM–MIDWEST WELL LOG

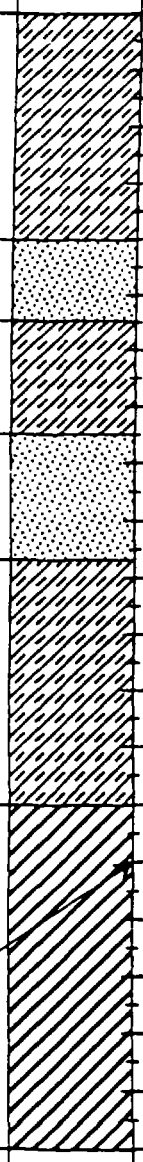
BORE NUMBER ▶ E-VF2	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 7/17, 7/24/90	WEATHER ▶ Partly Cloudy, 83F
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA and 5 1/2 IN. Roller Cone	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1146.50 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE PVC/S.S. DIAMETER 10"/2" LENGTH 15'/19' | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

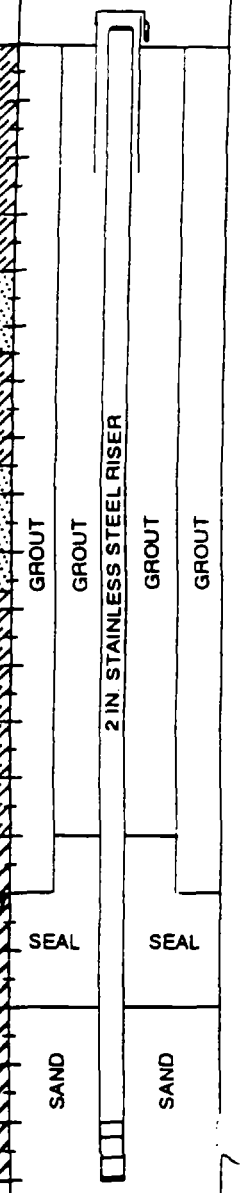
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.010 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 31 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry to Moist		Soft	Slight	1	OVA/Hnu 0/0	0–1	1.4'	3, 3, 5, 3	Medium brown SILTY CLAY with very fine sand, minor roots.
Dry		Soft	Non	2	0/0	2–3	2.0'	4, 10, 15, 15	Orange-brown SILTY CLAY with fine sand, minor gravel and rock fragments.
Very Moist	Poor	Soft	Slight	3	0/0	4–5	1.3'	4, 8, 8	Brown, fine to medium grain SAND with some gravels. Very moist.
Dry to Wet	Mod.	Soft	Non	4	0/0	6–7	1.3'	7, 6, 10, 10	Orange-brown SILTY CLAY with gray mottles.
Sat.	Poor	Soft	Non	5	0/0	8–9	1.6'	6, 3, 5, 8	Brown fine to medium grain SAND, minor gravels. Brown fine-coarse grain SAND with small gravels.
Dry		Soft	Very	6	0/0	10–11	0.9'	8, 3, 5, 7	Bottom 1 IN. orange-brown SILTY CLAY plug. Gray CLAY, very plastic, minor SILT.
Damp to Wet		Soft	Slight	7	0/0	12–13	1.5'	10, 8, 10, 10, 12	Same as above.
Dry	-	Soft	Very	8	0/0	14–15	1.3'	4, 8, 8, 10	Medium dark gray CLAY with very minor silt, stiff and plastic.
Dry	-	Soft	Slight	9	0/0	16–17	1.2'	1, 2, 8, 10	Same, bottom 4 IN. is siltier. **Base of 10 IN. PVC Casing**
Dry	-	Soft	Very	10	0/0	18–19	0.8'	4, 4, 8, 12	Medium dark gray CLAY with very minor silt, stiff and plastic.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ K-VF4

ERM–MIDWEST WELL LOG

CONTENT	SC	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		6, 8, 13, 19	Gray SAND AND GRAVEL.
Wet	Mod.	Soft	Non	11	0/0	21	0.3'		
						22		4, 7, 9, 11	Gray SILT with some very fine sand.
Wet	Well	Soft	Non	12	0/0	23	1.1'		
						24		8, 13, 8, 7	SILT with gravel sized material, poorly sorted.
Wet	Poor	Soft	Non	13	0/0	25	0.3'		
						26		4, 5, 12, 18	Gray SILTY CLAY, some very fine sand.
Damp	-	Soft	Slight	14	0/0	27	0.75'		
						28		20, 30, 20, 12	Same, bottom 1.5 FT. fine sand with some gravel. **Base of 10 IN. PVC Casing.**
Damp	-	Hard	Non	15	0/.	29	1.0'		
						30		6, 9, 2, 8	Gray SAND, fine to coarse grain, with some gravel.
Wet	Mod.	Soft	Non	16	0.2	31	2.0'		
						32		9, 25, 25, 30, 10	Gray SILTY CLAY. Gray SILTY CLAY with some gravels. 1.5 IN. buff/yellow sandstone fragments within sample (fine grain).
Moist to very moist	-	Hard	Slight	17	OVA 0.0	33	1.25'		
						34		14, 31, 61	Grades into SILT. Rock fragments bottom 2 IN.
Wet to moist	-	Hard	Non	18	0/0	35	1.25'		
						36		45, 60/4	SILTY CLAY with some rock fragments.
Wet	Good	Hard	Non	19	0/0		0.7'		Gray SAND, fine to medium grain, some gravel.
						37		45, 39	
Wet	Mod.	Hard	Non	20	0/0		1.0'		
						38		42, 55, 100/5	Gray CLAYEY SAND with rock fragments. Gray SILTY CLAY (till) with some sand and rock fragments.
Dry	-	Hard	Non	21	0/0.2	39	1.4'		
						40		55, 57, 100/4	Same, but with a 2.5 IN. rock fragments layer.
Dry	-	Hard	Non	22	0/0.2	41	0.8'		
						42		20, 30, 67, 85	Same, grades to a black SILTY CLAY then coal.
Dry	-	Hard	Non	23	0/0.2	43	1.25'		
						44		36, 26, 45, 75/2	Bedrock. COAL, very fractured and broke-up. Gray CLAY.
Dry	-	Hard	Non	24	0/0	45	1.0'		
						46			End of Boring 46.0 FT.

GRAPHIC LOG

WELL COMPLETION: GROUT; GROUT; 2 IN. STAINLESS STEEL RISER; GROUT; GROUT; SEAL; SEAL; SAND; STAINLESS STEEL SCREEN; SAND; SUMP; BENTONITE AND SAND; BENTONITE

LOCATION MAP

ERM—MIDWEST WELL LOG

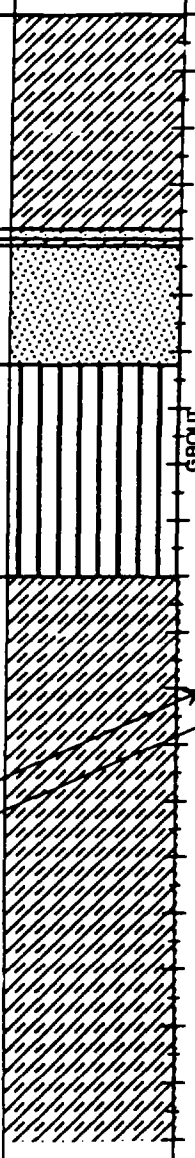
BORE NUMBER ▶ K-Lower Bedrock	LOCATION ▶ Ruetgers Nease, Salem, Ohio
DATE ▶ 6/01/90	WEATHER ▶ Clear, Warm
LOGGED BY ▶ DLF/RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4 IN. Hollow Stem Auger and Rotary: Air and Fluid	SAMPLING METHOD ▶ Split Spoon and NX-wire Core
ELEVATION ▶ 1140 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE 10 IN. PVC 8 IN. Steel DIAMETER 10 IN./8 IN. LENGTH 21 FT./43 FT. | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 7 7/8 IN.

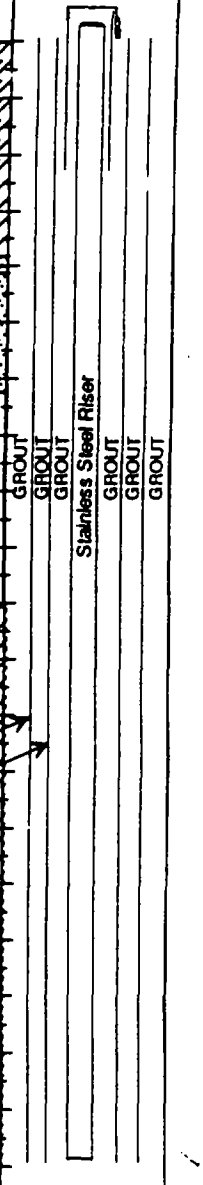
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 70.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	0		2	
Damp	-	Soft	Very	1	0 / 0	1	1.5'	2	Orange to medium brown SILTY CLAY, some gray mottling, roots
								2	
								4	
						2		1	
Very Moist	-	Soft	Very	2	0 / 0	3	1.0'	3	Same with fine sand and orange/rust stained.
								3	
								3	Gray CLAYEY SAND fine grain.
						4		1	Gray SILTY CLAY.
Wet	Poor	Soft	Non	3	0 / 0	5	1.5'	3	Medium brown SAND, fine to medium grain, with rock fragments.
								6	
						6		6	
								2	Grades into gray SILT
Wet	Mod.	Soft	Non	4	0 / 0	7	1.5'	4	
								8	
						8		10	
								8	Same as above.
Wet	Good	Soft	Non	5	0 / 0	9	1.6'	10	
								8	
						10		8	
								1	Gray SAND, very fine to medium grain.
Wet	Mod.	Soft	Non	6	0 / 0	11	1.5'	1	
								5	
						12		6	
								2	Gray SAND, fine to coarse grain with some gravel up to 3 cm.
Wet	Poor	Soft	Non	7	0 / 0	13	0.7'	4	
								6	
						14		6	
								3	Same as above.
Wet	Poor	Soft	Non	8	0 / 0	15	1.0'	10	
								10	
						16		10	
								1	Same as above, coarser with depth.
Wet	Poor	Soft	Non	9	0 / 0	17	1.0'	4	
								4	
						18		8	
								7	Scattered coarse SAND and rounded gravels.
Wet	Poor	Soft	Non	10	0 / 0	19	0.3'	13	
								10	
						20		8	

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ K-VF2

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	ST	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
Wet	Mod.	Soft	Non	11	0/0	20–21	0.3'	6, 8, 13, 19	Gray SAND AND GRAVEL, very coarse.		SAND
Wet	Well	Soft	Non	12	0/0	22–23	1.1'	4, 7, 9, 11	Gray SILT with some very fine sand.		BENTONITE PELLETS
Wet	Poor	Soft	Non	13	0/0	24–25	0.3'	8, 13, 8, 7	SILT with gravel sized material, poorly sorted.		
Damp	-	Soft	Slight	14	0/0	26–27	0.75'	4, 8, 12, 18	Gray SILTY CLAY, *some very fine sand.*		NATURAL COLLAPSE
Damp	-	Hard	Non	15	0/-	28–29	1.0'	20, 30, 20, 12	Same, bottom 1.5 FT. fine sand with some gravel.		
Wet	Mod.	Soft	Non	16	0.2	30–31	2.0'	6, 9, 2, 8	Gray SAND, fine to coarse grain, with *some gravel.*		
Mois to Very Moist	-	Hard	Slight	17	OVA 0.0	32–33	1.25'	9, 25, 25, 30	Gray SILTY CLAY. Gray SILTY CLAY with some gravels. 1.5 IN. buff/yellow sandstone fragments within sample (fine grain).		
Wet	Good	Hard	Non	18	0.0	34–35	1.6'	14, 22, 31, 27	Grades into gray SILT. Rock fragments bottom 2 IN.		
Wet	Mod.	Hard	Non	19	0.0	36–37	2.0'	18, 23, 29, 20	SILTY CLAY with large rock fragments. Gray SAND, fine to medium grain, some gravel.		
						38			Gray CLAYEY SAND with rock fragments		
						39			End of Boring 38.0 FT.		
						40					
						41					
						42					
						43					
						44					
						45					

LOCATION MAP

ERM–MIDWEST WELL LOG

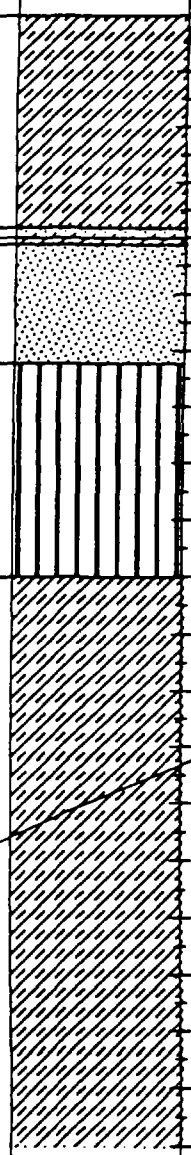
BORE NUMBER ▶ K-VF4	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/17/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4 and 12 1/4 Hollow Stem Auger	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶ 1136.00 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE PVC/S.S. DIAMETER 10"/2" LENGTH 28'/30' | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

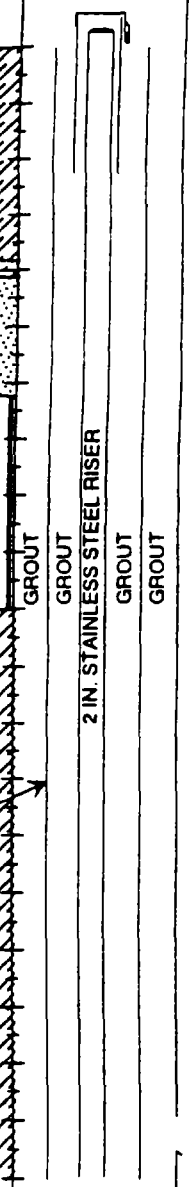
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 46 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		2	
Damp	-	Soft	Very	1	0/0	1	1.5'	2	Orange to medium brown SILTY CLAY, some gray mottling, roots
								2	
								4	
						2		1	
Very Moist	-	Soft	Very	2	0/0	3	1.0'	3	Same with fine sand and orange/rust stained.
								3	
								3	Gray CLAYEY SAND fine grain.
						4		1	Gray SILTY CLAY.
Wet	Poor	Soft	Non	3	0/0	5	1.5'	3	Medium brown SAND, fine to medium grain, with rock fragments.
								6	
								6	
						6		2	
Wet	Mod.	Soft	Non	4	0/0	7	1.5'	4	Grades into gray SILT
								8	
								10	
						8		8	Same as above.
Wet	Good	Soft	Non	5	0/0	9	1.6'	10	
								8	
								8	
						10		1	Gray SAND, very fine to medium grain.
Wet	Mod.	Soft	Non	6	0/0	11	1.5	1	
								5	
								6	
						12		2	Gray SAND, fine to coarse grain with some gravel up to 3 cm.
Wet	Poor	Soft	Non	7	0/0	13	0.7	4	
								6	
								6	
						14		3	Same as above.
Wet	Poor	Soft	Non	8	0/0	15	1.0'	10	10 IN. PVC Casing
								10	
								10	
						16		1	Same as above, coarser with depth.
Wet	Poor	Soft	Non	9	0/0	17	1.0'	4	
								4	
								8	
						18		7	
								13	Scattered coarse SAND and rounded gravels.
Wet	Poor	Soft	Non	10	0/0	19	0.3'	10	
								8	
						20			

GRAPHIC LOG



WELL COMPLETION

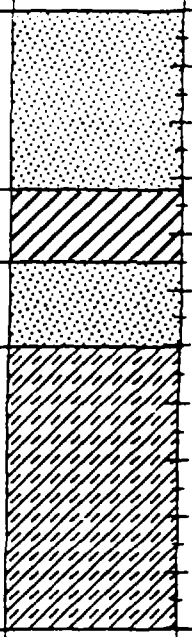


WELL NUMBER ▶ **E-VF2**

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	S	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	20		47	Gray SAND, fine to coarse, poorly sorted.
Wet	Poor	Hard	Non	11	0 / 0	21	1.6'	18	
								27	
								27	
						22		2	Top 9 IN. same gray SAND with gravel.
Wet	Poor	Stiff	Non	12	0 / 0	23	1.25'	18	
								27	Gray CLAY, stiff, minor gravel.
						24		18	
								27	
Wet	Poor	Stiff	Non	13	0 / 0	25	1.2'	18	Gray SAND coarser under the clay and finer towards bottom to fine sand and silt, poorly sorted, mixed with gravels.
								18	
								15	
						26		0	Gray SILTY CLAY.
Moist	-	Stiff	Slight	14	0 / 0	27	1.25'	14	
								15	
								18	
						28		4	Gray SILTY CLAY with minor pebbles, several very thin silt seams.
Moist	-	Soft	Slight	15	0 / 5.4	29	1.1'	4	
								8	
								9	
						30		4	
Moist	-	Soft	Slight	16	0 / 6.0		1.25'	8	Same, but top 2 IN. black coal, small fragments, some scattered fine sand.
						31			End of Boring 31 FT.
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			
						41			
						42			
						43			
						44			
						45			

GRAPHIC LOG



WELL COMPLETION

LOCATION MAP

ERM–MIDWEST WELL LOG

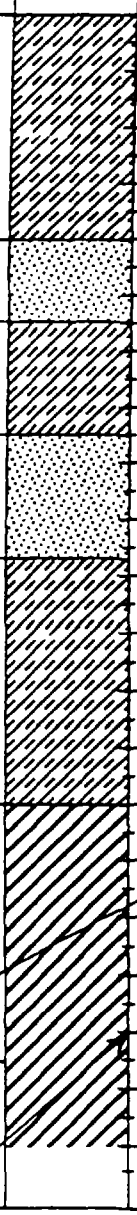
BORE NUMBER ► EVF3	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 10/02/91 10/08/91	WEATHER ► Partly Cloudy, 50F
LOGGED BY ► RLD	DRILLED BY ► Sprowls
DRILLING METHOD ► 12 1/4 , 4 1/4 HSA and 5 7/8 Roller Cone	SAMPLING METHOD ► 24 IN. Split Spoon Core
ELEVATION ► 1148.9 FT.	GRAVEL PACK ► #5 Sand / SEAL ► Bentonite

CASING ► TYPE S.S./PVC/PVC DIAMETER 2"/5"/8" LENGTH 40.5'/25'/18' | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 4.5 IN.

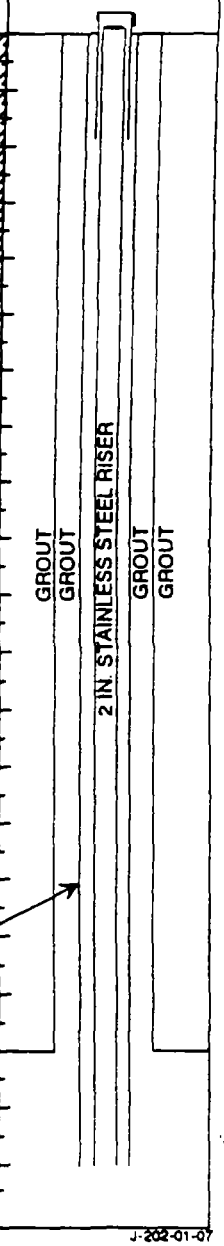
SCREEN ► TYPE S.S. SLOT 0.010 IN. DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 50 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0			
Dry to Moist		Soft	Slight		0/0	1	1.4'	3, 3, 5, 3	Medium brown SILTY CLAY with very fine sand, minor roots.
						2			
Dry		Soft	Non		0/0	3	2.0'	4, 10, 15, 15	Orange-brown SILTY CLAY with fine sand, minor gravel and rock fragments.
						4			
Very Moist	Poor	Soft	Slight		0/0	5	1.3'	4, 8, 8	Brown, fine to medium grain SAND with some gravels. Very moist.
						6		7	Orange-brown SILTY CLAY with gray mottles.
Dry to Wet	Mod.	Soft	Non		0/0	7	1.3'	6, 10, 10	
						8		6	Brown fine to medium grain SAND, minor gravels.
Sat.	Poor	Soft	Non		0/0	9	1.6'	3, 5, 8, 8	Brown fine-coarse grain SAND with small gravels.
						10		3	Bottom 1 IN. orange-brown SILTY CLAY.
Dry		Soft	Very		0/0	11	0.9'	5, 7, 10	Gray CLAY, very plastic, minor SILT.
						12		8	Same as above.
Damp to Wet		Soft	Slight		0/0	13	1.5'	10, 10, 12	
						14		4	
Dry	-	Soft	Very		0/0	15	1.3'	8, 8, 10	Medium dark gray CLAY with very minor silt, stiff and plastic.
						16		1	Same, bottom 4 IN. is siltier.
Dry	-	Soft	Slight		0/0	17	1.2'	2, 8, 10	5 IN. PVC Casing
						18			CLAY
Moist	-	Soft	Plast.	1	0/0	19	0.3'	P, U, S, H	Pebbles in gray CLAY.
						20			Base of 8 IN. PVC Casing

GRAPHIC LOG



WELL COMPLETION

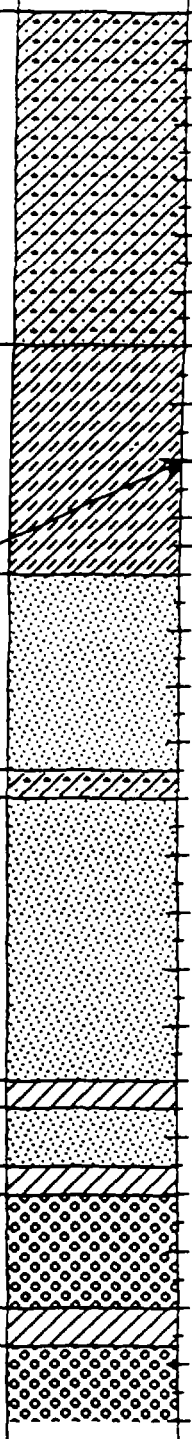


WELL NUMBER ▶ EVF3

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	IC	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	20			TILL from cuttings and drillers and comments.
						21			
						22			
						23			
						24			
						25			
						26			
Moist	-	Stiff	Slight		0/0	27	1.5'	PUSH	Gray SILTY CLAY, no pebbles.
						28			
						29			End of 5 IN. PVC
						30			
Wet	Mod.	-	-		0/0	31	1.3'	PUSH	SAND, fine sand with .16 FT. gray silty till at base.
						32			
						33			
						34			TILL
									SAND
						35			
						36			
						37			
						38			
						39			CLAY
						40			SAND
						41			CLAY
									GRAVEL
						42			
						43			CLAY
						44			Cobble GRAVEL
						45			

GRAPHIC LOG



WELL COMPLETION

GROUT
STAINLESS STEEL RISER
GROUT
SEAL
SEAL
SAND PACK
SAND PACK
SUMP
NATURAL CAVE IN

WELL NUMBER ▶ FVF3

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
						45			CLAY and SAND		NATURAL
						46			SAND by driller		
						47					
						48					
						49					
						50			Total Depth 50 FT.		
						51					
						52					
						53					
						54					
						55					
						56					
						57					
						58					
						59					
						60					
						61					
						62					
						63					
						64					
						65					
						66					
						67					
						68					
						69					
						70					

LOCATION MAP

ERM—MIDWEST WELL LOG

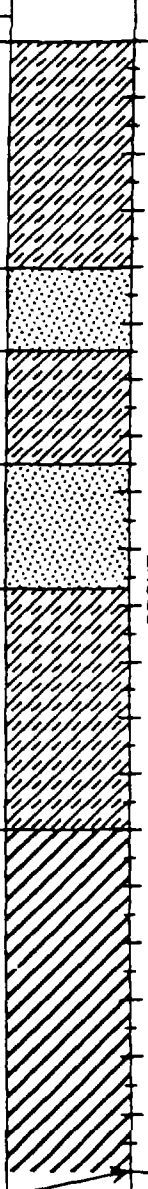
BORE NUMBER ▶ E-VF4	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/04/90	WEATHER ▶ Cloudy, Rain, 60F
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ Hollow Stem Auger	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1146.90 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE PVC/S.S. DIAMETER 10"/2" LENGTH 20'/45' | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

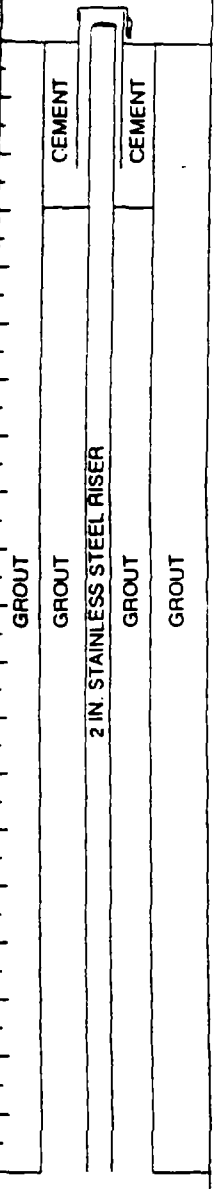
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 5 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 52 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry to Moist		Soft	Slight	1	OVA/Hnu 0/0	0–1	1.4'	3, 3, 5, 3	Medium brown SILTY CLAY with very fine sand, minor roots.
Dry		Soft	Non	2	0/0	2–3	2.0'	4, 10, 15, 15	Orange-brown SILTY CLAY with fine sand, minor gravel and rock fragments.
Very M	Poor	Soft	Slight	3	0/0	4–5	1.3'	4, 8, 8	Brown, fine to medium grain SAND with some gravels. Very moist.
Dry to Wet	Mod.	Soft	Non	4	0/0	6–7	1.3'	7, 6, 10, 10	Orange-brown SILTY CLAY with gray mottles.
Sat.	Poor	Soft	Non	5	0/0	8–9	1.6'	6, 3, 5, 8, 8	Brown fine to medium grain SAND, minor gravels. Brown fine -coarse grain SAND with small gravels.
Dry		Soft	Very	6	0/0	10–11	0.9'	3, 5, 7	Bottom 1 IN. orange-brown SILTY CLAY plug. Gray CLAY, very plastic, minor SILT.
Damp to Wet		Soft	Slight	7	0/0	12–13	1.5'	10, 8, 10, 10, 12	Same as above.
Dry		Soft	Very	8	0/0	14–15	1.3'	4, 8, 8, 10	Medium-dark gray CLAY with very minor silt, stiff, and plastic.
Dry		Soft	Slight	9	0/0	16–17	1.2'	1, 2, 8, 10	Same as above, bottom 4 IN. is siltier.
Dry		Soft	Very	10	0/0	18–19	0.8'	4, 4, 8, 12	Medium-dark gray CLAY with very minor silt, stiff and plastic.
						20			Bottom of 10 IN. PVC casing.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ **E-VF4**

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA / Hnu (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Wet	Poor	Hard	Non	11	0/0	20–21	1.6'	47, 18, 27, 27	Gray SAND, fine to coarse, poorly sorted.
Wet	Poor	Stiff	Non	12	0/0	22–23	1.25'	2, 18, 27, 18, 27	Top 9 IN. same gray SAND with gravel. Gray CLAY, stiff, minor gravel.
Wet	Poor	Stiff	Non	13	0/0	24–25	1.2'	18, 18, 15	Gray SAND coarser under the clay and finer towards bottom to fine sand and silt, poorly sorted, mixed with gravels.
Moist	-	Stiff	Slight	14	0/0	26–27	1.25'	0, 14, 15, 18	Gray SILTY CLAY.
Moist	-	Soft	Slight	15	0/5.4	28–29	1.1'	4, 4, 8, 9	Gray SILTY CLAY with minor pebbles, several very thin silt seams.
Moist	-	Soft	Slight	16	0/6.0	30–31	1.25'	4, 8, 12, 15	Same, but top 2 IN. black coal, small fragments, some scattered fine sand.
Moist	-	Soft	Slight	17	0.3/5.4	32–33	1.6'	0, 6, 19, 26	Same with silt layer at 32.8 to 33.1 FT., silt is wet some fine grained sand seams throughout.
Wet to Moist	Poor	Soft	Slight	18	4/2.0	34–35	1.5'	0, 4, 18, 32	Top 12 IN. fine to coarse SAND with some gravels, underlain by silty clay. SILTY CLAY with pebbles, stiff.
Slight Moist	-	Hard	Non	19	0.2/30	36–37	1.3'	25, 45, 80, 90	Medium-dark gray SILTY CLAY with small pebbles throughout, very stiff.
Moist	Poor	Hard	Non	20	0.8/3.4	38–39	1.4'	20, 35, 45, 30	Top 8 IN. gray SAND, fine to coarse grain with some gravels, very moist. Dark gray SILTY CLAY with small pebbles, very stiff.
Wet to Moist	Poor	Stiff	Non	21	0.1/2.5	40–41	1.25'	18, 24, 24, 19	Bottom 8 IN. gray SAND, fine to coarse grain with gravels. Silty clay plug between 41.6 and 41.8 FT.
Moist to Wet	-	Hard	Non	22	0.0/1.2	42–43	1.5'	40, 30, 30, 35	Gray SILTY CLAY with rock fragments. Gray sandy SILTY CLAY. Gray SILT with pebbles, sandstone fragments.
Moist	-	Hard	Non	23	0.0/1.2	44–45	1.2'	30, 30	Gray SILTY CLAY with small gravels, 1 IN. silt at 45.3 FT.

GRAPHIC LOG

WELL COMPLETION: GROUT; 2 IN. STAINLESS STEEL RISER; GROUT; BENTONITE SLURRY; BENTONITE SLURRY; SAND PACK; SAND PACK

WELL NUMBER ▶ E-VF4

ERM–MIDWEST WELL LOG

MOISTURE	SO.	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
Moist	-	Hard	Non	24	OVA / Hnu	45	1.2'	90/3	Gray SILTY CLAY.		
						46		-			
Wet	Mod.	Stiff	Non	25	0.5 / 1.2	47	2.0'	0 18 35	Brown SAND, fine-coarse grain, wet.		SAND PACK
						48		47 22	4 IN. brown rock fragments, wet, bottom 2 in. brown SILTY CLAY with gravel.		
Wet to Dry	Mod.	Hard	Non	26	0.2 / 0	49	2.0'	30 45	Top 18 IN. fine to medium, brown, SAND. Underlain by 1 IN. zone of rock fragments.		SCREEN
						50		90 55	Gray SILTY CLAY with some pebbles.		
Dry	-	Hard	Non	27	0 / 0	51	1.4'	100 100/5	Medium brown SILTY CLAY with some pebbles and rock fragments, pebbles are very small, some mottling.		SUMP
						52		-	Total Depth 52.0 FT.		SAND PACK
						53					
						54					
						55					
						56					
						57					
						58					
						59					
						60					
						61					
						62					
						63					
						64					
						65					
						66					
						67					
						68					
						69					
						70					

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ► E-LB	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/22/90	WEATHER ► Cloudy, Light Rain, 65F
LOGGED BY ► JDK	DRILLED BY ► Mathes/Sprowls
DRILLING METHOD ► 12 1/4, 4 1/4 HSA and 5 7/8 Roller Cone	SAMPLING METHOD ► 24 IN. Split Spoon Core
ELEVATION ► 1146.30 FT.	GRAVEL PACK ► #5 Sand 92.5-77 FT. / SEAL ► Bentonite 77-72 FT.

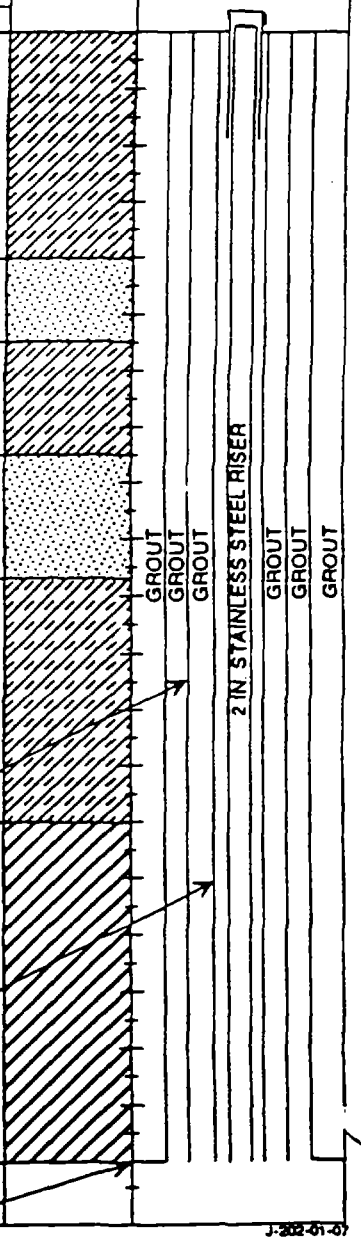
CASING ► TYPE PVC/PVC/Steel DIAMETER 10"/6"/5" LENGTH 20/60/79' | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 4.5 IN.

SCREEN ► TYPE Stainless Steel SLOT 0.010 IN. DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 91.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry to Moist		Soft	Slight	1	OVA/Hnu 0/0	0–1	1.4'	3, 3, 5, 3	Medium brown SILTY CLAY with very fine sand, minor roots.
Dry		Soft	Non	2	0/0	2–3	2.0'	4, 10, 15, 15	Orange-brown SILTY CLAY with fine sand, minor gravel and rock fragments.
Very Moist	Poor	Soft	Slight	3	0/0	4–5	1.3'	4, 8, 8	Brown, fine to medium grain SAND with some gravels. Very moist.
Dry to Wet	Mod.	Soft	Non	4	0/0	6–7	1.3'	7, 6, 10, 10	Orange-brown SILTY CLAY with gray mottles.
Sat.	Poor	Soft	Non	5	0/0	8–9	1.6'	6, 3, 5, 8, 8	Brown fine to medium grain SAND, minor gravels. Brown fine-coarse grain SAND with small gravels.
Dry		Soft	Very	6	0/0	10–11	0.9'	3, 5, 7, 10	Bottom 1 IN orange-brown SILTY CLAY. Gray CLAY, very plastic, minor SILT.
Damp to Wet		Soft	Slight	7	0/0	12–13	1.5'	8, 10, 10, 12	Same as above. 6 IN. Steel Casing
Dry	-	Soft	Very	8	0/0	14–15	1.3'	4, 8, 8, 10	Medium dark gray CLAY with very minor silt, stiff and plastic.
Dry	-	Soft	Slight	9	0/0	16–17	1.2'	1, 2, 8, 10	Same, bottom 4 IN. is siltier. 5 IN. Steel Casing
Dry	-	Soft	Very	10	0/0	18–19	0.8'	4, 4, 8, 12	Medium dark gray CLAY with very minor silt, stiff and plastic.
						20			Base of 10 IN. PVC Casing

GRAPHIC LOG

WELL COMPLETION



WELL NUMBER ▶ E-LB

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	[illegible]	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	20			
Wet	Poor	Hard	Non	11	0 / 0	21	1.6'	47, 18, 27, 27	Gray SAND, fine to coarse, poorly sorted.
						22		2	Top 9 IN. same gray SAND with gravel.
Wet	Poor	Stiff	Non	12	0 / 0	23	1.25'	18, 27, 18	Gray CLAY, stiff, minor gravel.
						24		27	
Wet	Poor	Stiff	Non	13	0 / 0	25	1.2'	18, 18, 15	Gray SAND coarser under the clay and finer towards bottom to fine sand and silt, poorly sorted, mixed with gravels.
						26		0	Gray SILTY CLAY.
Moist	-	Stiff	Slight	14	0 / 0	27	1.25'	14, 15, 18	
						28		4	Gray SILTY CLAY with minor pebbles, several very thin silt seams.
Moist	-	Soft	Slight	15	0 / 5.4	29	1.1'	4, 8, 9	
						30		4	Same, but top 2 IN. black coal, small fragments, some scattered fine sand.
Moist	-	Soft	Slight	16	0 / 6.0	31	1.25'	8, 12, 15	
						32		0	Same with silt layer at 32.8 to 33.1 FT., silt is wet some fine grained sand seams throughout.
Moist	-	Soft	Slight	17	0.3 / 5.4	33	1.6'	6, 19, 26	
						34		0	Top 12 IN. fine to coarse SAND with some gravels, underlain by silty clay.
Wet to Moist	Poor	Soft	Slight	18	4 / 2.0	35	1.5'	4, 18, 32	SILTY CLAY with pebbles, stiff.
						36		25	Medium-dark gray SILTY CLAY with small pebbles throughout, very stiff.
Slight Moist	-	Hard	Non	19	0.2 / 30	37	1.3'	45, 80, 90	
						38		20	Top 8 IN. gray SAND, fine to coarse grain with some gravels, very moist.
Moist	Poor	Hard	Non	20	0.8 / 3.4	39	1.4'	35, 45, 30	Dark gray SILTY CLAY with small pebbles, very stiff.
						40		18	
Wet to Moist	Poor	Stiff	Non	21	0.1 / 2.5	41	1.25'	24, 24, 19	Bottom 8 IN. gray SAND, fine to coarse grain with gravels. Silty clay plug between 41.6 and 41.8 FT.
						42		40	Gray sandy SILTY CLAY with rock fragments.
Moist to Wet	-	Hard	Non	22	0.0 / 1.2	43	1.5'	30, 30	Gray sandy SILTY CLAY.
								35	Gray SILT with pebbles, sandstone fragments.
						44		30	Gray SILTY CLAY with small gravels, 1 IN. silt at 45.3 FT.
Moist	-	Hard	Non	23	0.0 / 1.2	45	1.2'	30	

GRAPHIC LOG

WELL COMPLETION

GROUT
GROUT
2 IN. STAILESS STEEL RISER
GROUT
GROUT

6 IN. Steel Casing

6 IN. Steel Casing

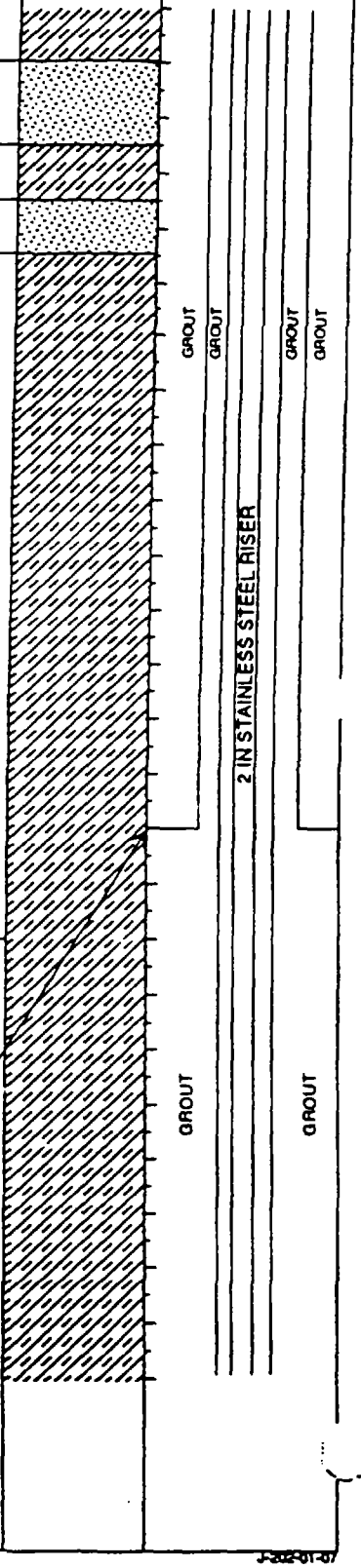
WELL NUMBER ▶ E-LB

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Moist	-	Hard	Non		OVA/Hnu	45	1.2'	90/3	Gray SILTY CLAY.
						46		-	
Wet	Mod.	Stiff	Non	24	0.5/1.2	47	2.0'	0 18 35	Brown SAND, fine to coarse grain, wet.
						48		47 22	4 IN. brown rock fragments, wet, bottom 2 in. brown SILTY CLAY with gravel.
Wet to Dry	Mod.	Hard	Non	25	0.2/0	49	2.0'	30 45	Top 18 IN. fine to medium, brown, SAND. Underlain by 1 IN. zone of rock fragments.
						50		90 55	Gray SILTY CLAY with some pebbles.
Dry	-	Hard	Non	26	0/0	51	1.4'	100 100/5	Medium brown SILTY CLAY with some pebbles and rock fragments, pebbles are very small, some mottling.
						52		-	
Wet to Dry	-	Hard	Non	27	0/1.5	53	0.9'	20 45 60	Gray/brown SILTY CLAY with some small pebbles and minor sand, 3 IN. sand layer within the SILTY CLAY which is wet.
						54	0.5'	80 150/6	Gray SILTY CLAY with pebbles and rock fragments.
Dry	-	Hard	Non	28	0/1.5	55		-	
Dry	-	Hard	Non	29	OVA Only 0	56	1.1'	21 45 90 70	Medium gray SILTY CLAY with several large rock fragments and small pebbles.
						57		45	Same, with rock fragments.
Dry	-	Hard	Non	30	0	58	1.7'	75 100	
						59		94	
Dry	-	Hard	Non	31	0.1		0.6'	21 45	Same, with rock fragments.
						60		18	Medium-dark brown SILTY CLAY with some rock fragments and small pebbles.
Dry	-	Hard	Slight	32	0.0	61	1.6'	25 35 50	
						62		35	Gray CLAY(over compacted till), SILT, very hard and brittle. Some rock fragments and sand.
Dry	-	Hard	Non	33	0.0	63	0.9'	85 63 75	
						64		28	Same as above.
Dry	-	Hard	Non	34	0.0	65	1.5'	41 55 57	Base of 6 IN.Steel Casing
						66		29	Same as above.
Dry	-	Hard	Non	35	0.0	67	1.25'	35 110/4	
						68		-	
Dry	-	Hard	Non	36	0.0	69	0.5'	32 62 70 30	Same, gray overcompacted clay/till.
						70			

GRAPHIC LOG

WELL COMPLETION

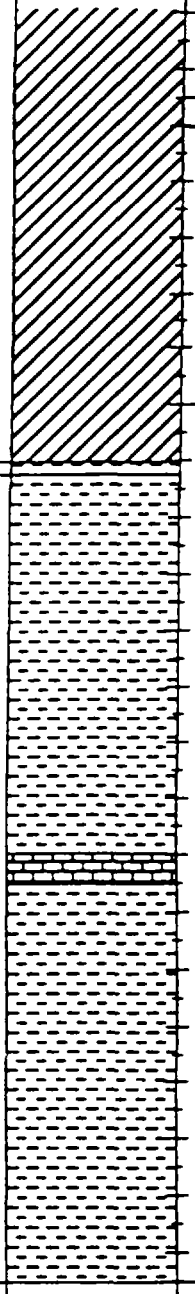


WELL NUMBER ▶ E-LB

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SCALING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA Only	70			
Dry	-	Hard	Non	36	0	71	1.5'	25, 50, 48, 60	Gray CLAY/till; overcompacted, some rock fragments, sand, and silt.
						72		37	Same as above.
Dry	-	Hard	Non	37	0	73	0.8'	65, 80, 90/5	
					Hnu	74		36	Same, but CLAY is is darker and there are coal fragments.
Dry	-	Hard	Slight	38	0	75	1.5'	40, 44, 75	
						76		50	Gray overcompacted CLAY/till with some sand and many small rock fragments and silt.
Dry	-	Hard	Non	39	0	77	1.25'	120, 110/5	
						78		-	
Dry	-	Hard	Non	40	0	79	0.20'	250/3	Greenish gray SHALE, soft and weathered.
		RUN 1				80			Fractured black SHALE.
						81			RQD = 0.5/10 Recovery = 5.1/10
						82			
						83			
						84			
						85			Fractured black limestone
						86			
						87			
						88			
						89			
						90			
		RUN 2				91			
						92			
						93			End of Boring 92.5 FT.
						94			
						95			

GRAPHIC LOG



WELL COMPLETION

GROUT
GROUT
GROUT
GROUT
BENTONITE SEAL
2 IN. STAILESS STEEL RISER
BENTONITE SEAL
SAND PACK
SAND PACK
SUMP

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ▶ F-VF3	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 10/19/91	WEATHER ▶ Cold, Overcast, Raining
LOGGED BY ▶ RAF	DRILLED BY ▶ Sprowls
DRILLING METHOD ▶ HSA Rotary Fluid	SAMPLING METHOD ▶ Split Spoon and NX-Wireline Core
ELEVATION ▶ 1160.9 FT.	GRAVEL PACK ▶ #5 Quartz Sand
	SEAL ▶ Bentonite

CASING ▶ TYPE PVC, S.S. DIAMETER 5"/2" LENGTH 36'/43.5'

WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.

HOLE DIA. 4.5 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 IN. DIAMETER 2 IN. LENGTH 10 FT.

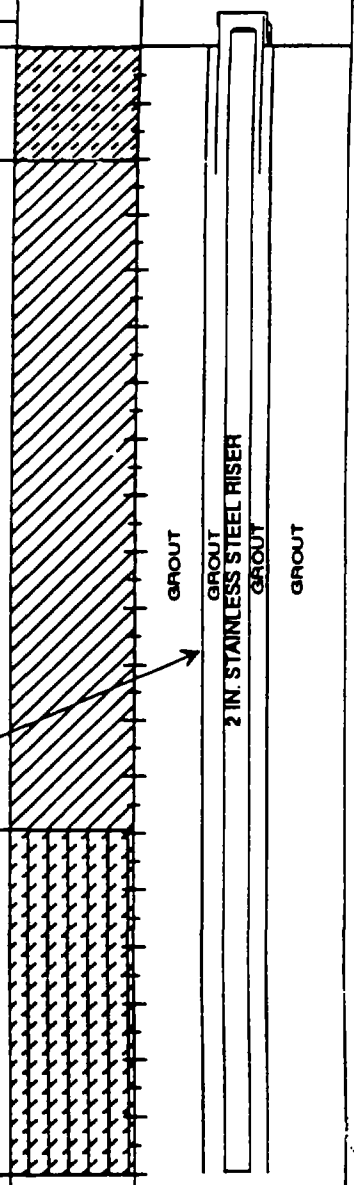
WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 53.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry				F1	OVA/Hnu 0/0	0–1	0.5'	6, 10, 10, 8	Brown SILTY CLAY, pebbles.
Moist		Med.	Mod.	F2	0/0	2–3	1.0'	6, 5, 5, 5	Brown sandy CLAY, pebbles.
Moist		Med. to Stiff	Mod.	F3	0/2.2	4–5	1.3'	4, 4, 4, 7	Brownsandy CLAY to gray and brown clay.
Moist		Stiff	Mod.	F4	1/0	6–7	1.0'	4, 5, 5, 5	Gray and brown CLAY, some pebbles.
Damp		Med.	Mod.	F5	2.5/0.4	8–9	1.3'	1, 2, 3, 3	Gray and brown CLAY as above. more pebbles some oxidized.
Very Moist		Med.	Plast.	F6	5.2/0.2	10–11	1.3'	2, 2, 2, 2	As above, sandy zones.
Very Moist		Med. to Low	Mod. to Non	F7	1000/5.8	12–13	1.5'	0, 2, 2, 2	As above, and organic fragments(appears to be fill material).
Very Moist		Med. to Stiff	Mod.	F8	800/0	14–15	1.45'	1, 2, 3, 5	Brown CLAY SILT sand and pebbles.
Moist		Stiff	Mod.	F9	9/0	16–17	1.35'	2, 3, 4, 4	As above. Sandier.
		Stiff	Mod.	F10	0/3.2	18–19	1.4'	1, 9, 15, 16	As above. Large percent of pebbles and sand in clay matrix.

GRAPHIC LOG

WELL COMPLETION

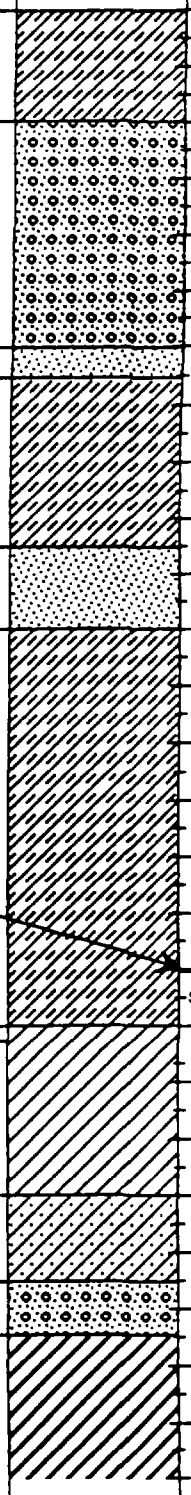


WELL NUMBER ▶ F-VF3

ERM–MIDWEST WELL LOG

Moisture Condition	Soil Type	Density	Plasticity	Sample No.	OVA (ppm)	Depth	Sample Recovery	Penetration Resistance	Lithology / Remarks
Moist to Wet		Stiff	Mod.	F11	0	20–21	0.8'	2, 6, 5, 4	Brown SILTY CLAY till, some pebbles.
Wet		Low	Non	F12	10	22–23	1.1'	3, 4, 8, 6	Very coarse grain SAND and GRAVEL
Wet		Low	Non	F13	0.4	24–25	1.4'	6, 6, 8, 8	As above.
Wet to Moist		Low	Non	F14	2.0	26–27	1.6'	4, 7, 8, 10	Fine SAND to silt, pebbles. Brown SILTY CLAY till.
Moist		Med.	Mod.	F15	0	28–29	1.7'	4, 5, 8	Brown SILTY CLAY till, pebbles.
Wet		Low	Mod.	F16	2.0	30–31	1.6'	16, 4, 9	Fine-coarse SAND to gravel.
Moist		Med.	Mod.	F17	0.8	32–33	1.78'	11, 9, 4, 6, 8	Gray SILTY CLAY till.
Moist		Med.	Mod.	F18	0	34–35	1.6'	9, 1, 3, 4	As above.
Moist		Med. to Stiff	Mod.	F19	0.2	36–37	2.0'	5, 1, 5, 6, 7	As above. Base of 5 IN. PVC
Moist		Stiff	Plast.	F20	1.0	38–39	1.0'	4, 3, 10, 12	2 IN. red CLAY; Gray CLAY till and pebbles.
Damp to Wet		High to Low	Non	F21	0.2	40–41	1.7'	7, 15, 21, 23	Gray CLAY till. Gray SANDY till, pebbles.
Moist to Wet		High	Non	F22	0.7	42–43	1.6'	17, 17, 16	Coarse SAND and GRAVEL
Moist to Wet		Low	Non	F23	0.6	44–45	1.6'	16, 17, 21	Gray CLAY till, sandstone and shale fragments.

GRAPHIC LOG



WELL COMPLETION

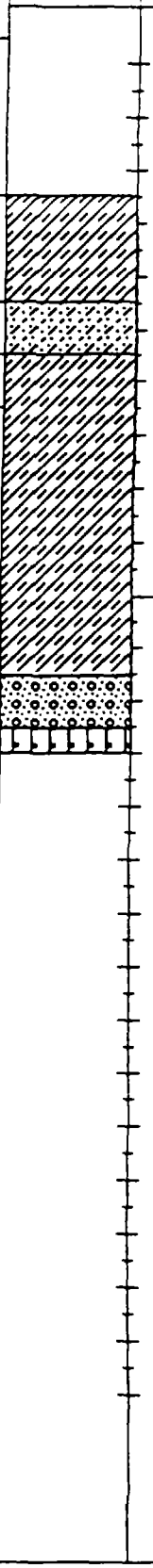
GROUT
GROUT
2 IN. STAINLESS STEEL RISER
GROUT
GROUT
SEAL
SEAL
SAND PACK
SAND PACK

WELL NUMBER ▶ F-VF3

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	45			
								34	
						46		33	
								60	6 IN. boulder.
						47	0'		
						48		8	Gray SILTY CLAY till and pebbles.
								15	
Moist		High	Slight to Mod.	F24	0/0	49	1.35'	18	
								25	
Moist to Wet		High to Low	Non to Mod.	F25	0.4/0	50		4	CLAYEY SAND and pebbles.
							2.0'	10	
						51		15	Gray SILTY CLAY till.
								21	
						52		12	Gray SILTY CLAY till and pebbles.
Moist		High	Mod.	F26	0/0		1.4'	11	
						53		14	
								24	
						54		17	As above, sandstone fragments.
Moist		High	Mod.	F27	0.6/0		1.5'	23	
						55		32	
								50	
Moist to Very Moist		High to Low	Mod. to Non	F28	0/0	56		24	As above, becomes sandy and silty.
							1.8'	27	
						57		40	Coarse SAND and GRAVEL, some silt and clay.
								44	
						58		19	Fine to medium grain SAND and SILT.
								29	Total Depth 58 FT.
						59			
						60			
						61			
						62			
						63			
						64			
						65			
						66			
						67			
						68			
						69			
						70			

GRAPHIC LOG



WELL COMPLETION

SAND

STAINLESS STEEL SCREEN

SUMP

SAND

FORMATION COLLAPSE

CATION MAP

ERM—MIDWEST WELL LOG

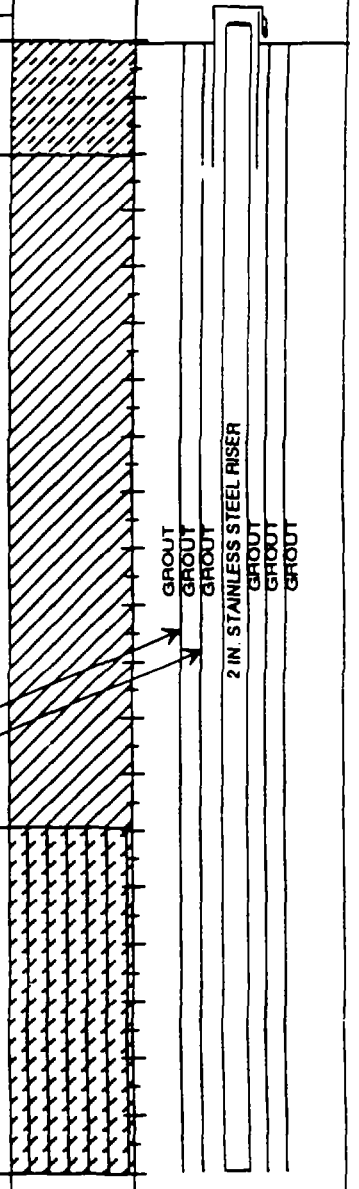
BORE NUMBER ▶ F-VF4	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 10/19/90	WEATHER ▶ Partly Cloudy,90F
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA Rotary Fluid	SAMPLING METHOD ▶ Split Spoon and NX-Wireline Core
ELEVATION ▶ 1160.9 FT.	GRAVEL PACK ▶ #5 Quartz Sand / SEAL ▶ Bentonite

CASING ▶ TYPE Steel/PVC/S.S DIAMETER 10"/8"/2" LENGTH 35'/52'/55' | WATER LEVEL INITIAL 14.7 FT. ■ B.G.S. □ B.M.P. | HOLE DIA. 4.25 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 IN. DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 12.78 FT. H.M.P. 2.4 FT. | TOTAL DEPTH 69 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry				F1	OVA/Hnu 0/0	0–2	0.5'	6, 10, 10, 8	Brown SILTY CLAY, pebbles.
Moist		Med.	Mod.	F2	0/0	2–4	1.0'	6, 5, 5, 5	Brown sandy CLAY, pebbles.
Moist		Med. to Stiff	Mod.	F3	0/2.2	4–6	1.3'	4, 4, 4, 7	Brown sandy CLAY to gray and brown clay.
Moist		Stiff	Mod.	F4	1/0	6–8	1.0'	4, 5, 5, 5	Gray and brown CLAY, some pebbles.
Damp		Med.	Mod.	F5	2.5/0.4	8–10	1.3'	1, 2, 3, 3	Gray and brown CLAY as above. more pebbles some oxidized.
Very Moist		Med.	Plast	F6	5.2/0.2	10–12	1.3'	2, 2, 2, 2	As above, sandy zones.
Very Moist		Med. to Low	Mod. to Non	F7	1000/5.8	12–14	1.5'	0, 2, 2, 2	As above, and organic fragments(appears to be fill material).
Very Moist		Med. to Stiff	Mod.	F8	800/0	14–16	1.45'	1, 2, 3, 5	Brown CLAY SILT sand and pebbles.
Moist		Stiff	Mod.	F9	9/0	16–18	1.35'	2, 3, 4, 4	As above. Sandier.
V. Moist		Stiff	Mod.	F10	0/3.2	18–20	1.4'	1, 9, 15, 16	As above. Large percent of pebbles and sand in clay matrix.

GRAPHIC LOG / WELL COMPLETION

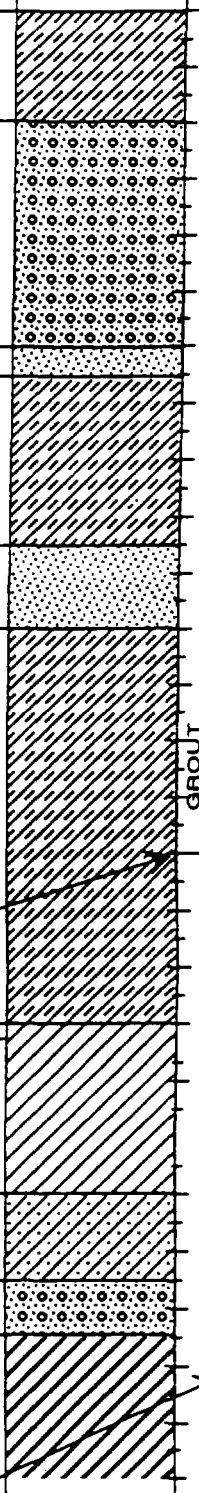


WELL NUMBER ▶ F-VF4

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		2	
Moist to Wet		Stiff	Mod.	F11	0	21	0.8'	6, 5, 4	Brown SILTY CLAY till, some pebbles.
						22		3	Very coarse grain SAND and GRAVEL.
Wet		Low	Non	F12	10	23	1.1'	4, 8, 6	
						24		6	As above.
Wet		Low	Non	F13	0.4	25	1.4'	6, 8, 8	
						26		4	Fine SAND to silt, pebbles.
Wet to Moist		Low	Non	F14	2.0	27	1.6'	7, 8, 10	Brown SILTY CLAY till.
						28		4	Brown SILTY CLAY till, pebbles.
Moist		Med.	Mod.	F15	0	29	1.7'	5, 8	
						30		16	Fine-coarse SAND to gravel.
Wet		Low	Mod.	F16	2.0	31	1.6'	4, 9, 11	Gray SILTY CLAY till.
						32		9	
Moist		Med.	Mod.	F17	0.8	33	1.78'	4, 6, 8	
						34		9	As above.
Moist		Med.	Mod.	F18	0	35	1.6'	1, 3, 4	
						36		5	As above. **Base of 10 IN. Steel**
Moist		Med. to Stiff	Mod.	F19	0.2	37	2.0'	1, 5, 6	
						38		7	
								4	2 IN. red CLAY
Moist		Stiff	Plast.	F20	1.0	39	1.0'	3, 10	Gray CLAY till and pebbles.
						40		12	
Damp to Wet		High to Low	Non	F21	0.2	41	1.7'	7, 15	Gray CLAY till.
						42		21, 23, 17	Gray SANDY till, pebbles.
Moist to Wet		High	Non	F22	0.7	43	1.6'	17, 16	Coarse SAND and GRAVEL.
						44		16	Gray CLAY till, sandstone and shale fragments.
Moist to Wet		Low	Non	F23	0.6	45	1.6'	17, 21	

GRAPHIC LOG



WELL COMPLETION

GROUT GROUT GROUT 2 IN. STAINLESS STEEL RISER GROUT GROUT GROUT

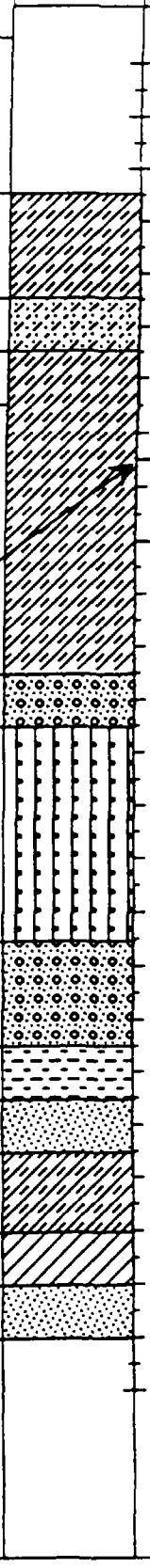
8 IN. Steel

WELL NUMBER ▶ F-VF4

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
				OVA/Hnu	45			
							34	
					46		33	
							60	6 IN. boulder.
					47	0'		
Moist	High	Slight to Mod.	F24	0/0	48	1.35'	8	Gray SILTY CLAY till and pebbles.
							15	
					49		18	
							25	
Moist to Wet	High to Low	Non to Mod.	F25	0.4/0	50	2.0'	4	CLAYEY SAND and pebbles.
							10	
					51		15	Gray SILTY CLAY till.
							21	
Moist	High	Mod.	F26	0/0	52	1.4'	12	Gray SILTY CLAY till and pebbles.
							11	
					53		14	
							24	
Moist	High	Mod.	F27	0.6/0	54	1.5'	17	As above, sandstone fragments.
							23	
					55		32	Base of 8 IN. PVC
							50	
Moist to Very Mo	High to Low	Mod. to Non	F28	0/0	56	1.8'	24	As above, becomes sandy and silty.
							27	
					57		40	Coarse SAND and GRAVEL, some silt and clay.
							44	
Wet to Moist	Med to Low	Mod. to Non	F29	0.4/0	58	2.0'	19	Fine to medium grain SAND and SILT
							29	Medium sand.
					59		34	Sand and gravel and clay till.
							32	Fine to medium SAND and SILT.
Wet to Moist	Low	Slight	F30	0.4/0	60	2.0'	23	Alternating medium grain SAND and SILTY till, pebbles.
							26	
					61		31	
Wet	Low	Slight	F31	1/0.2	62	0.85'	4	Very coarse SAND and fine GRAVEL.
							9	
					63		15	
							23	
Moist	Med.	Non	F32	1/0.7	64	1.25'	19	Gray SANDY CLAY till and pebbles.
							37	
					65		35	Fine-medium SAND, brown and gray, small percentage of clay.
							37	
Moist to Damp	High	Mod.	F33	1/0.4	66	1.2'	20	Gray SILTY CLAY till with abundant pebbles.
							20	
					67		18	
							30	Pure gray CLAY till.
Damp to Very Moist			F34	3.2/1	68	1.35'	22	
							30	Fine grain SAND, brown, well sorted.
					69		30	
							45	Total Depth 69 FT.
					70			

GRAPHIC LOG



WELL COMPLETION

GROUT
GROUT
GROUT
GROUT
SEAL
SEAL
2 IN. STAINLESS STEEL RISER
STAINLESS STEEL SCREEN
SAND PACK
SAND PACK
SUMP

LOCATION MAP

ERM–MIDWEST WELL LOG

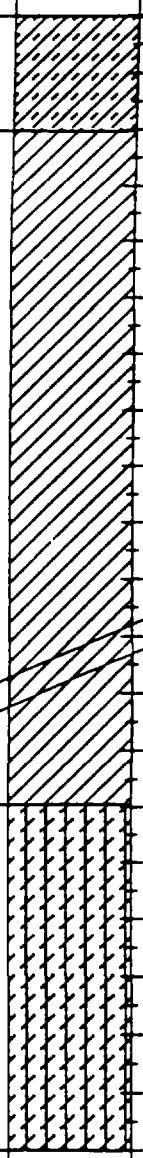
BORE NUMBER ► F-VF6	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 7/10/90	WEATHER ► Partly Cloudy,90F
LOGGED BY ► RLD	DRILLED BY ► Mathes
DRILLING METHOD ► HSA Rotary Fluid	SAMPLING METHOD ► Split Spoon and NX-Wireline Core
ELEVATION ► 1160.9 FT.	GRAVEL PACK ► #5 Quartz Sand / SEAL ► Bentonite

CASING ► TYPE PVC, Steel DIAMETER 10"/8" LENGTH 38.5'/52' | WATER LEVEL INITIAL 10.69 FT. ☐ B.G.S. ■ B.M.P. | HOLE DIA. 3.25 IN.

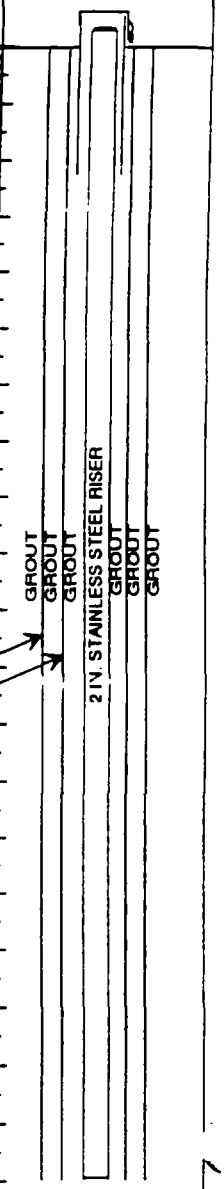
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 IN. DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 10.69 FT. H.M.P. 2.38 FT. | TOTAL DEPTH 96 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry				F1	0 / 0	0–2	0.5'	6, 10, 10, 8	Brown SILTY CLAY, pebbles.
Moist		Med.	Mod.	F2	0 / 0	2–4	1.0'	6, 5, 5, 5	Brown CLAY sandy, pebbles.
Moist		Med. to Stiff	Mod.	F3	0 / 2.2	4–6	1.3'	4, 4, 4, 7	Brown CLAY sandy to gray and brown clay.
Moist		Stiff	Mod.	F4	1 / 0	6–8	1.0'	4, 5, 5, 5	Gray and brown CLAY, some pebbles.
Damp		Med.	Mod.	F5	2.5 / 0.4	8–10	1.3'	1, 2, 3, 3	Gray and brown CLAY as above. more pebbles some oxidized.
Very Moist		Med.	Plast.	F6	5.2 / 0.2	10–12	1.3'	2, 2, 2, 2	As above, sandy zones.
Very Moist		Med. to Low	Mod. to Non	F7	1000 / 5.8	12–14	1.5'	0, 2, 2, 2	As above, and organic fragments(appears to be fill material).
Very Moist		Med. to Stiff	Mod.	F8	800 / 0	14–16	1.45'	1, 2, 3, 5	Brown CLAY SILT sand and pebbles.
Moist		Stiff	Mod.	F9	9 / 0	16–18	1.35'	2, 3, 4, 4	As above. Sandier.
Very Moist		Stiff	Mod.	F10	0 / 3.2	18–20	1.4'	1, 9, 15, 16	As above. Large percent of pebbles and sand in clay matrix.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ F-VF6

ERM–MIDWEST WELL LOG

CONTENT	G	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Moist to Wet		Stiff	Mod.	F11	0	20–21	0.8'	2, 6, 5, 4	Brown SILTY CLAY till, some pebbles.
Wet		Low	Non	F12	10	22–23	1.1'	3, 4, 8, 6	Very coarse grain SAND and GRAVEL
Wet		Low	Non	F13	0.4	24–25	1.4'	6, 6, 8, 8	As above.
						26		4	Fine SAND to silt, pebbles.
Wet to Moist		Low	Non	F14	2.0	27	1.6'	7, 8, 10	Brown SILTY CLAY till.
Moist		Med.	Mod.	F15	0	28–29	1.7'	4, 5, 8	Brown SILTY CLAY till, pebbles.
						30		16, 4	Fine-coarse SAND to gravel.
Wet		Low	Mod.	F16	2.0	31	1.6'	9, 11, 9	Gray SILTY CLAY till.
Moist		Med.	Mod.	F17	0.8	32–33	1.78'	4, 6, 8	
						34		9, 1	As above.
Moist		Med.	Mod.	F18	0	35	1.6'	3, 4, 5	
						36		1	As above.
Moist		Med. to Stiff	Mod.	F19	0.2	37	2.0'	5, 6, 7	
						38		4	2 IN. red CLAY
Moist		Stiff	Plast.	F20	1.0	39	1.0'	3, 10, 12	Gray CLAY till and pebbles.
Damp to Wet		High to Low	Non	F21	0.2	40–41	1.7'	7, 15, 21, 23	Gray CLAY till. Gray SANDY till, pebbles.
						42		17	Base of 10 IN. PVC
Moist to Wet		High	Non	F22	0.7	43	1.6'	17, 16	Coarse SAND and GRAVEL
Moist to Wet		Low	Non	F23	0.6	44–45	1.6'	16, 17, 21	Gray CLAY till, sandstone and shale fragments.

GRAPHIC LOG

WELL COMPLETION

GROUT
GROUT
GROUT
2 IN. STAINLESS STEEL RISER
GROUT
GROUT
GROUT

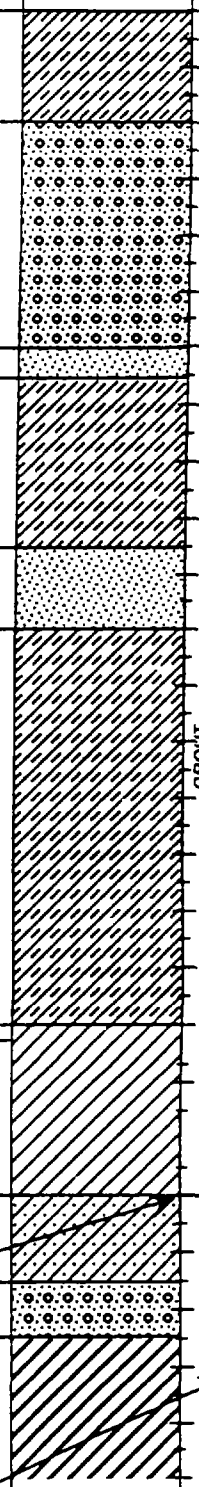
8 IN. Steel

WELL NUMBER ▶ F-VF6

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		2	Brown SILTY CLAY till, some pebbles.
Moist to Wet		Stiff	Mod.	F11	0	21	0.8'	6, 5, 4	
						22		3	Very coarse grain SAND and GRAVEL.
Wet		Low	Non	F12	10	23	1.1'	4, 8, 6	
						24		6	As above.
Wet		Low	Non	F13	0.4	25	1.4'	6, 8, 8	
						26		4	Fine SAND to silt, pebbles.
Wet to Moist		Low	Non	F14	2.0	27	1.6'	7, 8, 10	Brown SILTY CLAY till.
						28		4	Brown SILTY CLAY till, pebbles.
Moist		Med.	Mod.	F15	0	29	1.7'	5, 8	
						30		16	Fine-coarse SAND to gravel.
Wet		Low	Mod.	F16	2.0	31	1.6'	4, 9, 11	Gray SILTY CLAY till.
						32		9	
Moist		Med.	Mod.	F17	0.8	33	1.78'	4, 6, 8	
						34		9	As above.
Moist		Med.	Mod.	F18	0	35	1.6'	1, 3, 4	
						36		5	As above.
Moist		Med. to Stiff	Mod.	F19	0.2	37	2.0'	1, 5, 6	
						38		7	
								4	2 IN. red CLAY
Moist		Stiff	Plast.	F20	1.0	39	1.0'	3, 10	Gray CLAY till and pebbles.
						40		12	
Damp to Wet		High to Low	Non	F21	0.2	41	1.7'	7, 15	Gray CLAY till.
						42		21, 23, 17	Gray SANDY till, pebbles. Base of 10 IN. PVC
Moist to Wet		High	Non	F22	0.7	43	1.6'	17, 16	Coarse SAND and GRAVEL.
						44		16	Gray CLAY till, sandstone and shale fragments.
Moist to Wet		Low	Non	F23	0.6	45	1.6'	17, 21	

GRAPHIC LOG



WELL COMPLETION

GROUT GROUT GROUT 2 IN. STAINLESS STEEL RISER GROUT GROUT GROUT

8 IN. Steel

WELL NUMBER ▶ F-VF6

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SAMPLING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	45			
								34	
								33	
						46		60	6 IN. boulder.
							0'		
						47			
						48		8	Gray SILTY CLAY till and pebbles.
Moist		High	Slight to Mod.	F24	0/0		1.35'	15	
								18	
						49		25	
Moist to Wet		High to Low	Non to Mod.	F25	0.4/0	50	2.0'	4	CLAYEY SAND and pebbles.
								10	
						51		15	Gray SILTY CLAY till.
								21	
						52		12	Gray SILTY CLAY till and pebbles.
Moist		High	Mod.	F26	0/0		1.4'	11	
								14	
						53		24	
						54		17	As above, sandstone fragments.
Moist		High	Mod.	F27	0.6/0		1.5'	23	Base of 8 IN. Steel
								32	
						55		50	
Moist to Very Mc		High to Low	Mod. to Non	F28	0/0	56	1.8'	24	As above, becomes sandy and silty.
								27	
						57		40	Coarse SAND and GRAVEL, some silt and clay.
								44	
Wet to Moist		Med to Low	Mod. to Non	F29	0.4/0	58	2.0'	19	Fine to medium grain SAND and SILT
								29	Medium sand.
						59		34	Sand and gravel and clay till.
								32	Fine to medium SAND and SILT.
Wet to Moist		Low	Slight	F30	0.4/0	60	2.0'	23	Alternating medium grain SAND and SILTY till, pebbles.
								26	
						61		31	
						62		4	Very coarse SAND and fine GRAVEL.
Wet		Low	Slight	F31	1/0.2		0.85'	9	
						63		15	
								23	
						64		19	Gray SANDY CLAY till and pebbles.
Moist		Med.	Non	F32	1/0.7		1.25'	37	
						65		35	Fine-medium SAND, brown and gray, small percentage of clay.
								37	
Moist to Damp		High	Mod.	F33	1/0.4	66	1.2'	20	Gray SILTY CLAY till with abundant pebbles.
								20	
						67		18	
								30	Pure gray CLAY till.
Damp to Very Moist				F34	3.2/1	68	1.35'	22	
								30	Fine grain SAND, brown, well sorted.
						69		30	
								45	
						70			

GRAPHIC LOG

WELL COMPLETION

GROUT
GROUT
GROUT
GROUT
2 IN. STAINLESS STEEL RISER

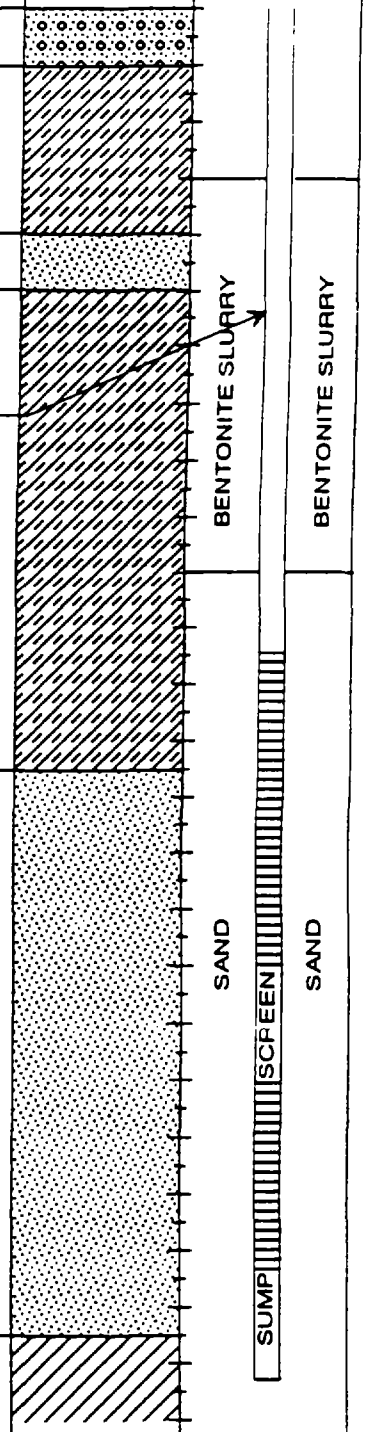
WELL NUMBER ▶ F-VF6

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Moist to Very Moist		Loose to Med.	Non	F35	OVA / Hnu 2 / 0.4	70, 71	2.0'	22, 19, 13	SAND and GRAVEL, some pebbles oxidized. Gray SILTY CLAY(bedded) grading into brown silt.
Moist to Dry		Med.	Non	F36	0 / 0	72, 73	1.2'	22, 19, 19, 30	As above except dry and large sanstone fragments.
Moist		Low	Non	F37	0 / 0	74, 75	2.0'	50, 27, 19	Medium SAND, brown, pebbles.
Moist		Med.	Mod.	F38	0.6 / 0.4	76, 77	1.55'	20, 32, 38, 18, 15	Gray SILTY CLAY till with pebbles, yellow sandstone fragments, and black shale fragments. 2 IN. Riser
Moist		Med.	Slight	F39	0 / 0	78, 79	1.35'	8, 13, 15, 22	Slightly SILTY bedded CLAY(varved) Lake Clay.
Moist to Very Moist		Low	Slight	F40	0 / 0.6	80, 81	0.75'	9, 13, 18, 19	Gray SILTY CLAY till and abundant pebbles. Yellow coarse grain sand.
Moist		Low	Non	F41	0 / 0.4	82, 83	1.1'	13, 10, 9, 8	Gray silty clay, bedded. Gray silt.
Wet		Low	Non	F42	0 / 0.2	84, 85	1.0'	7, 8, 6, 7	Very fine grain, gray-brown, SAND, plant debris.
Wet to Very Moist		Low	Non	F43	0.1 / 0.2	86, 87	1.6'	9, 9, 13, 14	As above.
Wet		Low	Non	F44	0 / 0	88, 89	1.35'	9, 13, 15, 17	As above.
Wet		Low	Non	F45	0.6 / 0	90, 91	1.6'	17, 17, 23, 24	As above.
Wet to Moist		Low	Non	F46	0.1 / 0	92, 93	1.5'	16, 22, 19, 23	As above. As above with pebbles and lithic fragments.
Moist		High	Mod.	F47	0.1 / 0	94, 95	1.3'	13, 22, 25, 50/4"	Gray CLAY till, pebbles

GRAPHIC LOG

WELL COMPLETION



WELL NUMBER ▶ F-VF6

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA / Hnu	95			Gray CLAY till, pebbles.		
Wet				F48	0 / 0	96	0.4'		Medium gray Silty SHALE, weathered.		Total Depth 96 FT.
						97					
						98					
						99					
						100					
						101					
						102					
						103					
						104					
						105					
						106					
						107					
						108					
						109					
						110					
						111					
						112					
						113					
						114					
						115					
						116					
						117					
						118					
						119					
						120					

LOCATION MAP

ERM–MIDWEST WELL LOG

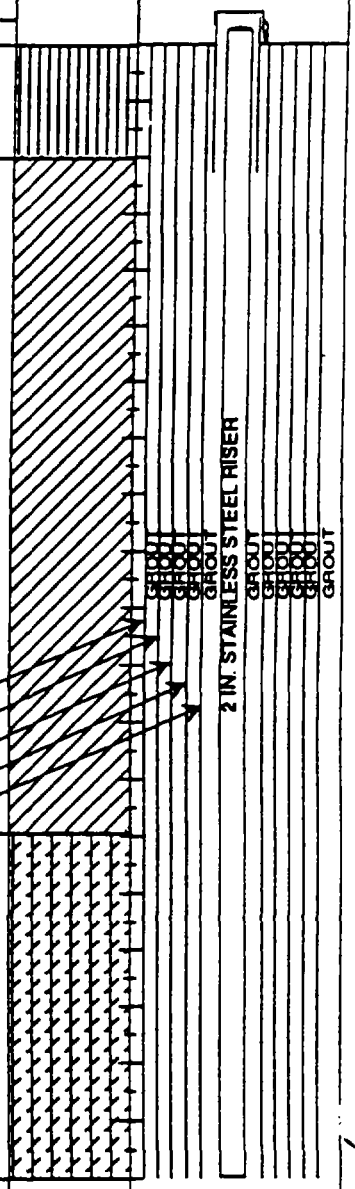
BORE NUMBER ▶ F-Lower Bedrock	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 10/04/91	WEATHER ▶ Cloudy,65F
LOGGED BY ▶ RLD/RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA Rotary Fluid	SAMPLING METHOD ▶ Split Spoon and NX-Wireline Core
ELEVATION ▶ 1160.9 FT.	GRAVEL PACK ▶ #5 Quartz Sand / SEAL ▶ Bentonite

CASING ▶ TYPE Steel/Steel/Steel Steel/PVC/S.S. DIAMETER 16"/14"/10" 8"/5"/2" LENGTH 34'/47'/85' 79.5'/96.5'/117.5' | WATER LEVEL INITIAL 10.69 FT. ■ B.G.S. ○ B.M.P. | HOLE DIA. 4 3/4 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 IN. DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 130 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry				F1	OVA/Hnu 0/0	0–1	0.5'	6, 10, 10, 8	Brown SILTY loam, pebbles.
Moist		Med.	Mod.	F2	0/0	2–3	1.0'	6, 5, 5, 5	Brown CLAY loam sandy, pebbles.
Moist		Med. to Stiff	Mod.	F3	0/2.2	4–5	1.3'	4, 4, 4, 7	Brown CLAY loam sandy to gray and brown clay.
Moist		Stiff	Mod.	F4	1/0	6–7	1.0'	4, 5, 5, 5	Gray and brown CLAY, some pebbles.
Damp		Med.	Mod.	F5	2.5/0.4	8–9	1.3'	1, 2, 3, 3	Gray and brown CLAY as above. more pebbles some oxidized.
Very Moist		Med.	Plast.	F6	5.2/0.2	10–11	1.3'	2, 2, 2, 2	As above, sandy zones.
Very Moist		Med. to Low	Mod. to Non	F7	1000/5.8	12–13	1.5'	0, 2, 2, 2	As above, and organic fragments(appears to be fill material).
Very Moist		Med. to Stiff	Mod.	F8	800/0	14–15	1.45'	1, 2, 3, 5	Brown CLAY SILT sand and pebbles.
Moist		Stiff	Mod.	F9	9/0	16–17	1.35'	2, 3, 4, 4	As above. Sandier.
Very Moist		Stiff	Mod.	F10	0/3.2	18–19	1.4'	1, 9, 15, 16	As above. Large percent of pebbles and sand in clay matrix.

GRAPHIC LOG / WELL COMPLETION



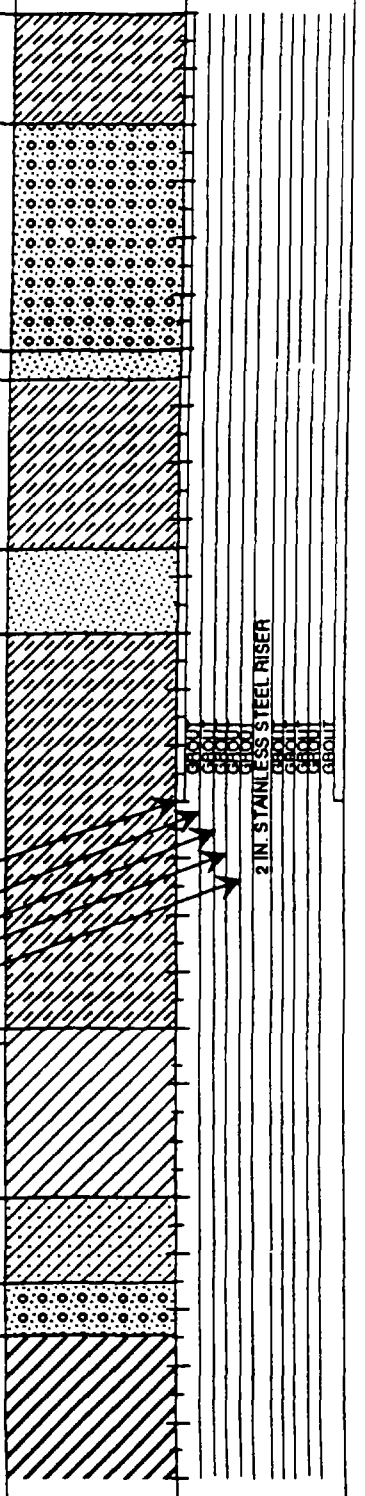
WELL NUMBER ▶ **F-Lower Bedrock**

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	S.G.	DENSITY	PLASTICITY	SAMPLE NO	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Moist to Wet		Stiff	Mod.	F11	0	20–21	0.8'	2, 6, 5, 4	Brown SILTY CLAY till, some pebbles.
Wet		Low	Non	F12	10	22–23	1.1'	3, 4, 8, 6	Very coarse grain SAND and GRAVEL.
Wet		Low	Non	F13	0.4	24–25	1.4'	6, 6, 8, 8	As above.
Wet to Moist		Low	Non	F14	2.0	26–27	1.6'	4, 7, 8, 10	Fine SAND to silt, pebbles. Brown SILTY CLAY till.
Moist		Med.	Mod.	F15	0	28–29	1.7'	4, 5, 8	Brown SILTY CLAY till, pebbles.
Wet		Low	Mod.	F16	2.0	30–31	1.6'	16, 4, 9	Fine-coarse SAND to gravel.
Moist		Med.	Mod.	F17	0.8	32–33	1.78'	11, 9, 4, 6	Gray SILTY CLAY till.
Moist		Med.	Mod.	F18	0	34–35	1.6'	8, 9, 1, 3	As above.
Moist		Med. to Stiff	Mod.	F19	0.2	36–37	2.0'	4, 5, 1, 5	As above.
Moist		Stiff	Plast.	F20	1.0	38–39	1.0'	6, 7, 4, 3	2 IN. red CLAY; Gray CLAY till and pebbles.
Damp to Wet		High to Low	Non	F21	0.2	40–41	1.7'	10, 12, 7, 15	Gray CLAY till.
Moist to Wet		High	Non	F22	0.7	42–43	1.6'	21, 23, 17, 17	Gray SANDY till, pebbles.
Moist to Wet		Low	Non	F23	0.6	44–45	1.6'	16, 17, 21	Coarse SAND and GRAVEL. Gray CLAY till, sandstone and shale fragments.

GRAPHIC LOG

WELL COMPLETION

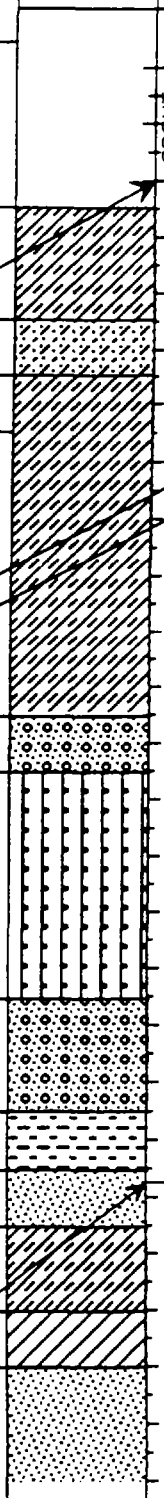


WELL NUMBER ▶ F-Lowerbedrock

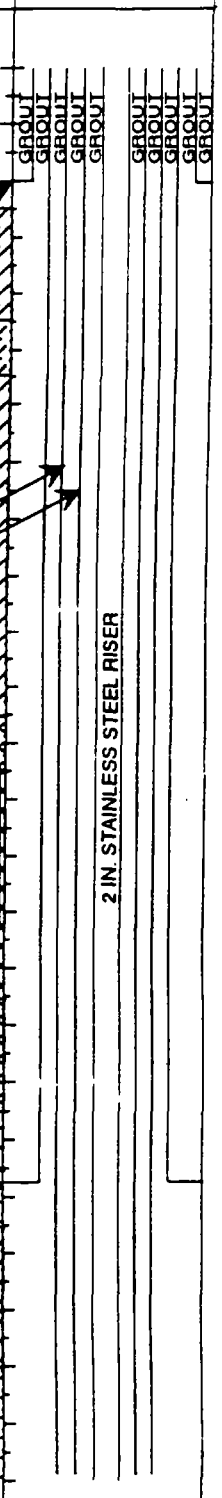
ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	45		34	
						46		33	
							0'	60	6 IN. boulder.
						47			
Moist		High	Slight to Mod.	F24	0 / 0	48	1.35'	8	Gray SILTY CLAY till and pebbles.
								15	
						49		18	Base of 14 IN. Steel
								25	
Moist to Wet		High to Low	Non to Mod.	F25	0.4 / 0	50	2.0'	4	CLAYEY SAND and pebbles.
								10	
						51		15	Gray SILTY CLAY till.
								21	
Moist		High	Mod.	F26	0 / 0	52	1.4'	12	Gray SILTY CLAY till and pebbles.
								11	
						53		14	
								24	
Moist		High	Mod.	F27	0.6 / 0	54	1.5'	17	As above, sandstone fragments.
								23	8 IN Steel
						55		32	5 IN. PVC
								50	
Moist to Very Moist		High to Low	Mod. to Non	F28	0 / 0	56	1.8'	24	As above, becomes sandy and silty.
								27	
						57		40	Coarse SAND and GRAVEL, some silt and clay.
								44	
Wet to Moist		Med to Low	Mod. to Non	F29	0.4 / 0	58	2.0'	19	Fine to medium grain SAND and SILT
								29	Medium sand.
						59		34	Sand and gravel and clay till.
								32	Fine to medium SAND and SILT.
Wet to Moist		Low	Slight	F30	0.4 / 0	60	2.0'	23	Alternating medium grain SAND and SILTY till, pebbles.
								26	
						61		31	
Wet		Low	Slight	F31	1 / 0.2	62	0.85'	4	Very coarse SAND and fine GRAVEL.
								9	
						63		15	
								23	
Moist		Med.	Non	F32	1 / 0.7	64	1.25'	19	Gray SANDY CLAY till and pebbles.
								37	
						65		35	Fine-medium SAND, brown and gray, small percentage of clay.
								37	
Moist to Damp		High	Mod.	F33	1 / 0.4	66	1.2'	20	Gray SILTY CLAY till with abundant pebbles.
								20	
						67		18	Base of 10 IN. Steel
								30	Pure gray CLAY till.
Damp to Very Moist				F34	3.2 / 1	68	1.35'	22	
								30	Fine grain SAND, brown, well sorted.
						69		30	
								45	
						70			

GRAPHIC LOG



WELL COMPLETION



GROUT GROUT GROUT GROUT GROUT GROUT GROUT GROUT GROUT GROUT

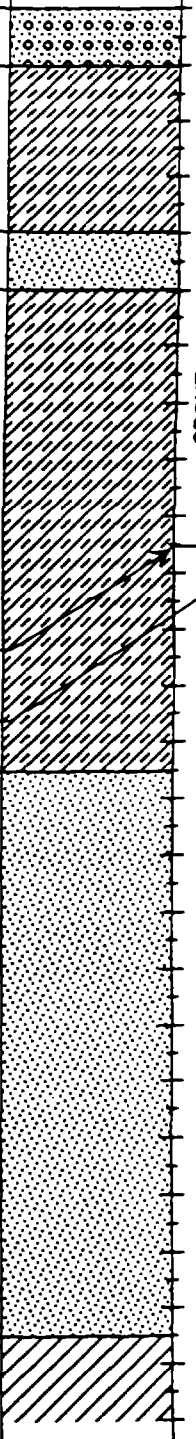
2 IN. STAINLESS STEEL RISER

WELL NUMBER ▶ **F-Lower Bedrock**

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	USC	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Moist to Very Moist		Loose to Med.	Non	F35	OVA / Hnu 2 / 0.4	70	2.0'	22, 19	SAND and GRAVEL, some pebbles oxidized.
						71		13	Gray SILTY CLAY(bedded) grading into brown silt.
Moist to Dry		Med.	Non	F36	0 / 0	72	1.2'	22, 19, 19	
						73		30	As above except dry and large sandstone fragments.
						74		50	
Moist		Low	Non	F37	0 / 0		2.0'	27, 19	Medium SAND, brown, pebbles.
						75		20	Gray SILTY CLAY till with pebbles, yellow sandstone fragments, and black shale fragments.
Moist		Med.	Mod.	F38	0.6 / 0.4	76	1.55'	32, 38, 18	
						77		15	
Moist		Med.	Slight	F39	0 / 0	78	1.35'	8, 13, 15	Slightly SILTY bedded CLAY(varved)
						79		22	
Moist to Very Moist		Low	Slight	F40	0 / 0.6	80	0.75'	9, 13, 18	Gray SILTY CLAY till and abundant pebbles. Yellow coarse grain sand.
						81		19	Base of 8 IN. Steel
Moist		Low	Non	F41	0 / 0.4	82	1.1'	13, 10, 9	Gray silty clay, bedded. 5 IN. PVC
						83		8	Gray silt.
Wet		Low	Non	F42	0 / 0.2	84	1.0'	7, 8, 6	Very fine grain, gray-brown, SAND, plant debris.
						85		7	
Wet to Very Moist		Low	Non	F43	0.1 / 0.2	86	1.6'	9, 9, 13	As above.
						87		14	
Wet		Low	Non	F44	0 / 0	88	1.35'	9, 13, 15	As above.
						89		17	
Wet		Low	Non	F45	0.6 / 0	90	1.6'	17, 17, 23	As above.
						91		24	
Wet to Moist		Low	Non	F46	0.1 / 0	92	1.5'	16, 22, 19	As above. As above with pebbles and lithic fragments.
						93		23	
Moist		High	Mod.	F47	0.1 / 0	94	1.3'	13, 22, 25	Gray CLAY till, pebbles
						95		50/4"	

GRAPHIC LOG



WELL COMPLETION

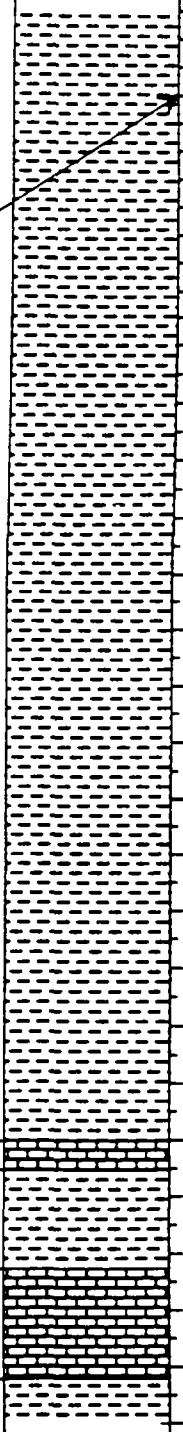
GROUT
GROUT
GROUT
2 IN. STAINLESS STEEL RISER
GROUT
GROUT
GROUT

WELL NUMBER ▶ **F-Lower Bedrock**

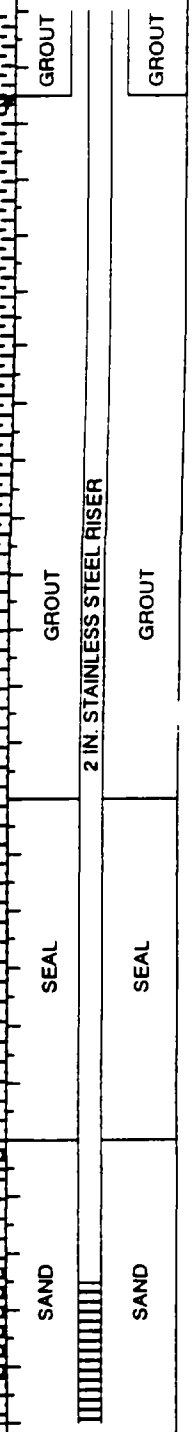
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	95, 96			SHALE
Dry				Run 1	0 / 4	97, 98, 99	2.9'		SHALE, fractured, dry, horizontal fractures, gray to dark gray. **Base of 5 IN. PVC**
Dry				Run 2	0 / 3	100, 101, 102, 103, 104, 105, 106, 107, 108, 109	9.95'		SHALE, very fractured, dry. SHALE, less fractured. SHALE, very few fractures.
Wet									
Dry				Run 3	0 / 3	110, 111, 112, 113, 114, 115, 116, 117, 118, 119	9.3'		Gray SHALE, abundant horizontal fractures, dry. LIMESTONE, pyrite crystals. Gray SHALE. Dark gray to black LIMESTONE, fossil fragments.
Wet						120			Gray to black SHALE, non fractured.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ F-Lower Bedrock

ERM—MIDWEST WELL LOG

CONTENT	G	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA/Hnu	120			RQD 4.95/10 FT. Dark gray to black SHALE, abundant horizontal fractures.		SAND PACK
						121					
						122					
						123					
						124					
Wet				Run 4	0.2/3.5	125	9.9'		Limestone (0.2 FT. thick), shell fragments.		STAINLESS STEEL SCREEN
						126					
						127			Limestone (0.2 FT. thick), shell fragments.		
						128			COAL		SUMP
						129			Light gray SILTSTONE, shell fragments.		SAND PACK
						130			Total Depth 130 FT.		
						131					
						132					
						133					
						134					
						135					
						136					
						137					
						138					
						139					
						140					
						141					
						142					
						143					
						144					
						145					

LOCATION MAP

ERM–MIDWEST WELL LOG

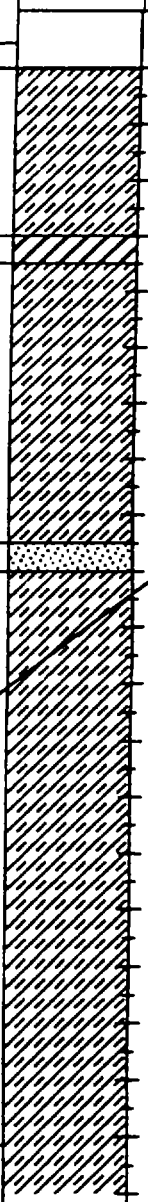
BORE NUMBER ▶ G-Upper Bedrock	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 6/26 - 6/29/90	WEATHER ▶ Sunny, 75F
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 6 1/4 IN. Hollow Stem Auger and 5 1/2 IN. Rollercone	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1156.70 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE Steel DIAMETER 8 IN. LENGTH 32 FT. | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 5.25 IN.

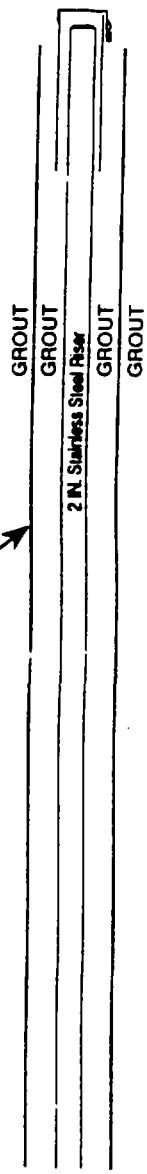
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 47.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	-	Soft	Slight	1	OVA/Hnu 0/1.0	0–1	1.0'	2, 3, 4, 4	Medium brown SILTY CLAY becoming slightly clayier with depth
Dry	-	Soft	Slight	2	70/0	2–3	0.83'	3, 10, 10	Black "trash" with glass fragments.
Dry	-	Soft	Slight	3	3/0	4–5	1.3'	7, 4, 7, 8	Brown SILTY CLAY with gray mottles throughout, some glass at top of sample .
Dry	-	Stiff	Slight	4	1.5/1.0	6–7	0.92'	10, 9, 12, 16	Same as above.
Dry to Wet	Mod.	Hard	Slight	5	1.0/0	8–9	1.9'	19, 5, 15, 20	Brown, fine grain, SAND, wet.
Dry	-	Hard	Slight	6	0/0	10–11	1.25'	30, 7, 15, 25	Dark-Medium brown SILTY CLAY with gray mottles, stiff, dry. Medium brown SILTY CLAY with gray mottles. 8 IN. Steel Casing
Dry	-	Stiff	Slight	7	0/0	12–13	1.0'	30, 6, 12, 20	Grades into gray SILTY CLAY.
Dry	-	Soft	Very	8	0/0	14–15	1.5'	20, 5, 6, 7	Gray SILTY CLAY, soft and plastic.
Dry	-	Soft	Very	9	0/0	16–17	1.1'	12, 3, 9, 15	Same as above.
Dry to Damp	-	Soft	Very	10	0/0	18–19	1.1'	16, 6, 9, 12	Same as above.
						20		19	Brown-gray SILTY CLAY, becomes slightly sandy and damp, some rock fragments.

GRAPHIC LOG



WELL COMPLETION



UMBER ▶ G-Upper Bedrock

ERM—MIDWEST WELL LOG

DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
			OVA/Hnu	20		4, 8, 12, 20	Medium brown CLAYEY SAND and sandy clay, fine grained, damp to moist.
Mod.	Soft	Slight	11	21	1.3'		
			0/0				Brown SILTY CLAY.
				22		7, 7	Brown SANDY CLAY, clayey sand, moist. Wet sand seam at 22.4 FT.
-	Soft	Slight	12	23	1.5'	12, 7	Gray SILTY CLAY with wet seam.
			0.2/0	24		6, 6, 9, 8	
Mod.	Soft	Slight	13	25	1.16'		Gray SILTY CLAY with several wet silt-fine sand seams otherwise dry.
			0/0	26		9, 5, 10, 19	
-	Soft	Very	14	27	0.25'		Gray SILTY CLAY, very plastic.
			0/0	28		10, 100/4	
Poor	Hard	Non	15		0.75'		Gray SAND, fine to coarse grain, with cobbles, fine upwards.
			3.5/0	29		55, 75, 42, 15	
Poor	Hard	Non	16	30	0.3'		Cobbles and SAND, rock fragments.
			1.8/0	31		15, 25	
Mod.	Soft to Hard	Non	17	32	0.6'		Gray SANDSTONE, weathered, fine grain with mica chips.
			1.5/0			100/3	R.Q.D. = 2.1 FT.
		Run #1	0/0	33	2.85'		Buff brown SANDSTONE with heavy iron staining, micacous, fine to coarse grain with some cross-bedding.
				34			
				35			**Base of 8 IN. Steel Casing.**
		Run #2	0/0	36	3.15'		R.Q.D. = 0.38 FT.
				37			Same light colored rust staining to 37 FT. Between 37-39 FT. blue-gray SANDSTONE, fine to coarse grain, wet.
				38			
				39			R.Q.D. = 3.5 FT.
		Run #3	0.2/0	40	4.5'		Blue-gray SANDSTONE, fine to coarse grain, micacous, scattered coal layers, massive, wet.
				41			
				42			
				43			
		Run #4	0.2/0	44	4.0'		R.Q.D. = 3.1 FT. Blue gray SANDSTONE, fine to coarse grain, micacous, massive, scattered coal layers, wet.
				45			
				46			
				47			End of Boring 47.5 FT.

GRAPHIC LOG

WELL COMPLETION: GROUT; GROUT; 2 IN. STAINLESS STEEL RISER; GROUT; GROUT; SEAL; SEAL; SAND; STAINLESS STEEL SCREEN; SAND; SUMP

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ►	H-Shallow	LOCATION ►	Ruetgers-Nease, Salem, Ohio
DATE ►	6/19/90	WEATHER ►	Clear, Warm
LOGGED BY ►	RLD	DRILLED BY ►	Matnes
DRILLING METHOD ►	4 1/4 Hollow Stem Auger	SAMPLING METHOD ►	Split Spoon
ELEVATION ►	1175 FT.	GRAVEL PACK ►	#5 Quartz Sand
SEAL ►	Bentonite		

CASING ► TYPE DIAMETER LENGTH

WATER LEVEL INITIAL 2.22 FT. ■ B.G.S. □ B.M.P.

HOLE DIA. 9.25 IN.

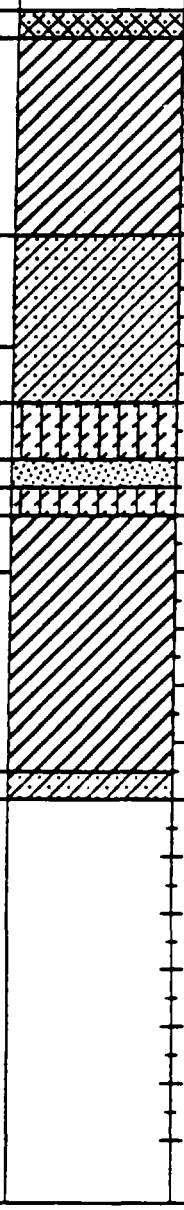
SCREEN ► TYPE 304 Stainless Steel SLOT DIAMETER 2 IN. LENGTH 5 FT.

WATER LEVEL AT COMPLETION 4.62 FT. H.M.P. 2.4 FT.

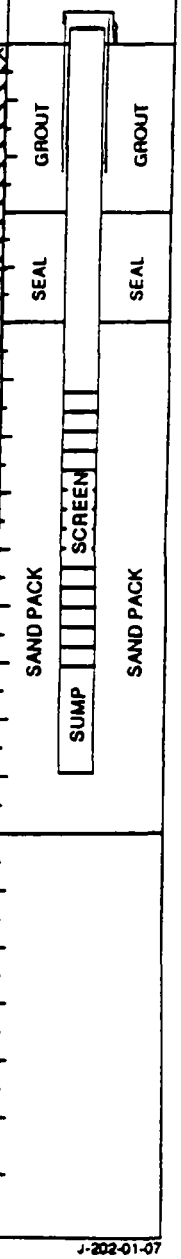
TOTAL DEPTH 14 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	0		5	Brown top soil and vegetation.
Moist			Slight to Non	1	0 / 0.2	1	1.1'	7, 6	Gray mottled CLAY(oxidized).
						2		8	Light gray mottled CLAY, pebbles.
Moist			Slight	2	0 / 0	3	1.1'	7, 10, 12, 12	Gray and brown CLAY mottled, sandy, oxidized pebbles.
Moist			Slight to Non	3	0 / 0	4, 5	1.1'	2, 4, 6, 6	Sandstone cobble, red brown sandy loam, pebbles, fine grain sand oxidized.
Wet to Moist		Stiff	Slight to Non	4	0 / 0	6, 7	1.5'	3, 3, 4, 4	Brown SANDY CLAY loam, pebbles some oxidized. Olive gray CLAY and SILT
Wet to Moist		Stiff	Non to Plast.	5	0 / 0	8, 9	1.5'	1, 2, 3, 3	Medium coarse SAND. Red brown CLAYEY SILT. Medium gray CLAY
Wet to Moist		Stiff	Non to Plast.	6	0 / 0	10, 11	1.5'	0, 1, 2, 3	Medium gray CLAY till, sandy.
Moist to Wet		Stiff	Plast.	7	0 / 3.8	12, 13	1.15'	1, 1, 5	Gray CLAY till.
						14		3	Coarse SAND and CLAY
						15, 16, 17, 18, 19, 20			Total Depth 14 Feet.

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM—MIDWEST WELL LOG

BORE NUMBER ▶ HVF1	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 06/20/90	WEATHER ▶ Cloudy, Cool
LOGGED BY ▶ RAF, RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1\4 Hollow Stem Auger	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1169.4 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

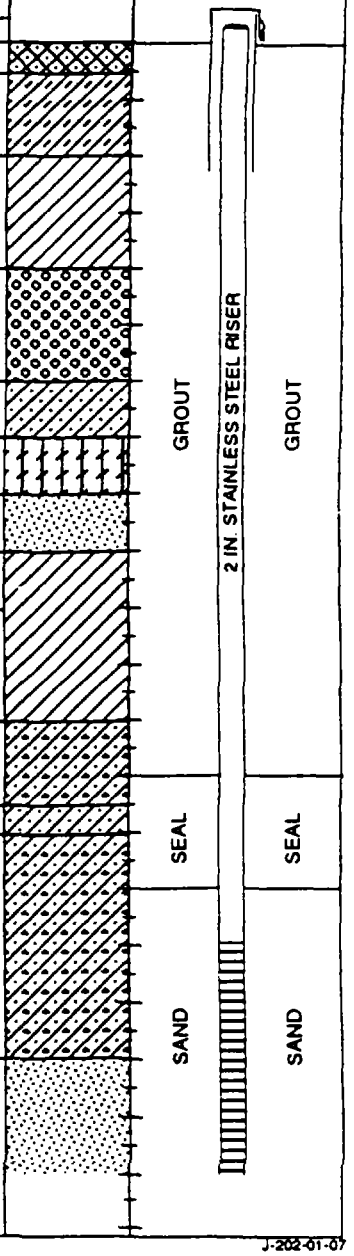
CASING ▶ TYPE 304 Stainless Steel DIAMETER 2 IN. LENGTH 19 FT. | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 16 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 24 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		6	Brown TOPSOIL
Moist			Non	1	0/0.2	1	1.1'	6, 6, 8	Gray mottled SILTY CLAY, oxidized.
Moist			Slight	2	0/0	2, 3	1.1'	7, 10, 12, 12	Gray and brown CLAY mottled, sandy, oxidized, pebbles.
Moist			Slight	3	0/0	4, 5	1.1'	2, 4, 6, 6	Sandstone COBBLE, sandy clay, red-brown pebbles, sand fine grain, oxidized.
Wet			Slight	4	0/0	6, 7	1.5'	3, 3, 4, 4	SANDY CLAY, brown pebbles, some oxidized, 2 IN. medium sand. Olive gray CLAY and SILT and red brown silt.
Moist			Slight	5	0/0	8, 9	1.3'	1, 2, 3, 3	Medium to coarse SAND, muddy, red-brown clay silt. Medium gray CLAY.
Moist			Slight	6	0/0.4 BKG	10, 11	1.3'	0, 1, 2, 3	Medium gray CLAY till, sandy. 2 IN. of gray CLAY till.
Moist			Plast.	7	0/0.2-0.4 0.4 BKG	12, 13	1.15'	1, 1, 5, 3	Gray TILL. Coarse SAND and CLAY.
Moist		Med. Stiff	Slight	8	0/0.4 BKG	14, 15	1.25'	2, 3, 3, 5	Gray TILL, silty, pebbles, (erratic).
Moist		Med. Stiff	Slight	9	0/0	16, 17	1.25'	1, 2, 3, 4	Gray TILL as above.
W	Mod.	Soft	Plast.	10	0/0	18, 19, 20	1.3'	4, 5, 5, 5	Coarse SAND well rounded, medium sorted coal fragment, pebbles at base.

GRAPHIC LOG

WELL COMPLETION



WELL NUMBER ▶ HVF1

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA / Hnu	20					
Wet	Well	Soft	-	11	0 / 0	21	1.2'	5, 4, 3	Gray SAND and GRAVEL, medium grained.		SAND PACK
Dry	Poor	Soft	Slight			22		5, 1	Gray SILTY CLAY with trace gravel.		S. S. SUMP
Dry	Poor	Soft	Slight	12	0 / 0	23	1.7'	2, 2, 5	Total Depth 23 FT.		SAND PACK
						24					
						25					
						26					
						27					
						28					
						29					
						30					
						31					
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					
						41					
						42					
						43					
						44					
						45					

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ▶	HUB	LOCATION ▶	Ruetgers-Nease, Salem, Ohio
DATE ▶	06/19/90 09/10/91	WEATHER ▶	Cloudy, Cool
LOGGED BY ▶	RAF, RLD	DRILLED BY ▶	Mathes
DRILLING METHOD ▶	4 1\4 Hollow Stem Auger	SAMPLING METHOD ▶	24 IN. Split Spoon
ELEVATION ▶ 1170 FT.	GRAVEL PACK ▶	#5 Sand	SEAL ▶ Bentonite

CASING ▶ TYPE PVC\Steel\S.S. DIAMETER 10"/6"/2" LENGTH 17'/30'/34'

WATER LEVEL INITIAL 21.7 FT. ■ B.G.S. □ B.M.P.

HOLE DIA. 17.5/ 8.25 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT.

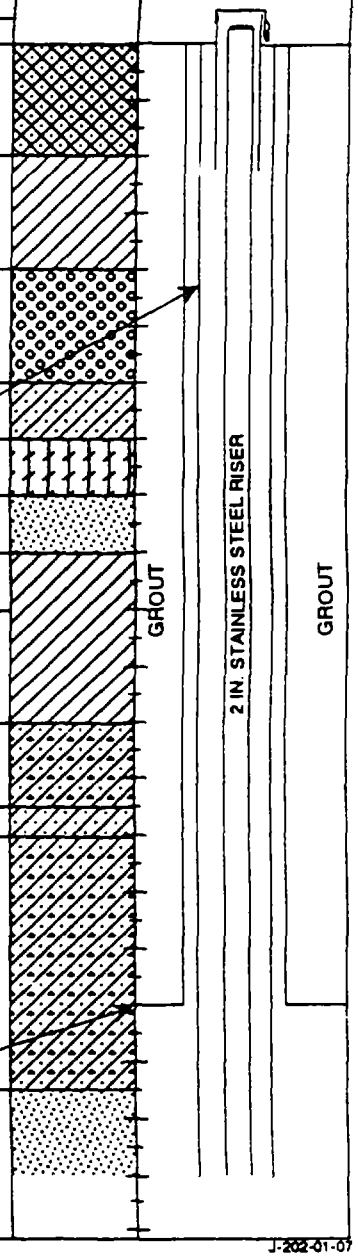
WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 46.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		6/5	Brown TOPSOIL and vegitation.
Moist			Non to Slight	1	0/0.2	1	1.1'	6/7 6/6 6/8	Gray mottled clay (oxidized). Same as above, light gray mottled clay pebbles.
						2		7	Gray and brown CLAY mottled, sandy, oxidized, pebbles.
Moist			Slight	2	0/0	3	1.1'	10 12 12	
						4		2	Sandstone COBBLE, sandy clay, red-brown pebbles, sand fine grain, oxidized.
Moist			Slight to Non	3	0/0	5	1.1'	4 6/6 6/6	
						6		3	SANDY CLAY loam, brown pebbles, some oxidized. 2 IN. medium sand. (6 IN. Steel)
Wet to Moist		Stiff	Slight	4	0/0	7	1.25'	3 4 4	Olive gray CLAY and SILT and red brown silt.
						8		1	Medium to coarse SAND, muddy, red-brown clay silt.
Wet to Moist		Stiff	Non Plast.	5	0/0	9	1.25'	2 3 3	Medium gray CLAY.
						10		0	
Wet to Moist		Stiff	Non to Plast.	6	0/0.4 BKG	11	1.25'	1 2 3	Medium gray CLAY till, sandy. 2 IN. of gray CLAY till.
						12		1	Gray TILL, pure.
Moist to Wet		Stiff	Plast.	7	0/0.2-0.4 0.4 BKG	13	1.15'	1 5 3	
						14		2	Coarse SAND and CLAY. Gray TILL, silty, pebbles.
Moist		Med. Stiff	Slight	8	0/0.4 BKG	15	1.25'	3 3 5	
						16		1	Gray TILL as above.
Moist		Med. Stiff	Slight	9	0/0	17	1.25'	2 3 4	
						18		1	Gray TILL as above. (End of 10 IN. PVC)
Moist to Wet				10	0.6/0.4 BKG	19	1.75'	3 3 5	Coarse SAND well rounded, medium sorted coal fragment, pebbles at base (channel lag).
						20			

GRAPHIC LOG

WELL COMPLETION

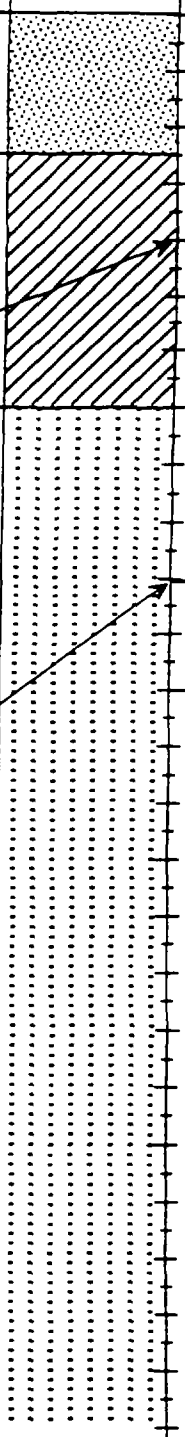


WELL NUMBER ▶ **HUBA**

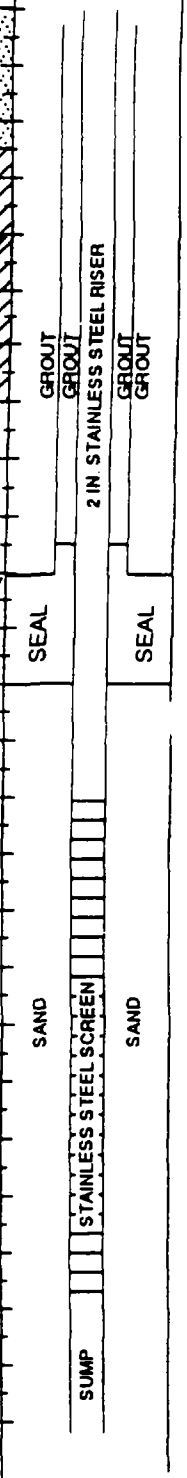
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	20			
Wet to Sat.				11	0 / 0	21	0.4'	0, 0, 1, 1	SAND, fine to medium grain at top, coarse at base large pebbles.
						22			Same as above.
Wet to Moist		Stiff	Slight	12	0 / 0	23	1.75'		Gray CLAY till.
						24			
Dry	Poor	Soft	Very Plast.	13	0 / 0	25	1.4'	2, 3, 5, 9	Same as above, trace gravel. End of 16 IN. Steel
						26			
Dry	Poor	Soft	Slight	14	0 / 0	27	1.1'	2, 5	Same as above, gravel.
								50	Weathered gray SANDSTONE, fractured.
Dry	Poor	Hard	Non	15	0 / 0	28	0.7'	40, 50	
						29			Same as above. Gray SILTY CLAY, trace silt, race gravel.
						30	0'		Coarse grain, light gray SANDSTONE, 31-34 FT. highly fractured, 34-34.6 FT. silty shale, tan and gray.
						31			
						32			End of 6 IN. Steel
						33			
						34			
Sat.	Mod.	-	-	C1	0 / 6	35	9.0'		35.3-36.7 FT. stained yellow-orange.
						36			
						37			37-38.8 FT. iron stained.
						38			
						39			39.3-40 FT. iron stained.
						40			RQD. 7.6
						41			40-50 FT. medium to coarse SANDSTONE. gray and iron stained.
						42			42.7-42.9 FT. highly fractured.
Sat.	Mod.	-	-	C2	0 / 6	43	9.9'		4 IN. fine sand seam.
						44			Same as above.
						45			

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ **HUBA**

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SOIL COLOR	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA/Hnu	45			Coarse SANDSTONE.		SUMP
						46					
						47					
Sat.	Mod.	-	-	C2	0/6	48					SAND
						49					
						50					
						51					
						52					
						53			Total Depth 50 FT.		SAND
						54					
						55					
						56					
						57					
						58					
						59					
						60					
						61					
						62					
						63					
						64					
						65					
						66					
						67					
						68					
						69					
						70					

LOCATION MAP

ERM–MIDWEST WELL LOG

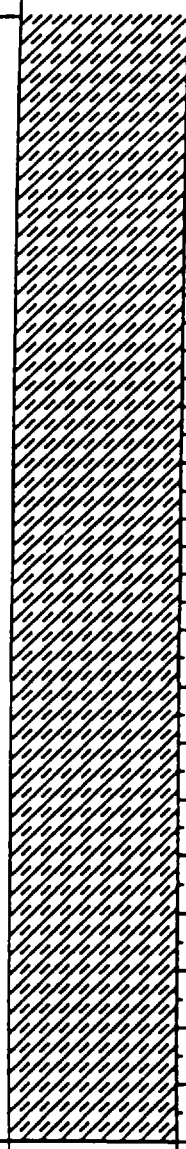
BORE NUMBER ▶	I-SHALLOW	LOCATION ▶	Ruetgers-Nease, Salem, Ohio
DATE ▶	5/2/90	WEATHER ▶	Overcast, Cool
LOGGED BY ▶	DLF	DRILLED BY ▶	Mathes
DRILLING METHOD ▶	4 1/4 Hollow Stem Auger	SAMPLING METHOD ▶	Split Spoon
ELEVATION ▶	1208.05 FT.	GRAVEL PACK ▶	#5 Quartz Sand
		SEAL ▶	Bentonite

CASING ▶ TYPE 304 Stainless Steel DIAMETER 2 IN. LENGTH | WATER LEVEL INITIAL 21.5 FT. ☐ B.G.S. ■ B.M.P. | HOLE DIA. 9.25 IN.

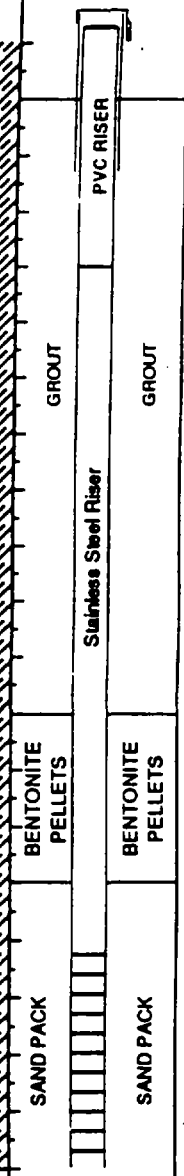
SCREEN ▶ TYPE 304 Stainless Steel SLOT DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 23.55 FT. H.M.P. 1.96 | TOTAL DEPTH 28 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		1	Medium brown SILTY CLAY.
Damp				1	0/0	1	0.5'	2	
								3	
						2		3	
								1	Medium brown SILTY CLAY, some very fine grain sand. More clay rich at base.
Damp		Dense		2	0/0	3	0.8'	2	
								4	
						4		6	
								3	Medium-dark brown-reddish sandy, silty, clay, few sandy cobbles.
Damp		Dense		3	0/0	5	1.0'	6	
								8	
						6		7	
								6	Reddish brown clay rich silt some pebbles, mottled.
Moist		Dense		4	0/0	7	1.3'	7	
								9	
						8		9	
								1	Reddish brown, clay rich, silt, very fine grain sand. Clay at base.
Moist				5	0/0.2	9	1.0'	2	
								2	
						10		3	
								1	Medium brown-reddish, clay rich, silt. Medium gray, silty clay at base.
Damp				6	0/0	11	1.5'	2	
								4	
								5	
						12		1	Medium-light gray silty clay, traces of organic material, mottled.
Damp		Dense		7	0/5.8	13	1.3'	3	
								5	
						14		4	
								2	Same.
Damp		Dense		8	0/5.8	15	1.5'	5	
								1	
						16		7	
								3	Medium-dark gray, SILTY CLAY, some fine sand.
Damp		Dense		9	0/6.2	17	1.3'	6	
								6	
						18		8	
								1	Same.
Damp				10	0/3.2	19		3	
								4	
						20		8	Reddish brown fine sand at base.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▸ I-SHALLOW

ERM–MIDWEST WELL LOG

Unified	S	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA/Hnu	20		1			
								2	Reddish brown sand, fine grain, with clay, bottom 1 IN. dark gray clay as above. 3 IN. zone saturated.		
	Poor			11	0/0.4	21	1.3'	3			
								4			
						22		4	Clay rich silt to very fine grain sand, medium-dark gray, few pebbles.		
				12	0/0.4	23	1.5'	4			
								5			
						24		8			
								1	Medium brown CLAY SILT with pebbles, increase in size with depth to gravel. hard		
Moist		Soft		13	Slt/5.8	25	1.3'	2			
								7			
						26		16	Medium-dark gray weathered SHALE.		
								7			
Damp		Soft Shale		14	Slt/1	27	1.3'	14			
								37			
								53			
						28			TOTAL DEPTH 28.1 FT.		
						29					
						30					
						31					
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					
						41					
						42					
						43					
						44					
						45					

SAND PACK
SCREEN
SAND PACK
SUMP

LOCATION MAP

ERM–MIDWEST WELL LOG

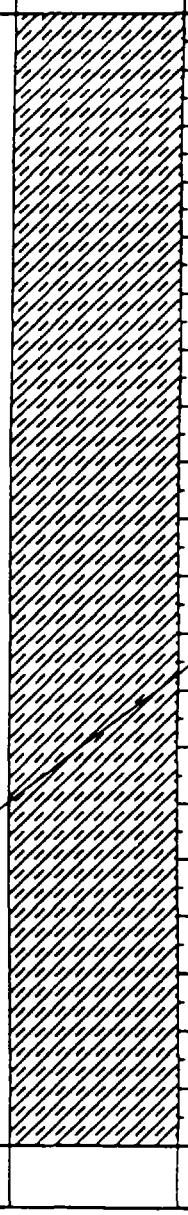
BORE NUMBER ► I-Shale	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/9/90	WEATHER ► Clear, Mild
LOGGED BY ► DLF	DRILLED BY ► Mathes
DRILLING METHOD ► 4 1/4 IN. HSA and Rotary; Air and Fluid	SAMPLING METHOD ► Split Spoon and NX-Wireline Core
ELEVATION ► 1207.75 FT.	GRAVEL PACK ► #5 Sand 31.5-43.5
SEAL ► Bentonite	

CASING ► TYPE Steel/S.S. DIAMETER 8"/2" LENGTH 31'/32.5' | WATER LEVEL INITIAL 22.28 FT. ■ B.G.S. □ B.M.P. | HOLE DIA. 5 1/2 IN.

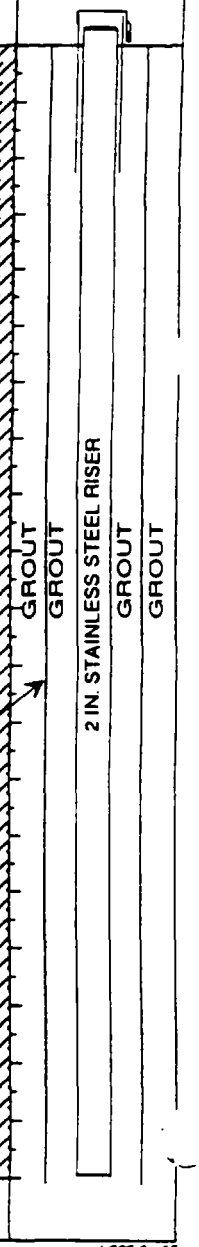
SCREEN ► TYPE 304 Stainless Steel SLOT.01" DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 24.49 FT. H.M.P. 2.21 | TOTAL DEPTH 45 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		1	Medium brown SILTY CLAY.
Damp				1	0/0	1	0.5'	2	
								3	
						2		3	
								1	Medium brown SILTY CLAY, some very fine grain sand. More clay rich at base.
Damp		Dense		2	0/0	3	0.8'	2	
								4	
						4		6	
								3	Medium-dark brown-reddish sandy, silty, clay, few sandy cobbles.
Damp		Dense		3	0/0	5	1.0'	6	
								8	
						6		7	
								6	Reddish brown clay rich silt some pebbles, mottled.
Moist		Dense		4	0/0	7	1.3'	7	
								9	
						8		9	
								1	Reddish brown, clay rich, silt, very fine grain sand. Clay at base.
Moist				5	0/0.2	9	1.0'	2	
								2	
						10		3	
								1	Medium brown-reddish, clay rich, silt. Medium gray, silty clay at base.
Damp				6	0/0	11	1.5'	2	
								4	
						12		5	
								1	Medium-light gray silty clay, traces of organic material, mottled.
Damp		Dense		7	0/5.6	13	1.3'	3	
								5	
						14		4	
								2	Same.
Damp		Dense		8	0/5.8	15	1.5'	5	
								1	
						16		7	
								3	Medium-dark gray, SILTY CLAY, some fine sand, some iron.
Damp		Dense		9	0/6.2	17	1.3'	6	
								6	
						18		8	
								1	Same.
Damp				10	0/3.2	19		3	
								4	
						20		8	Reddish brown fine sand at base.

GRAPHIC LOG



WELL COMPLETION



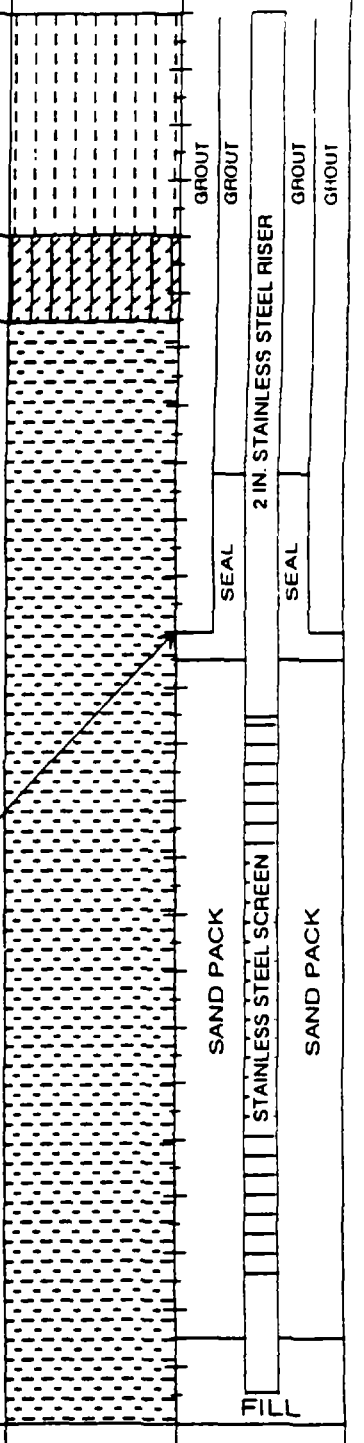
WELL NUMBER ▶ I-Shale

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SOIL	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	20		1	
Sat.	Poor			11	0/0.4	21	1.3'	2, 3, 4	Reddish brown sand, fine grain, with clay, bottom 1 IN. dark gray clay as above. 3 IN. zone saturated
						22		4	
				12	0/0.4	23	1.5'	4, 5, 8	
						24		1	Medium brown CLAY SILT with pebbles, increase in size with depth to gravel. hard
Moist		Soft		13	Slt/5.8	25	1.3'	2, 7	
						26		16	Medium-dark gray weathered SHALE.
Damp		Soft Shale		14	Slt/1	27	1.3'	7, 14, 37, 53	
Damp					0.6	28		6	Light gray thinly laminated weathered SHALE, silty.
						29		16, 34, 50	
						30			
						31			Highly fractured dark brown, silty to very fine grain sandy SHALE with many vertical fractures, some vertical fractures and bedding plane fractures have iron strain.
				CORE #1	0	32, 33	2.6'		
						34			
						35			BASE OF 8 IN. STEEL
				CORE #2	0	36, 37, 38, 39, 40	3.3'		Dark brown thinly laminated silty SHALE, few vertical fractures in places, interbedded with siltstone to very fine grain sandstone.
						41, 42, 43, 44			
						45			Total Depth 45 FT.

GRAPHIC LOG

WELL COMPLETION



LOCATION MAP

ERM—MIDWEST WELL LOG

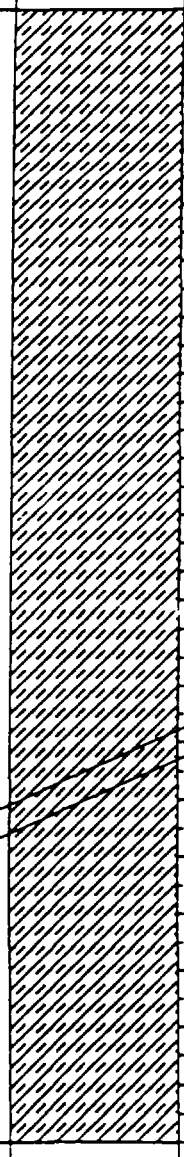
BORE NUMBER ▶ I Upper Bedrock	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/3/90	WEATHER ▶ Clear, Cool
LOGGED BY ▶ DLF/RLD	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ HSA 4.25 to 31 FT. Rotary: Air and Fluid	SAMPLING METHOD ▶ Split Spoon and NX-Wireline Core
ELEVATION ▶ 1207.95 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE Steel/Steel/S.S. DIAMETER 8"/6"/2" LENGTH 31'/60'/62.5' | WATER LEVEL INITIAL 28.15 FT. ☐ B.G.S. ■ B.M.P. | HOLE DIA 5.5 IN.

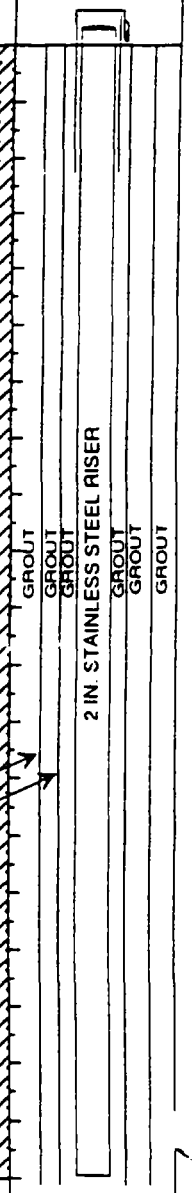
SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. 2.21 | TOTAL DEPTH 74.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		1	Medium brown SILTY CLAY.
Damp				1	0/0	1	0.5'	2 3 3	
						2		1	Medium brown SILTY CLAY, some very fine grain sand. More clay rich at base.
Damp		Dense		2	0/0	3	0.8'	2 4 6	
						4		3	Medium-dark brown-reddish sandy, silty, clay, few sandy cobbles.
Damp		Dense		3	0/0	5	1.0'	6 8 7	
						6		6	Reddish brown clay rich silt some pebbles, mottled.
Moist		Dense		4	0/0	7	1.3'	7 9 9	
						8		1	Reddish brown, clay rich, silt, very fine grain sand. Clay at base.
Moist				5	0/02	9	1.0'	2 2 3	
						10		1	Medium brown-reddish, clay rich, silt. Medium gray, silty clay at base.
Damp				6	0/0	11	1.5'	2 4 5	
						12		1	Medium-light gray silty clay, traces of organic material, mottled.
Damp		Dense		7	0/5.8	13	1.3'	3 5 4	
						14		2	Same. 8 IN. Steel / 6 IN. Steel
Damp		Dense		8	0/5.8	15	1.5'	5 1 7	
						16		3	Medium-dark gray, SILTY CLAY, some fine sand, some iron.
Damp		Dense		9	0/6.2	17	1.3'	6 6 8	
						18		1	Same.
Damp				10	0/3.2	19		3 4 8	
						20			Reddish brown fine sand at base.

GRAPHIC LOG



WELL COMPLETION

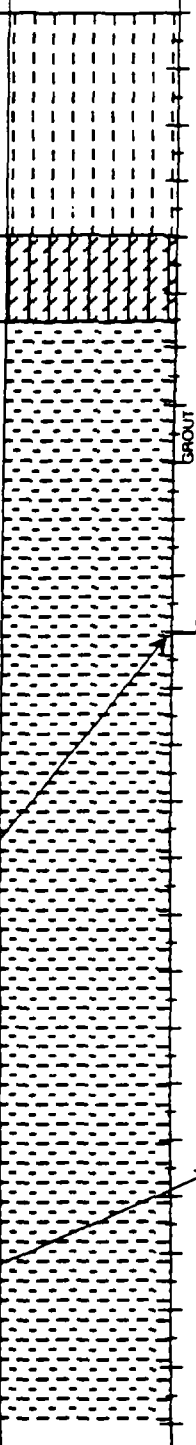


WELL NUMBER ▶ I Upper Bedrock

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		1	
Sat.	Poor			11	0/0.4	21	1.3'	2, 3, 4	Reddish brown sand, fine grain, with clay, bottom 1 IN. dark gray clay as above. 3 IN. zone saturated
						22		4	Clay rich SILT to very fine grain sand, medium-dark gray, few pebbles.
				12	0/0.4	23	1.5'	4, 5, 8	
						24		1	Medium brown CLAY SILT with pebbles, increase in size with depth to gravel, hard
Moist		Soft		13	Slt/5.8	25	1.3'	2, 7	
						26		16	Medium-dark gray weathered SHALE.
Damp		Soft		14	Slt/1	27	1.3'	7, 14, 37, 53	
Damp					0.6	28		6	Light gray thinly laminated weathered SHALE, silty.
						29		16, 34, 50	
						30			
						31			Highly fractured dark brown, silty to very fine grain sandy SHALE with many vertical fractures, some vertical fractures and bedding plane fractures have iron strain.
				CORE #1	0	32, 33	2.6'		RQD=0
						34			
						35			Bottom of 8 IN. Steel
						36			
						37			
						38			Dark brown thinly laminated silty SHALE, few vertical fractures in places, interbedded with siltstone to very fine grain sandstone.
				CORE #2	0	39, 40	3.3'		RQD=0
						41			
						42			8 IN. Steel
						43			
						44			
						45			

GRAPHIC LOG

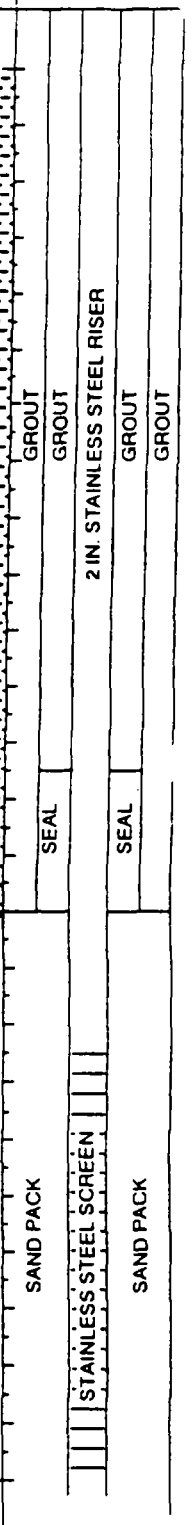


WELL COMPLETION

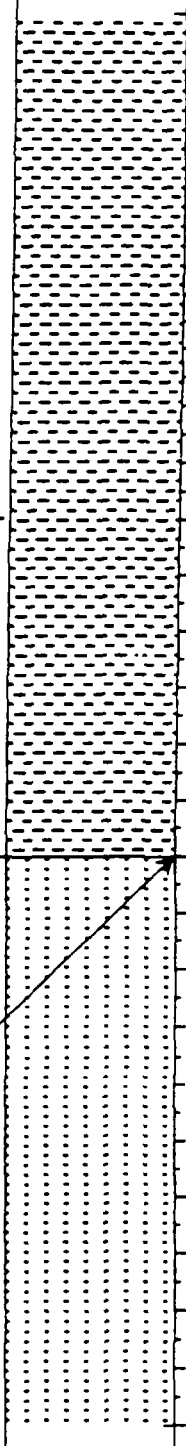
GROUT GROUT GROUT 2 IN. STAINLESS STEEL RISER GROUT GROUT GROUT

WELL NUMBER ▶ I-Upper Bedrock

ERM—MIDWEST WELL LOG



MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
				Core #3		45			Dark gray clay rich siltstone, very fine grain. Top 1 FT. becoming dark gray-black SHALE with silty lenses(stringers).		GROUT; GROUT; 2 IN. STAINLESS STEEL RISER; GROUT; GROUT
						46					
						47	3.1'				
						48					
						49					
				Core #4		50			Top 2 FT. same as above.		
						51					
						52	1.5'		Black COAL.		
						53					
						54			Soft, medium-light gray SHALE.		
				Core #5		55					
						56					
						57	0.4'		Soft, medium-light gray SHALE.		
						58					SEAL; SEAL
						59					
				Core #6		60					
						61			SANDSTONE, medium-light gray, medium to well sorted, slight cross bedding, fine grain. small amount of opaque material, sub rounded miscellaneous.		
						62					
						63	5.5'		Bottom of 6 IN. Steel.		
Wet						64					SAND PACK; STAINLESS STEEL SCREEN; SAND PACK
						65					
Wet				Core #7		66					
						67			Same as above.		
Wet						68	2.5'+		R.Q.D. 3.97 FT.		
						69					
Wet						70					



WELL NUMBER ▶ I-Upper Bedrock

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SOIL	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
						70			Same as above.		SAND PACK / SUMP / SAND PACK
						71	3.45'				
Wet				Core #8	0	72					
						73	3.5'				
						74					
						75			Total Depth 74.5 FT.		
						76					
						77					
						78					
						79					
						80					
						81					
						82					
						83					
						84					
						85					
						86					
						87					
						88					
						89					
						90					
						91					
						92					
						93					
						94					
						95					

LOCATION MAP

ERM—MIDWEST WELL LOG

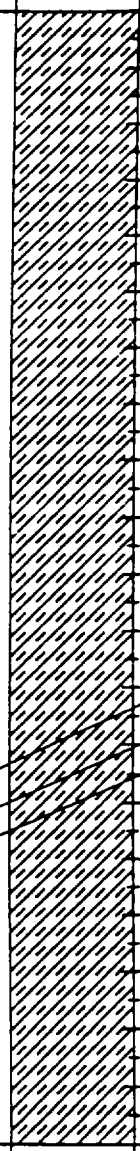
BORE NUMBER ► H-Lower Bedrock		LOCATION ► Ruetgers-Nease, Salem, Ohio	
DATE ► 5/14/90		WEATHER ► Partly Cloudy, Breezy Warm	
LOGGED BY ► RLD		DRILLED BY ► Mathes	
DRILLING METHOD ► HSA 12.25 to 31 FT. Rotary; Air and Fluid		SAMPLING METHOD ► Split Spoon and NX-Wireline Core	
ELEVATION ► 1207.45 FT.	GRAVEL PACK ► #5 Quartz Sand	SEAL ► Bentonite	

CASING ► TYPE PVC, Steel DIAMETER 10"/8"/6"/2" LENGTH 35'/50'/116.4'/134' | WATER LEVEL INITIAL 28.15 FT. ☐ B.G.S. ■ B.M.P. | HOLE DIA. 5 1/2 IN.

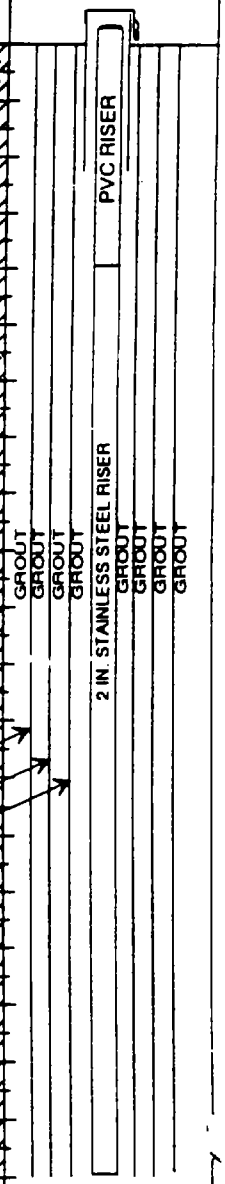
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION 43.70 FT. H.M.P. 2.56 | TOTAL DEPTH 222.4 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		1	Medium brown SILTY CLAY.
Damp				1	0/0	1	0.5'	2 3 3	
						2		1	Medium brown SILTY CLAY, some very fine grain sand. More clay rich at base.
Damp		Dense		2	0/0	3	0.8'	2 4 6	
						4		3	Medium-dark brown-reddish sandy, silty, clay, few sandy cobbles.
Damp		Dense		3	0/0	5	1.0'	6 8 7	
						6		6	Reddish brown clay rich silt some pebbles, mottled.
Moist		Dense		4	0/0	7	1.3'	7 9 9	
						8		1	Reddish brown, clay rich, silt, very fine grain sand. Clay at base.
Moist				5	0/0.2	9	1.0'	2 2 3	
						10		1	Medium brown-reddish, clay rich, silt. Medium gray, silty clay at base.
Damp				6	0/0	11	1.5'	2 4 5	
						12		1	Medium-light gray silty clay, traces of organic material, mottled.
Damp		Dense		7	0/5.8	13	1.3'	3 5 4	
						14		2	Same.
Damp		Dense		8	0/5.8	15	1.5'	5 1 7	
						16		3	Medium-dark gray, SILTY CLAY, some fine sand,
Damp		Dense		9	0/6.2	17	1.3'	6 6 8	
						18		1	Same.
Damp				10	0/3.2	19		3 4 8	
						20			Reddish brown fine sand at base.

GRAPHIC LOG



WELL COMPLETION

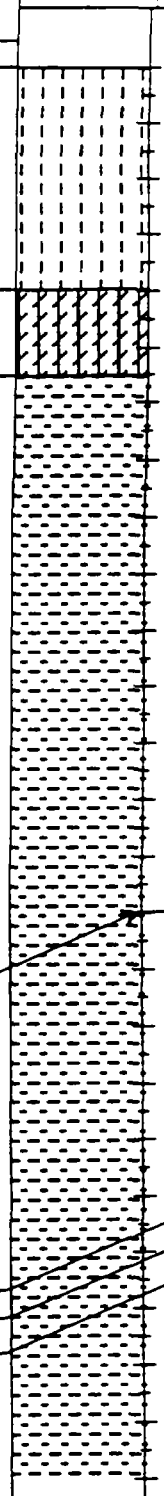


WELL NUMBER ▶ I-Lower Bedrock

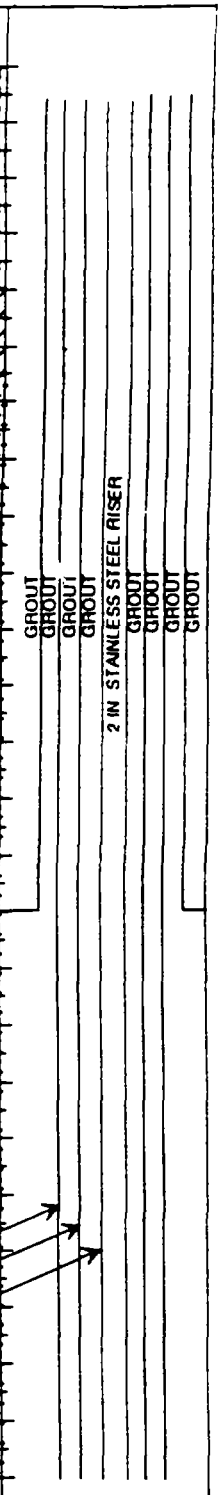
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	20		1	
Sat.	Poor			11	0/0.4	21	1.3'	2, 3, 4	Reddish brown sand, fine grain, with clay, bottom 1 IN. dark gray clay as above. 3 IN. zone saturated.
						22		4	
				12	0/0.4	23	1.5'	4, 5, 8	Clay rich SILT to very fine grain sand, medium-dark gray, few pebbles.
						24		1	Medium brown CLAY SILT with pebbles, increase in size with depth to gravel. hard
Moist		Soft		13	Slt/5.8	25	1.3'	2, 7	
						26		16, 7	Medium-dark gray weathered SHALE.
Damp		Soft Shale		14	Slt/1	27	1.3'	14, 37, 53	
Damp					0.6	28		6, 16, 34, 50	Light gray thinly laminated weathered SHALE, silty.
						29			
						30			
						31			Highly fractured dark brown, silty to very fine grain sandy SHALE with many vertical fractures, some vertical fractures and bedding plane fractures have iron strain.
				CORE #1		32			
					0	33	2.6'		
						34			
						35			
						36			Base of 10 IN. PVC
						37			
						38			Dark brown thinly laminated silty SHALE, few vertical fractures in places, interbedded with siltstone to very fine grain sandstone.
						39			
				CORE #2	0	40	3.3'		
						41			
						42			
						43			
						44			
						45			

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ **I-Lower Bedrock**

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
				Core #3	OVA / Hnu	45–49	3.1'		Dark gray clay rich siltstone, very fine grain. Top 1 FT. becoming dark gray-black SHALE with silty lenses(stringers).
				Core #4		50–54	1.5'		Top .2 FT. same as above. Black COAL. Base of 8 IN. Steel
				Core #5		55–59	0.4'		Soft, medium-light gray SHALE. Soft, medium-light gray SHALE.
Wet				Core #6		60–65	5.5'		SANDSTONE, medium-light gray, medium to well sorted, slight cross bedding, fine grain. Micaceous small amount of opaque material, sub rounded. 6 IN. Steel
Wet				Core #7		66–70			Same as above. R.Q.D. 3.97 FT.
Wet									
Wet									

GRAPHIC LOG

WELL COMPLETION: GROUT; GROUT; GROUT; 2 IN. STAINLESS STEEL RISER; GROUT; GROUT; GROUT

MBER ▶ I-Lower Bedrock | ERM–MIDWEST WELL LOG | Page 4 of 10

DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
			OVA / Hnu	70			Same as above.		
				71	3.45'				
			0	72					
				73	3.5'				
		Core #9	0.0 / 0.5	74					
				75			SANDSTONE as above.		
				76			R.Q.D. 9.5 FT.		
				77					
				78	10		SANDSTONE becomes more coarse now, medium-coarse sub round.		
				79					
				80			SANDSTONE, medium to light gray.		GROUT GROUT GROUT GROUT
				81			Cross-bedding.		
				82					
				83					
		Core #10		84			SANDSTONE as above. R.Q.D. 5.05 FT.		
				85					
			0.0 / 1.2	86	5.6'				
				87					
				88			At 86.3 FT., light brown-tan silt lense, with coal streaks.		
				89					
		Core #11		90	1.2'		As above. R.Q.D. 1.05 FT.		
		Core #12		91					
				92					
				93					
				94					
				95					

6 IN. Steel

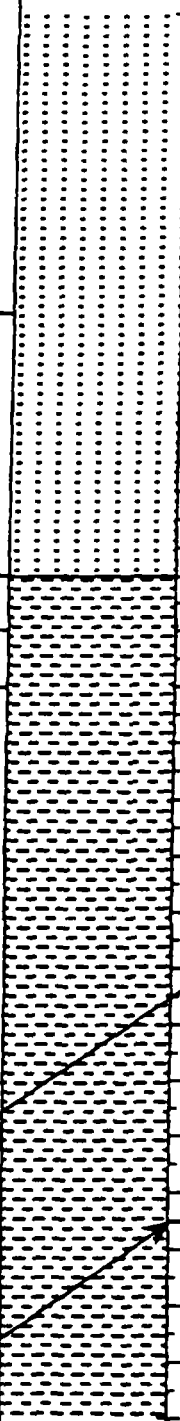
2 IN. Riser

WELL NUMBER ▶ **I-Lower Bedrock**

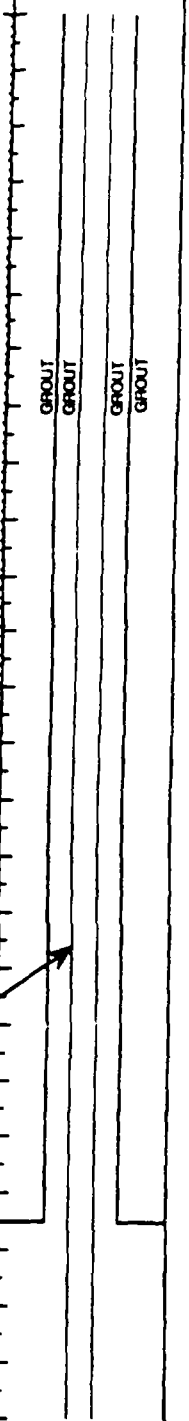
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Wet				Core #12	OVA / Hnu 0	95–100	9.7'		SANDSTONE as above, coal stringers. R.Q.D. 7.9 FT.
Dry Wet Dry Wet				Core #13	0	101–105	4.7'		SANDSTONE as above, coal stringers, channel lag at base. R.Q.D 3.45 FT.
Dry Dry				Core #14	0	105–111	5.0'		Dark gray SHALE. Black coaly SHALE. Medium-light gray SHALE. R.Q.D. 0.0 FT.
Dry Dry				Core #15	0	111–116	5.2'		R.Q.D. 4.0 FT. 2 IN. Riser
Dry				Core #16	0	116–120			Medium-light gray SHALE R.Q.D. 3.64 FT. Base of 6 IN. Steel

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ I-Lower Bedrock | ERM–MIDWEST WELL LOG | Page 6 of 10

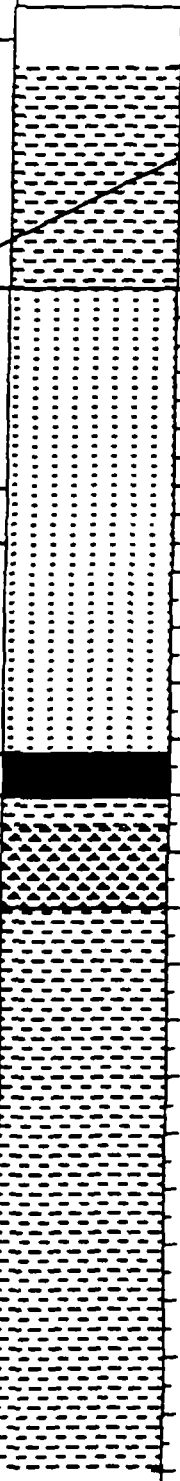
CONTENT	SC	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
				Core #16	0	120			Medium gray shale		GROUT
						121	6.9'				
					0	122					
						123					
				Core #17	0	124					
						125					
						126			Medium gray shale.		
						127	9.0'		R.Q.D. 3.1 FT.		
					0	128					
						129			2 IN. Riser		SEAL
						130					
						131					
						132					
				Core #18	0.2	133			Medium-dark gray shale		SAND
						134					
						135			Black silty SHALE.		
Wet					0.8				Black LIMESTONE.		
						136			Dark gray platy SHALE.		
					0.1	137			Dark gray-black LIMESTONE, shell fragments.		
					4.0	138	9.4'				
						139			Dark gray-black, platy SHALE.		SCREEN
					1.0	140			R.Q.D. 3.4 FT.		
						141					
						142					
				Core #19		143			Dark gray-black LIMESTONE, shell fragments.		
						144			Dark gray black SHALE.		SUMP
						145			R.Q.D. 5.1 FT.		

WELL NUMBER ▸ **I-Lower Bedrock**

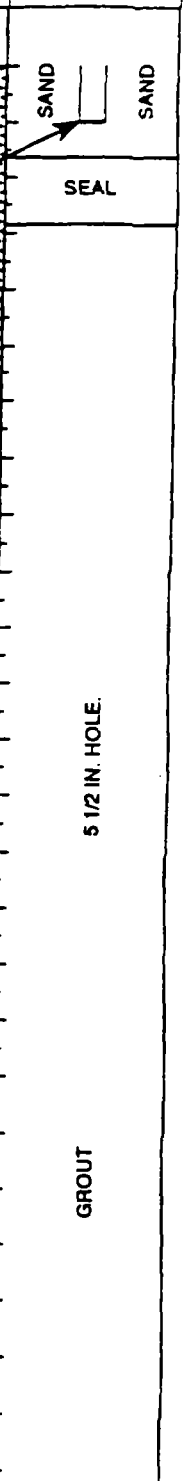
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
				Core #19		145–149	9.6'		Dark gray to black SHALE. Bottom of Sump
				Core #19		149–152			Calcite cement, medium gray, silty SANDSTONE.
Dry				Core #20	0	153	1.0'		Medium-light gray siltstone. R.Q.D. 0.47 FT.
				Core #21	0	154–157			Medium-light gray siltstone. R.Q.D. 2.82 FT.
						157–158			COAL.
						158			Dark gray-black SHALE(carbonate cement).
				Core #22	0	159–162	4.0'		CHERT, brown-tan. Underclay light gray-tan calareous. R.Q.D. 1.17 FT.
				Core #23	0	163–170	10.15'		Medium gray SHALE (siliceous cement). R.Q.D. 6.25 FT. Zones of interbedded round coarse grain sandstone.

GRAPHIC LOG



WELL COMPLETION



ERM–MIDWEST WELL LOG

SC	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
			Core #23		170–172			Medium gray SHALE.		
			Core #24		173–176			Siltstone and SHALE interbedded.		5 1/2 IN. HOLE.
					175–176			Dark gray-black SHALE(clay), fissile, wet.		
					177–178	10'		Dark gray-black silty SHALE. R.Q.D. 6.8 FT.		
					179–180					
					181–182			Light gray, silty SHALE.		
			Core #25		183			Medium gray SANDSTONE, fine to medium grain.		GROUT
					184–187			Black SHALE. R.Q.D. 8.5 FT.		
					188–192	9.95'		Brown SHALE, some siltstone.		
			Core #26		193–195			Black SHALE, siltstone lenses. R.Q.D. 8.5 FT.		3 IN. HOLE. GROUT

WELL NUMBER ▶ I-Lower Bedrock

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
Dry				Core #26		195			Black SHALE.		GROUT 3 IN HOLE. GROUT
						196					
						197					
						198	9.8'				
						199					
						200					
						201					
						202					
Dry				Core #27	2	203			Dark gray-black SHALE.		
						204					
						205					
					10	206			COAL		
							10.1'		Gray-black silty SANDSTONE, very fine grain. Coal partings.		
						207					
					12	208			R.Q.D. 6.2 FT.		
					6	209					
						210					
						211					
					2	212			Gray clay SHALE.		
Dry				Core #28	2	213			Gray-light gray clay SHALE.		
									Dark gray-black SHALE.		
						214			R.Q.D. 8.2 FT.		GROUT 3 IN HOLE. GROUT
						215					
						216	9.75'				
						217					
						218					
						219					
						220					

NUMBER ▶ I-Lower Bedrock

ERM—MIDWEST WELL LOG

SO	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					220			Dark gray-black SHALE.		GROUT
					221					3 IN. HOLE.
					222					GROUT
					223			Total Depth 222.4 FT.		
					224					
					225					
					226					
					227					
					228					
					229					
					230					
					231					
					232					
					233					
					234					
					235					
					236					
					237					
					238					
					239					
					240					
					241					
					242					
					243					
					244					
					245					

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ►	J-LBA	LOCATION ►	Ruetgers-Nease, Salem, Ohio
DATE ►	6/11/90, 9/20/91	WEATHER ►	Sunny, 75F
LOGGED BY ►	JDK, RAF, RLD	DRILLED BY ►	Mathes/Sprowls
DRILLING METHOD ►	12 1/4, 4 1/4 H.S.A. 5 7/8 Roller Cone, 7 7/8 Bit	SAMPLING METHOD ►	24 IN. Split Spoon
ELEVATION ► 1144.30 FT.	GRAVEL PACK ►	#5 Sand	SEAL ► Bentonite

CASING ► TYPE Steel\Steel\S.S. DIAMETER 8"/6"/2" LENGTH 29'/53'/76.5'

WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.

HOLE DIA. 4.5 IN.

SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT.

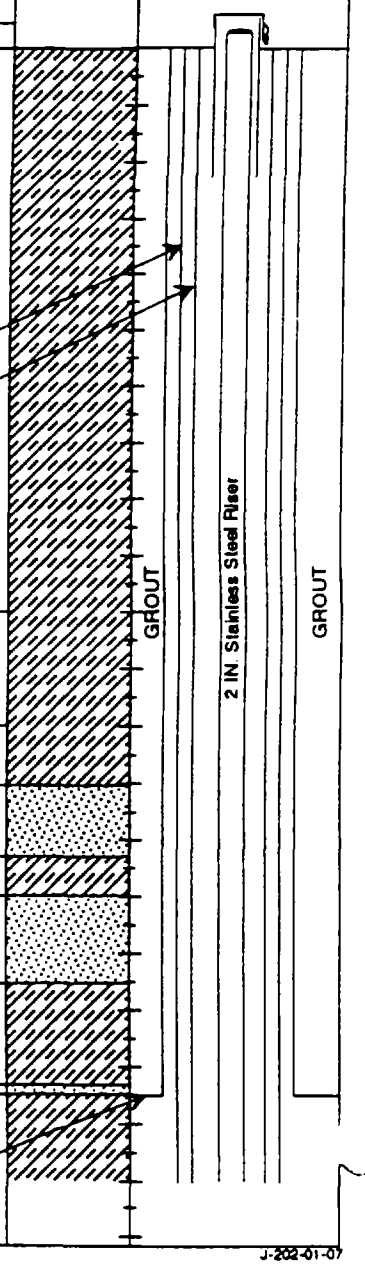
WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 79 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry		Soft	Slight	1	OVA/Hnu 0/1.0	0–1	1.9'	1, 3, 4, 5	Medium brown SILTY CLAY with some fine-medium sand, some orange mottles. some pebbles.
Dry		Soft	Slight	2	0/0	2–3	1.0'	3, 4, 4, 5	Same as above.
Dry		Soft	Slight	3	0/0.2	4–5	1.1'	4, 4, 5, 7	Same as above, getting stiffer with depth. 8 IN. Steel; 6 IN. Steel
Dry to Moist		Soft	Slight	4	3.0/0	6–7	2.0'	4, 3, 4, 4	Same, with gray mottles. Bottom 3 IN. has more fine sand and is moist.
Dry to Damp		Soft	Slight	5	0/0	8–9	1.1'	2, 4, 7, 7	Medium brown SILTY CLAY, damp. Bottom 3 IN. brown to gray SILTY CLAY with some roots.
Dry		Soft	Slight	6	0/0	10–11	1.2'	4, 6, 9, 7	Medium brown-dark gray SILTY CLAY, stiff.
Dry to Wet	Poor	Soft	Slight	7	0.6/0	12–13	1.7'	4, 2, 2, 3	Medium gray sandy SILTY CLAY(dry-damp). Gray SAND, silt medium grain.
Dry	Poor	Soft	Slight	8	0/0	14–15	1.2'	4, 4, 7, 10, 15	Gray SILTY CLAY, very plastic. Gray SAND with some clay and rock fragments.
Dry	-	Stiff	Slight	9	0/0	16–17		6, 8, 14	Gray SILTY CLAY, plastic.
						18		10	Gray SAND, silt med. grain, wet.
Dry	-	Stiff	Slight	10	0/0	19–20		4, 13, 25, 25	Medium gray SILTY CLAY. End of 10 IN. PVC

GRAPHIC LOG

WELL COMPLETION

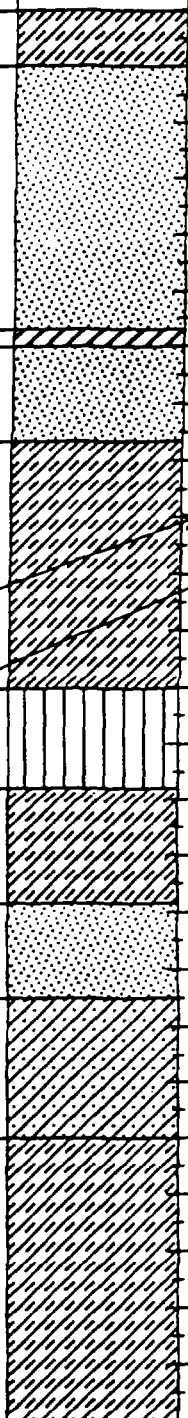


WELL NUMBER ▶ J-LBA

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SOIL	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	20		4, 16	Gray SILTY CLAY.
Dry to Wet	Well	Stiff	Slight	11	0/0	21	1.3'	14, 13	Gray SAND, fine to medium grain, wet.
						22		2, 7	Gray SAND, fine to medium grain, gray silt, wet.
Wet	-	Soft	Non	12	0/0	23	1.6'	9, 7	
						24		3, 13	Gray silt and SAND, minor clay and rock fragments.
Wet	Well	Stiff	Non	13	0/0	25	1.4'	25, 9	
						26		15	Gray Till. Medium gray SAND, fine to medium grain, wet, grades into gray silty clay.
Wet	Mod.	Stiff	Non	14	0.4/0	27	1.25'	23, 30	
						28		13, 7	Medium gray SILTY CLAY (till) with some sand, minor wet silt, large rock fragments at bottom of spoon.
Dry	-	Stiff	Sight	15	0/0	29	1.2'	21, 13	
						30		13, 9	Gray till
Dry	-	Stiff	Sight	16	0/0	31	1.2'	13, 17, 22	End of 8 IN. Steel; 6 IN. Steel
						32		-	Gray SILT with some pebbles. Underlain 1.5 IN. fine to medium gray sand. Then underlain by 2.5 IN. gray silty clay (till).
We. to Dry	Mod.	Soft	Non	17	0/0	33	0.6'	9, 7, 8	
						34		24, 24	Gray SILTY CLAY (till) with rock fragments at ~35.5 FT.
Dry to Wet	-	Stiff	Slight	18	0.2/0	35	0.9'	18, 7	
						36		1, 4	Gray fine to coarse SAND with some gravels.
Wet	Poor	Soft	Non	19	0.2/1.0	37	1.2'	4, 5	
						38		3	Gray fine grain SANDY CLAY.
Damp to Very Moist	Mod.	Soft	Slight	20	3.0/2.0	39	1.3'	6, 9, 9	Gray fine grain SANDY CLAY (till), plastic.
						40		20, 16	Brown mottled SILTY CLAY with gravel 1 IN. gravels blocked spoon (maybe 1 IN. sand).
Damp	Poor	Soft	Slight	21	0.2/0.2	41	0.5'	14, 16	
						42		7, 10	Gray SILTY CLAY with brown mottles, gravel, trace sand, sandstone fragments.
Damp	Poor	Soft	Slight	22	0.4/1	43	0.8'	10, 13	
						44		8, 16	Same, but with mottles.
Damp	Poor	Soft	Slight	23	0.2/0	45	1.4'		

GRAPHIC LOG



WELL COMPLETION

GROUT; 2 IN. STAINLESS STEEL RISER; GROUT; GROUT; GROUT

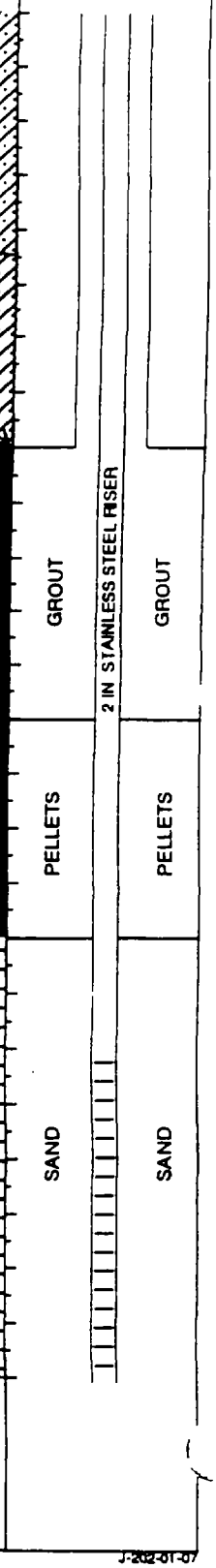
WELL NUMBER ▶ J-LBA

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Damp	Poor	Soft	Slight	23	OVA/Hnu 0.2/0	45–46	1.4'	18, 21, 17	Gray SILTY CLAY with gravel, trace sand.
Damp	Poor	Soft	Slight	24	0/0.2	47–48	1.2'	23, 29, 41	Same as above.
Dry	Poor	Soft	Slight	25	-/4	49–50	1.1'	13, 14, 12	Grades to gray sandy clay with gravel, trace sandstone fragments.
Dry	Poor	Stiff	Non	26	-/4	51–52	1.4'	19, 9, 16, 20, 33	Black SILTY CLAY. **Base of 6 IN. Steel Casing.** Same as above, but gray mottles, some coal fragments.
Dry	Poor	Hard	Non	27	-/5	53–54	1.6'	14, 18, 62, 80/4	Coal, black, fractured, blocky.
Moist				C1	0-0.2/5-6	55–58	4.0'		Coal as above.
				C2	1-2/4-5	59–69	9.2'		RQD=2.45 59-62 fractured underclay wet in fractures. Banded light and medium gray silty SHALE, wavy bedding, fractured, wet in fractures, some zones more silty.
				C3		70			

GRAPHIC LOG

WELL COMPLETION



WELL NUMBER ▶ J-LBA

ERM–MIDWEST WELL LOG

CONTROL	S	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
					OVA / Hnu	70			RQD 1.3		
						71			Highly fractured, shaley siltstone to very fine grained SANDSTONE, flaser bedding, no coal partings, fractures horizontal and oblique.		
						72					
						73					
wet		-	-	C3	.5-1 / 4-5	74	9.4'		Light gray to medium-dark gray.		SAND / SUMP / SAND
						75					
						76					
						77					
						78					
						79			Bottom 0.3' medium gray SHALE, massive, fractured.		
						80			Total Depth 79.0 FT.		
						81					
						82					
						83					
						84					
						85					
						86					
						87					
						88					
						89					
						90					
						91					
						92					
						93					
						94					
						95					

LOCATION MAP

ERM–MIDWEST WELL LOG

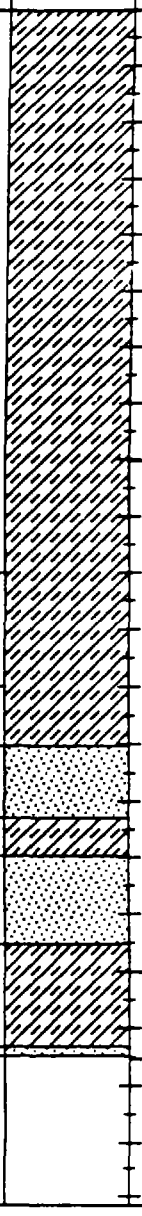
BORE NUMBER ► J-VF2	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 6/13/90	WEATHER ► Sunny, 75F
LOGGED BY ► JDK	DRILLED BY ► Mathes
DRILLING METHOD ► 4 1/4 Hollow Stem Auger	SAMPLING METHOD ► 24 IN. Split Spoon
ELEVATION ► 1143.6 FT.	GRAVEL PACK ► #5 Sand
	SEAL ► Bentonite

CASING ► TYPE 304 Stainless Steel DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

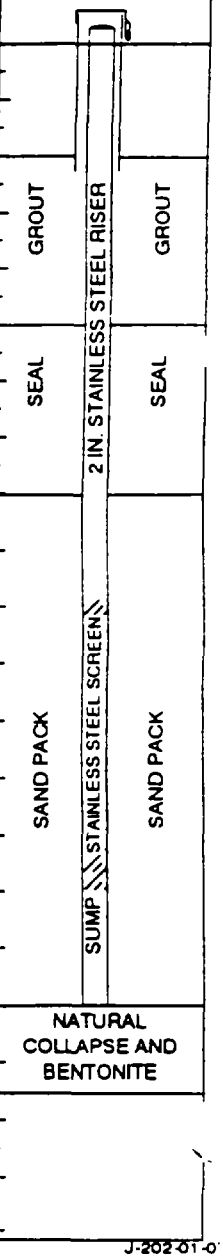
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 5 FT. | WATER LEVEL AT COMPLETION H.M.P. 2.21 FT. | TOTAL DEPTH 18 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry		Soft	Slight	1	OVA/Hnu 0/1.0	0–1	1.9'	1, 3, 4, 5	Medium brown SILTY CLAY with some fine-medium sand, some orange mottles, some pebbles.
Dry		Soft	Slight	2	0/0	2–3	1.0'	3, 4, 4, 5	Same as above.
Dry		Soft	Slight	3	0/0.2	4–5	1.1'	4, 4, 5, 7	Same as above, getting stiffer with depth.
Dry to Moist		Soft	Slight	4	3.0/0	6–7	2.0'	4, 3, 4, 4	Same, with gray mottles. Bottom 3 IN. has more fine sand and is moist.
Dry to Damp		Soft	Slight	5	0/0	8–9	1.1'	2, 4, 7, 7	Medium brown SILTY CLAY, damp. Bottom 3 IN. brown to gray SILTY CLAY with some roots.
Dry		Soft	Slight	6	0/0	10–11	1.2'	4, 6, 9, 7	Medium brown-dark gray SILTY CLAY, stiff.
Dry to Wet	Poor	Soft	Slight	7	0.6/0	12–13	1.7'	4, 2, 2, 3	Medium gray sandy SILTY CLAY(dry-damp). Gray SAND, silt medium grain.
Dry	Poor	Soft	Slight	8	0/0	14–15	1.2'	4, 4, 7, 10, 15	Gray SILTY CLAY, very plastic. Gray SAND with some clay and rock fragments.
Dry	-	Stiff	Slight	9	0/0	16–17		6, 8, 14	Gray SILTY CLAY, plastic.
				10		18–19		10	Gray SAND, silt med. grain, wet. Total Depth 18.5 FT.

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM–MIDWEST WELL LOG

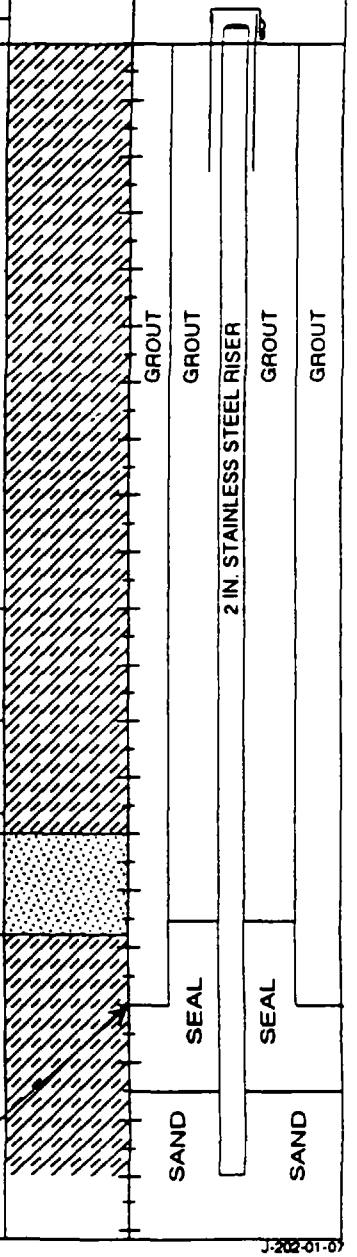
BORE NUMBER ▶ J-VF3	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 6/14, 6/17/90	WEATHER ▶ Sunny, 75F
LOGGED BY ▶ JDK	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 6 1/4 IN. Hollow Stem Auger 5 1/5 IN. Roller Cone	SAMPLING METHOD ▶ 24 IN. Split Spoon
ELEVATION ▶ 1145 FT.	GRAVEL PACK ▶ #5 Sand / SEAL ▶ Bentonite

CASING ▶ TYPE Steel/S.S. DIAMETER 6"/2" LENGTH 17'/20' | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 5.5 IN.

SCREEN ▶ TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 32 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0			
Dry		Soft	Slight	1	0/1.0	1	1.9'	1, 3, 4, 5	Medium brown SILTY CLAY with some fine-medium sand, some orange mottles, some pebbles.
						2			
Dry		Soft	Slight	2	0/0	3	1.0'	3, 4, 4, 5	Same as above.
						4			
Dr		Soft	Slight	3	0/0.2	5	1.1'	4, 4, 5, 7	Same as above, getting stiffer with depth.
						6			
Dry to Moist		Soft	Slight	4	3.0/0	7	2.0'	4, 3, 4, 4	Same, with gray mottles. Bottom 3 IN. has more fine sand and is moist.
						8			
Dry to Damp		Soft	Slight	5	0/0	9	1.1'	2, 4, 7, 7	Medium brown SILTY CLAY, damp. bottom 3 IN. Brown to gray SILTY CLAY with some roots.
						10			
Dry		Soft	Slight	6	0/0	11	1.2	4, 6, 9, 7	Medium brown-dark gray SILTY CLAY, stiff.
						12			
Dry to Wet	Poor	Soft	Slight	7	0.6/0	13	1.7'	4, 2, 4, 4	Medium gray sandy SILTY CLAY grades into gray sand.
						14			Gray SILTY CLAY with some roots.
Wet	Poor	Soft	Non	8	0/0	15	1.2'	-, 5, 7, 10	Gray SAND with some clay and rock fragments.
						16			Gray SILTY CLAY.
Dri to Moist		Stiff	Plast	9	0/0	17	1.3'	15, 15, 10, 10	Medium brown SILTY CLAY with some fine sand and rock fragments.
						18			Medium gray SILTY CLAY, very plastic.
-	-	Stiff	Very	10	0/0	19	1.8'	4, 13, 25, 25	Base of 6 IN. Steel Casing
						20			

GRAPHIC LOG / WELL COMPLETION

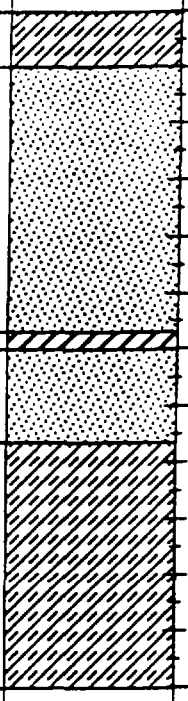


WELL NUMBER ▶ J-VF3

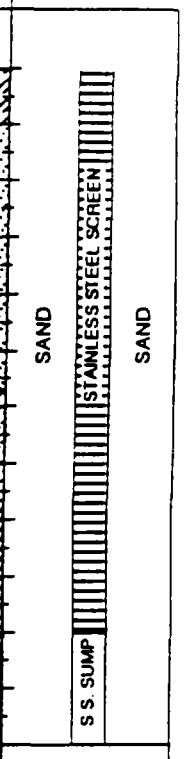
ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	20		4	Gray SILTY CLAY.
Dry to Wet	Well	Stiff	Slight	11	0/0	21	1.3'	16	
								14	Gray SAND, fine to medium grain, wet.
								13	
						22		2	Gray SAND, fine to medium grain, gray silt, wet.
Wet	-	Soft	Non	12	0/0	23	1.6'	7	
								9	
						24		7	Gray silt and SAND, minor clay and rock fragments.
								3	
Wet	Well	Stiff	Non	13	0/0	25	1.4'	13	
								25	
						26		9	Gray Till.
								15	Medium gray SAND, fine to medium grain, wet, grades into gray silty clay.
Wet	Mod.	Stiff	Non	14	0.4/0	27	1.25'	23	
								30	
						28		13	Medium gray SILTY CLAY (till)with some sand, minor wet silt, large rock fragments at bottom of spoon.
								7	
Dry	-	Stiff	Sight	15	0/0	29	1.2'	21	
								13	
						30		13	
								9	Gray till
Dry	-	Stiff	Sight	16	0/0	31	1.2'	13	
								17	
								22	
						32			End of Boring 32.0 FT.
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			
						41			
						42			
						43			
						44			
						45			

GRAPHIC LOG



WELL COMPLETION

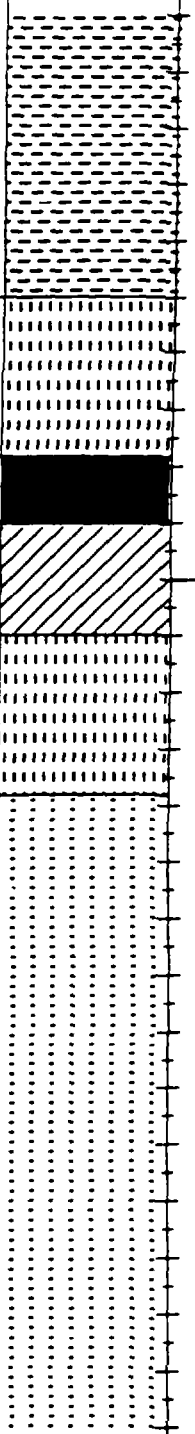


WELL NUMBER ▶ RW-1

ERM—MIDWEST WELL LOG

CONTENT	DENSITY	PLASTICITY	SAMPLE NO	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					20			Gray SHALE with horizontal breaks, chemical odor, dry.
				40-60	21			
					22			
					23			
					24			
					25			Gray SILTSTONE, abundant horizontal breaks, dry, chemical odor.
				40-60	26			
				60-100	27			
					28			COAL, blocky fractures, dry, pyrite, strong chemical odor, dry.
				>1000	29			
Run Depth	Rec.	RQD						
3 29.5-39.5	93%	51%			30			Gray underclay, soft, massive, horizontal breaks, chemical odor, dry.
					31			
				N/A	32			Gray SILTSTONE, dry chemical odor, abundant horizontal breaks, laminae bedding, dry.
					33			
					34			Light gray micaeous SANDSTONE cross-bedded, medium to coarse grained, chemical odor.
					35			
					36			
					37			
					38			
					39			
4 39.5-49.5	100%	98%		N/A	40			
					41			
					42			
					43			
					44			
					45			

GRAPHIC LOG



WELL COMPLETION

GROUT

10 IN. STEEL

GROUT

10 IN. OPEN HOLE

WELL NUMBER ▶ RW-1

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
Run	Depth	Rec.	RQD								
4	39.5-49.5	100%	98%			45			Light gray micaeous SANDSTONE crossbedded, medium to coarse grain, moist to wet, slight chemical odor.		
						46					
						47					
						48					
						49					
						50					
5	49.5-59.5	100%	79%			51					
						52					
						53			No chemical odor.		
						54					
						55					10 IN. OPEN HOLE
						56			Rubble zone.		
						57			Clay rip-up clasts present.		
						58					
						59					
6	59.5-69.5	100%	98%			60					
						61					
						62					
						63			Coal present on cross bedding laminae.		
						64					
						65					
						66			Abundant coal stringers.		
						67					
						68					
						69					
7	69.5-79.5	100%	81%			70					

WELL NUMBER ▶ L-LBA

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	S	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
						95					
						96			Dark gray SHALE		SAND PACK
						97					
				C3		98					SUMP
						99					
						100					SAND PACK
						101			Total Depth 101 FT.		
						102					
						103					
						104					
						105					
						106					
						107					
						108					
						109					
						110					
						111					
						112					
						113					
						114					
						115					
						116					
						117					
						118					
						119					
						120					

LOCATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ▸ RW-1	LOCATION ▸ Ruetgers-Nease, Salem, Ohio
DATE ▸ 06/02-06/03/92	WEATHER ▸ Hot, Clear, 70F
LOGGED BY ▸ R.A.F.	DRILLED BY ▸ Sprowls Drilling
DRILLING METHOD ▸ 4 1/4" Hollow Stem Auger 9 7/8" Roller Bit	SAMPLING METHOD ▸ Split Spoon
ELEVATION ▸ 1182.6 FT.	GRAVEL PACK ▸ None / SEAL ▸ None

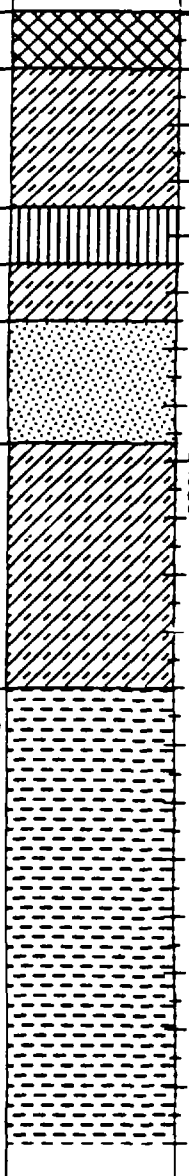
CASING ▸ TYPE Steel DIAMETER 10 IN. LENGTH 30 FT. | WATER LEVEL INITIAL 24.20 FT. ■ B.G.S. □ B.M.P. | HOLE DIA. 9-7/8 IN.

SCREEN ▸ TYPE None SLOT DIAMETER LENGTH | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 83 FT.

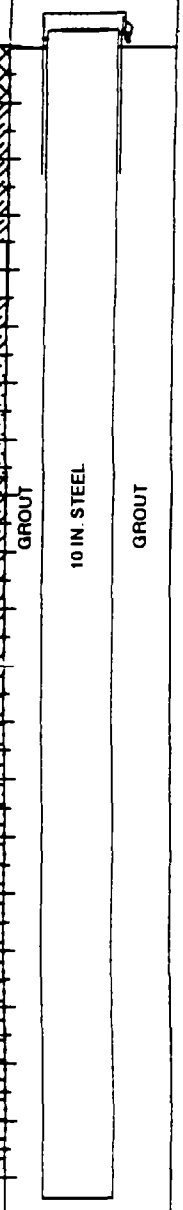
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0		None	Railroad ballast.
				1		1	0'		Brown SILTY CLAY/sandy clay.
Damp	Poor	Soft	Slight			2		Soft	Brown sandy clay with gravel.
				2	0	3	1.75'	Push	
Moist	Well	Soft	Non			4		Spoon Soft	Brown SILT.
Dry to Damp	Poor	Soft	Slight	3	0	5	1.5'		Brown SILTY CLAY with cobbles.
						6		Soft	Very sandy clay with coal fragments, grades to gray/black medium grain SAND.
Wet	Med. Poor	Soft	Non	4	0	7	0.7'		
Dry	Poor	Soft	Slight			8		Soft	Brown and gray mottled SILTY CLAY.
Dry	Poor	Stiff	Slight	5	0	9	1.5'		Brown SILTY CLAY with gravel, coal fragments.
						10		Soft	Grades to gray SILTY CLAY with shale fragments.
Dry	Poor	Stiff	Non	6	1.5	11	1.5'	Stiff	
						12		Stiff	Gray weathered SHALE, highly fractured, some brown staining. Strong chemical odor.
Dry	Poor	Stiff	Non	7	0	13	2.0'		
Dry	Poor	Stiff	Non	8	10	14	0.5'		
						15			
					25	16			Gray SHALE, very weathered, abundant horizontal fractures, chemical odor.
						17			
					95	18			
						19			
						20			

Run	Depth	Rec.	RQD
1	14.5-19.5	54%	0/0
2	19.5-29.5	80%	0/0

GRAPHIC LOG



WELL COMPLETION

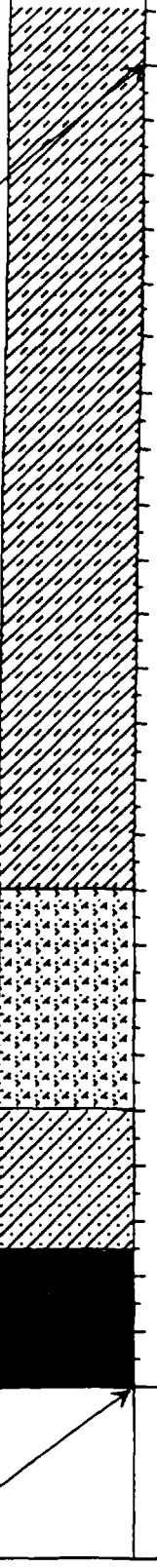


WELL NUMBER ▶ L-LBA

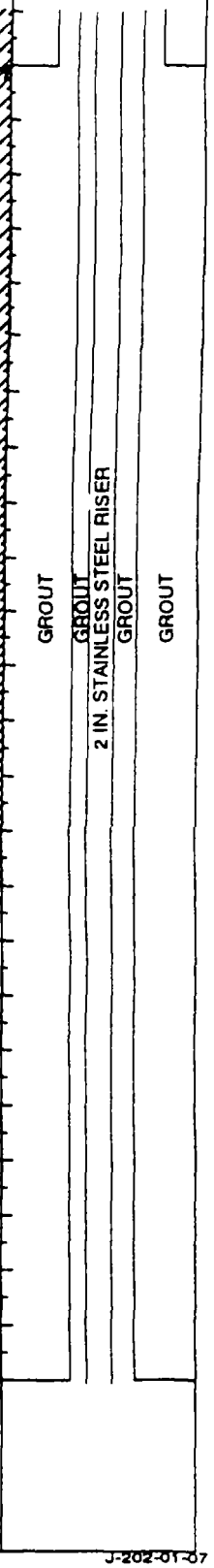
ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	Poor	Hard	Non	22	OVA/Hnu 0/0	45–46	1.65'	40, 50, X, X	Gray SILTY CLAY with gravel, trace sand, coal fragments.
Dry to Moist	Poor	Hard	Non	23	0/0	47–48	1.8'	28, 52, 71, 86	Gray SILTY CLAY with gravel, sand, coal fragments (rounded). End of 10 IN. Steel
Dry	Poor	Hard	Non	24	0/1(?)	49–50	1.6'	20, 46, 42, 82	Same as above, sandstone fragments.
Dry to Slight Moist	Poor	Hard	Non	25	0.2/0	51–52	1.8'	26, 48, 72, 69	Same as above, trace more sand.
Dry	Poor	Hard	Non	26	0/0	53–54	1.4'	17, 40, 54, 65	Same as above, more rock fragments.
Damp	Poor	Hard	Non	27	0	55–56	1.6'	9, 18, 20, 34	Grading to sandy clay, increasing rock fragments, rounded shale pebbles and weathered sandstone.
Damp	Poor	Hard	Non	28	0.6	57–58	1.6'	23, 31, 44, 37	Same as above, coal fragments, increasing sand and gravel content.
Damp	Poor	Hard	Non	29	0	59–60	1.9'	11, 20, 27, 36	Gray; Light brown; Dark chocolate brown to black; Light brown, abundant sandstone fragments.
Damp	Poor	Hard	Non	30	0	61–62	1.6'	16, 29, 41	Brown CLAYEY SAND with gravel, sandstone fragments, coal grades dark gray.
Damp	Poor	Hard	Non	31	0	63–64	1.9'	30, 14, 27, 34, 42	Grades dark gray. Same as above. Abundant sandstone fragments that are very weathered.
Damp	Poor	Hard	Non	32	0	65–66	1.4'	9, 12, 24, 43, 14	Dark brown to gray SANDY CLAY with gravel, abundant weathered sandstone fragments. Same as above.
Damp to Wet	Poor	Stiff	Non	33	0	67–68	2.0'	26, 20, 22	Black COAL, highly fractured, weathered.
Damp	Poor	Stiff	Non	34	0	69–70	1.3'	13, 52	COAL, block fractures, lithified.

GRAPHIC LOG



WELL COMPLETION



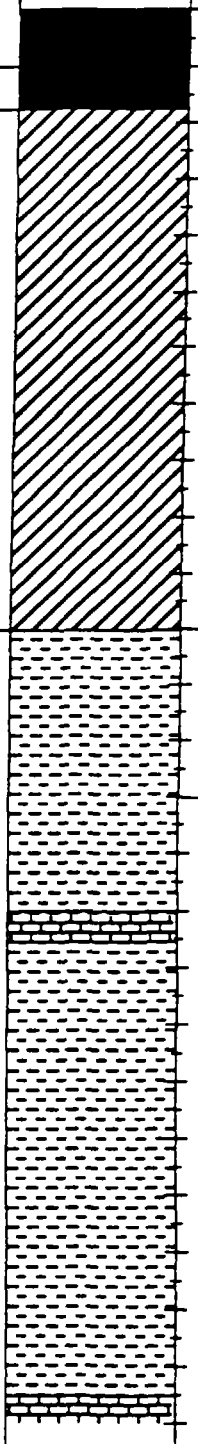
End of 6 IN. Steel

WELL NUMBER ▶ L-LBA

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA / Hnu	70			COAL
						71			COAL blocky
						72			Remainder underclay, wet in fractures, otherwise dry.
						73			
						74			
						75			
	-	-	-	C1	0 / 3	76	3.5'		
						77			
						78			
						79			
						80			
						81			RQD 2.0 *Dark gray laminae, bedded SHALE,* lost top 3.5 FT., pyrite nodules.
						82			
						83			
						84			
						85			
Wet in Fract.	-	-	-	C2	0 / 0-1	86	6.5'		Black-brown limestone nodules at 86.0-86.5 FT., fractured horizonally vertically and obliquely.
						87			
						88			
						89			
						90			
						91			RQD 5.4 Dark gray SHALE fractured horizontally and obiquely, rip upclasts, massive bedding.
						92			
Wet in Fract.	-	-	-	C3	0-.5 / 0-.6	93	6.8'		
						94			94.5-95.3 FT. black fossilturious limestone fractured with coal interbedded.
						95			Base of limestone underclay and coal mix 0.2 FT. 93.7-94.5 FT. dark gray SHALE with pyrite nodules.

GRAPHIC LOG



WELL COMPLETION

GROUT

BENTONITE SEAL

SAND PACK

2 IN STAILESS STEEL RISER

GROUT

BENTONITE SEAL

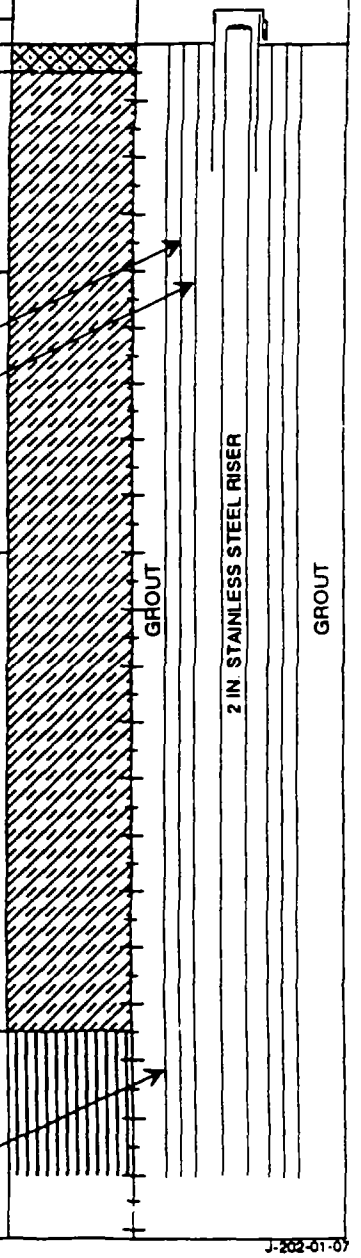
SAND PACK

ERM—MIDWEST WELL LOG

BORE NUMBER ► L-LBA	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 09/11/91	WEATHER ► Sunny, 75F
LOGGED BY ► RAF, RLD	DRILLED BY ► Mathes/Sprowls
DRILLING METHOD ► 4 1\4 Hollow Stem Auger	SAMPLING METHOD ► 24 IN. Split Spoon
ELEVATION ► 1168.40 FT.	GRAVEL PACK ► #5 Sand / SEAL ► Bentonite
CASING ► TYPE Steel\Steel\S.S. DIAMETER 16"/10"/6" LENGTH 24'/46'/70'	WATER LEVEL INITIAL 21.7 FT. ■ B.G.S. □ B.M.P. / HOLE DIA. 4.5 IN.
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT.	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 99.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		2	TOPSOIL-grass
Dry	Poor	Soft	Slight	1	0/0	1	1.0'	13, 13	Brown SILTY CLAY with gravel, roots, mottled orange.
						2		17, 6	Same as above, trace sand.
Dry	Poor	Soft	Slight	2	0/0	3	0.5'	6, 7, 8	Orange mottles.
						4		4	Brown SILTY CLAY with gray mottles, gray silt laminae ~1 IN. thick.
Dry	Well	Soft	Non	3	0/0	5	0.9'	6, 7, 8	10 IN. Steel; 6 IN. Steel
						6		3	
Dry	Well	Soft	Non	4	0/0	7	1.4'	7, 9, 10	Same as above.
						8		3	
Dry	Well	Soft	Non Plast.	5	0/0	9	1.4'	3, 5, 7	Same as above. Gray SILTY CLAY, brown silt.
						10		2	Gray SILTY CLAY.
Dry	Well	Soft	Plast.	6	0/0	11	1.0'	4, 4, 6	
						12		2	
Dry	Well	Soft	Plast.	7	0/0	13	1.7'	5, 3, 5	Same as above.
						14		2	Same as above.
Moist	Well	Soft	Plast	8	0/0	15	1.4'	2, 4, 5	
						16		1	Same as above.
Dry to Moist	Well	Soft	Plast.	9	0/0	17	1.8'	3, 5, 7	
						18		2	Gray SILT.
	Well	Soft	Non	10	0/0	19	1.6'	5, 7, 6	Gray SILT. 16 IN. Steel
						20			

GRAPHIC LOG / WELL COMPLETION

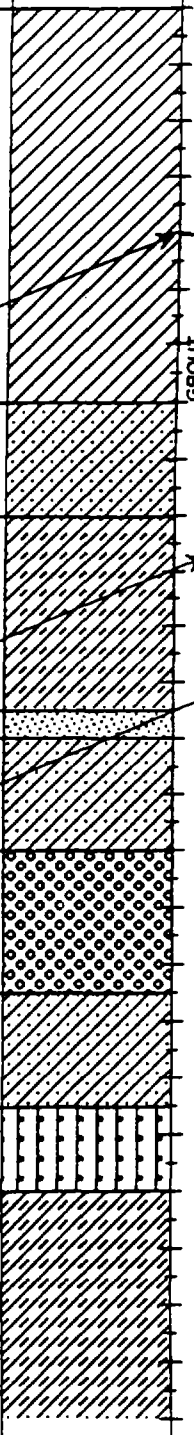


WELL NUMBER ▶ **L-LBA**

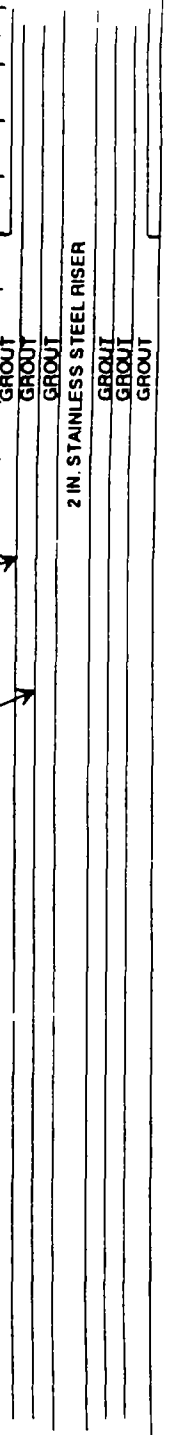
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	20		1	Gray CLAY, no silt, no cobbles, no sand.
Moist	Well	Soft	Plast.	11	0/0	21	1.85'	3 4 4	
						22		1	Same as above.
Dry	Well	Soft	Plast.	12	0/0	23	1.85'	3 3 5	
						24		1	
Dry	Well	Soft	Plast.	13	0/0	25	1.4'	3 3 4	Same as above. End of 16 IN. Steel
						26		5 5	Same as above.
Damp Sand Moist	Poor	Soft	Plast.	14	0/0	27	2.0'	9 6	Gray SANDY CLAY with sand grading to clayey sand and gravel.
						28		6 6	Clayey sand and gravel.
Damp	Poor	Soft	Plast.	15	0/0	29	2.0'	6 6	Gray SILTY CLAY, trace silt, trace gravel.
						30		5	Increasing sand content, more gravel.
Dry	Poor	Soft	Plast.	16	0.2/0	31	2.0'	6 7 9	10 IN. Steel
						32		6	Same as above.
Dry	Poor	Soft	Plast.	17	0/0	33	1.3'	3 5 4	Gray fine SAND, damp to moist. Gray SANDY CLAY with gravel. 6 IN. Steel
						34		1	
Dry to Wet	Poor to Well	Soft to Hard	Plast. to Non	18	0/0	35	1.4'	3 3 5	Same as above. Coarse GRAVEL, >1/4 IN.
						36		2	Same as above.
Wet	Poor	Soft	Non	19	0/0	37	1.1'	3 1	
						38		Wt. 1	Gray silty/SANDY CLAY with gravel.
Damp to Wet	Poor to Well	Soft	Plast. to Non	20	0/0	39	1.4'	3 4	Same as above.
						40		6	Fine SAND and SILT.
Wet	Well	Soft	Non	21	0/0	41	2.0'	3 9	Same as above.
Dry	Poor	Hard	Non			42		12 16	Gray SILTY CLAY with gravel.
Dry	Poor	Soft	Non	22	0/0	43	2.0'	9 18 29	Same as above, trace more sand. 4 IN. fine sand seam.
						44		45	
Dry	Poor	Hard	Non	23	0/0	45	1.65'	24 39	Same as above.

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM—MIDWEST WELL LOG

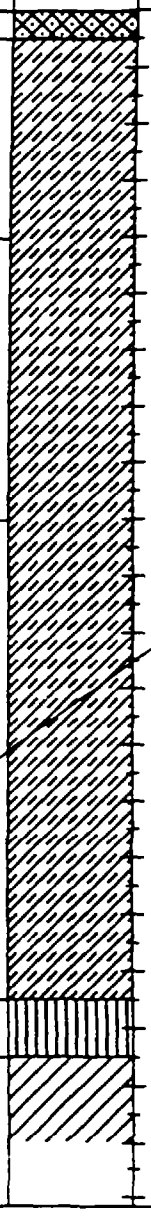
BORE NUMBER ► L-VF2	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 09/16/91	WEATHER ► Cool, Overcast
LOGGED BY ► RAF, RLD	DRILLED BY ► Mathes
DRILLING METHOD ► 4 1\4 Hollow Stem Auger	SAMPLING METHOD ► 24 IN. Split Spoon
ELEVATION ► 1168 FT.	GRAVEL PACK ► #5 Sand / SEAL ► Bentonite

CASING ► TYPE Steel/S.S. DIAMETER 10"/2" LENGTH 24'/45' | WATER LEVEL INITIAL 26 FT. ■ B.G.S. □ B.M.P. | HOLE DIA. 9 IN.

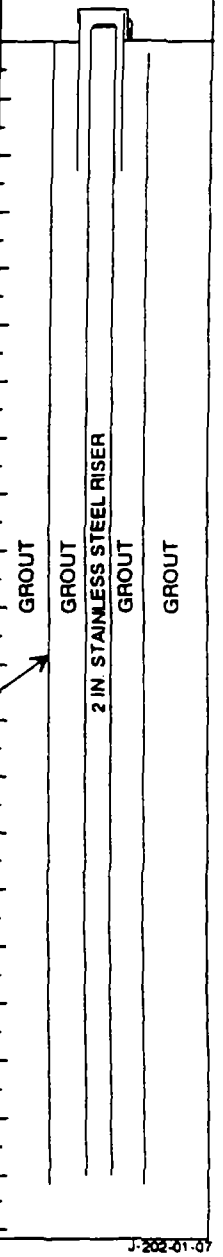
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 45 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		2	TOPSOIL-grass
Dry	Poor	Soft	Slight	1	0/0	1	1.0'	13, 13, 17	Brown SILTY CLAY with gravel, roots, mottled orange.
						2		6	Same as above, trace sand.
Dry	Poor	Soft	Slight	2	0/0	3	0.5'	6, 7, 8	Orange mottles.
						4		4	Brown SILTY CLAY with gray mottles, gray silt laminae ~1 IN. thick.
Dry	Well	Soft	Non	3	0/0	5	0.9'	6, 7, 8	
						6		3	
Dry	Well	Soft	Non	4	0/0	7	1.4'	7, 9, 10	Same as above.
						8		3	
Dry	Well	Soft	Non Plast.	5	0/0	9	1.4'	3, 5, 7	Same as above. Gray SILTY CLAY, brown silt.
						10		2	Gray SILTY CLAY.
Dry	Well	Soft	Plast.	6	0/0	11	1.0'	4, 4, 6	
						12		2	
Dry	Well	Soft	Plast.	7	0/0	13	1.7'	5, 3, 5	Same as above.
						14		2	Same as above.
Moist	Well	Soft	Plast	8	0/0	15	1.4'	2, 4, 5	
						16		1	Same as above.
Dry to Moist	Well	Soft	Plast.	9	0/0	17	1.8'	3, 3	
						18		6, 4	Gray SILT.
	Well	Soft	Non	10	0/0	19	1.6'	4, 1, 3	Gray CLAY, moist, no sand.
						20			

GRAPHIC LOG



WELL COMPLETION

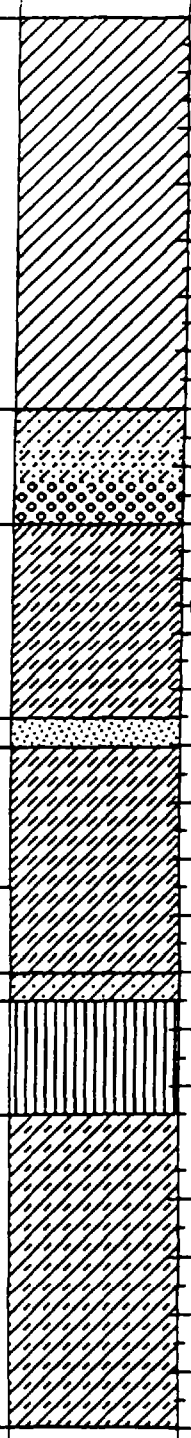


WELL NUMBER ▶ L-VF2

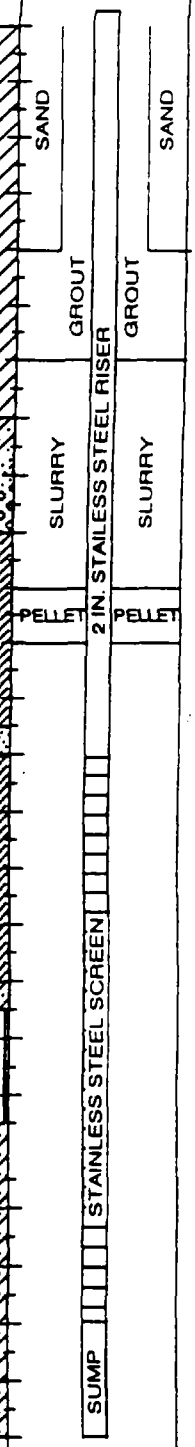
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		1	Gray CLAY, moist, no sand.
Moist	Well	Soft	Plast.	11	0/0	21	1.85'	3 4 4	
						22		1	Same as above.
Dry	Well	Soft	Plast.	12	0/0	23	1.85'	3 3 5	
						24		1	Same as above.
Dry	Well	Soft	Plast.	13	0/0	25	1.4'	3 3 4	
						26		5	
Damp Sand Moist	Poor	Soft	Plast.	14	0/0	27	2.0'	5 9	Gray SANDY CLAY with sand grading to CLAYEY SAND and GRAVEL.
						28		6 6	
Damp	Poor	Soft	Plast.	15	0/0	29	2.0'	6 6	Gray SILTY CLAY, trace silt, trace gravel.
						30		5	
Dry	Poor	Soft	Plast.	16	0/0	31	2.0'	6 7 9	Increasing sand content, more gravel.
						32		6	
Dry	Poor	Soft	Plast.	17	0	33	1.3'	3 5	Gray fine SAND, damp to moist.
						34		4 3	Gray SILTY CLAY with sand and gravel, coal fragments.
Damp to Wet	Poor	Soft	Slight	18	0	35	1.4'	4 5	
						36		6 3	Same as above, fine sand, trace silt
Wet	Poor	Soft	Slight	19	0	37	1.8'	5 3	Gray SANDY CLAY with gravel.
						38		1 1	Gray SILT, trace clay, fine sand grade to medium grained sand sand gravel
Wet	Poor	Soft	Non	20	0	39	1.8'	4 6	
						40		10	Gray SILTY CLAY with gravel.
						41			
						42			
						43			
						44			
						45			Total Depth 45 FT.
						46			

GRAPHIC LOG



WELL COMPLETION

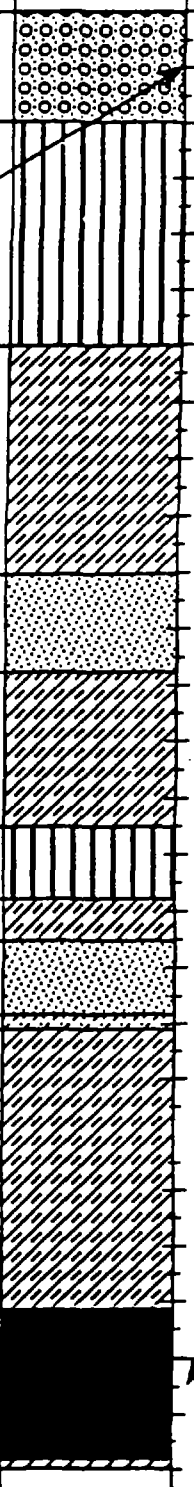


WELL NUMBER ▶ K-Lower Bedrock

ERM–MIDWEST WELL LOG

Content	SI	Density	Plasticity	Sample No.	OVA (ppm)	Depth	Sample Recovery	Penetration Resistance	Lithology / Remarks
						20		6	Gray SAND AND GRAVEL.
Wet	Mod.	Soft	Non	11	0/0	21	0.3'	8, 13, 19	
						22		4	Gray SILT with some very fine sand.
Wet	Well	Soft	Non	12	0/0	23	1.1'	7, 9, 11	Base of 10 IN. PVC
						24		8	SILT with gravel sized material, poorly sorted.
Wet	Poor	Soft	Non	13	0/0	25	0.3'	13, 8, 7	
						26		4	Gray SILTY CLAY, some very fine sand.
Dmp	-	Soft	Slight	14	0/0	27	0.75'	8, 12, 18	
						28		20	Same, bottom 1.5 FT. fine sand with some gravel.
Dmp	-	Hard	Non	15	0/-	29	1.0'	30, 20, 12	
						30		6	Gray SAND, fine to coarse grain, with some gravel.
Wet	Mod.	Soft	Non	16	0.2	31	2.0'	9, 2, 8	
						32		9	Gray SILTY CLAY.
Moist to Dry Moist	-	Hard	Slight	17	OVA 0.0	33	1.25'	25, 25, 30	Gray SILTY CLAY with some gravels. 1.5 IN. buff/yellow sandstone fragments within sample (fine grain).
						34		10	
Wet to Moist	-	Hard	Non	KV1	0/0	35	1.25'	14, 31, 61	Grades into SILT. Rock fragments bottom 2 IN.
						36		45	SILTY CLAY with some rock fragments.
Wet	Mod.	Hard	Non	KV2	0/0		0.7'	60/4	Gray SAND, fine to medium grain, some gravel.
						37		45	
Wet	Mod.	Hard	Non	KV3	0/0		1.0'	39	
						38		42	Gray CLAYEY SAND with rock fragments
Dry	-	Hard	Non	KV4	0/0.2	39	1.4'	55, 100/5, -	Gray SILTY CLAY (till) with some sand and rock fragments.
						40		55	Same, but with a 2.5 IN. rock fragments layer.
Dry	-	Hard	Non	KV5	0/0.2	41	0.8'	57, 100/4, -	
						42		20	Same, grades to a black SILTY CLAY then coal.
Dry	-	Hard	Non	KV6	0/0.2	43	1.25'	30, 67, 85	Bedrock.
						44		36	COAL, very fractured and broke-up.
Dry	-	Hard	Non	KV7	0/0	45	1.0'	26, 45, 75/2	Gray CLAY.
						46			

GRAPHIC LOG



WELL COMPLETION

GROUT

GROUT

Stainless Steel Riser

GROUT

GROUT

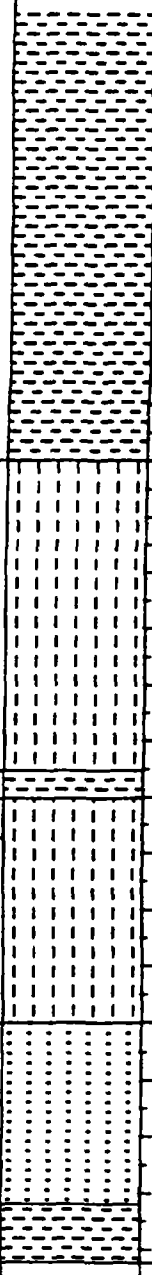
Base of 8 IN. Steel

WELL NUMBER ▸ **K-Lower Bedrock**

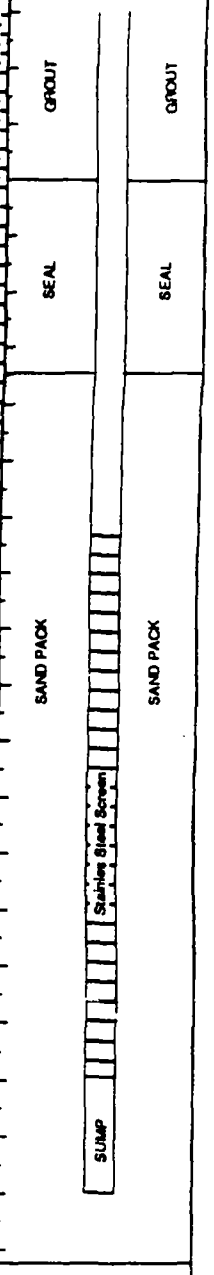
ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	45			
						46			
						47			
						48		28	
Dry		Hard	Non	KL1	2.8/52	49	0.4'	112	Medium-light gray SHALE, soft.
								63	
						50		96	
							0.8'	15	
Dry		Hard	Non	KL2	5.0/48	51		125	Medium-light gray SHALE.
							0.3'	100	Medium gray SHALE, soft to fissle.
						52		100	Light-medium gray SHALE.
						53			
						54			Medium-dark gray shaley SILTSTONE, highly fractured, massive bedding, horizontal and vertical fractures.
						55			R.Q.D. = 2.15 FT.
						56			
Wet				Core K1		57	9.6'		
						58			
						59			Medium-dark gray Silty SHALE, fractured.
									Shaley SILTSTONE, as above.
						60			SILTSTONE or very fine grain sandstone, black cross beds(flaser beds).
						61			
Dry						62			
						63			
						64			Light-medium gray SANDSTONE, fine to medium grain, fractured, flaser bedding prominant.
Wet				Core K2		65	4.2'		R.Q.D.= 0.32 FT.
						66			
Dry						67			Medium-dark gray Silty SHALE.
						68			Reamed to this point.
						69			
						70			

GRAPHIC LOG



WELL COMPLETION



LOCATION MAP

ERM–MIDWEST WELL LOG

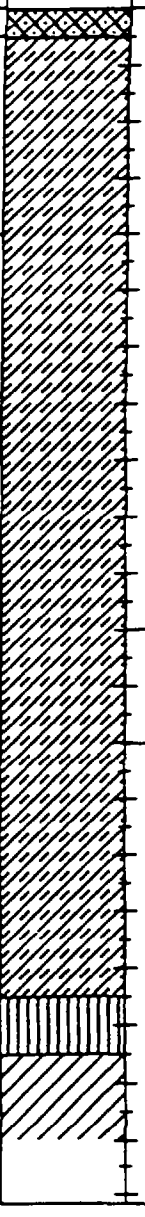
BORE NUMBER ► L-VF1	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 09/11/91	WEATHER ► Clear, Hot
LOGGED BY ► RAF, RLD	DRILLED BY ► Mathes
DRILLING METHOD ► 4 1/4 Hollow Stem Auger	SAMPLING METHOD ► 24 IN. Split Spoon
ELEVATION ► 1168 FT.	GRAVEL PACK ► #5 Sand
	SEAL ► Bentonite

CASING ► TYPE Stainless Steel DIAMETER 2 IN. LENGTH 18 FT. | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

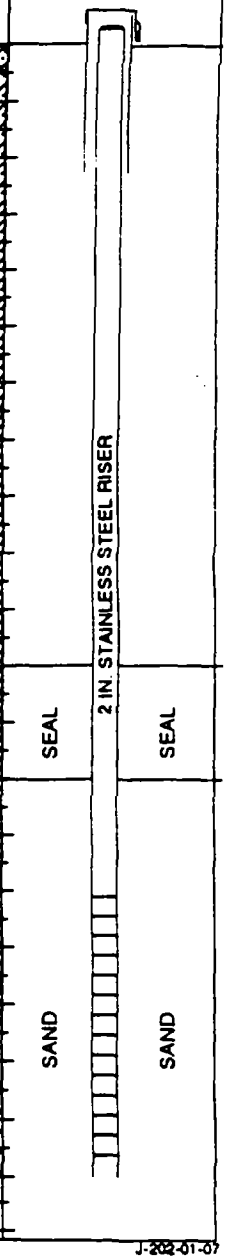
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 5 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 22 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0		2	TOPSOIL-grass
Dry	Poor	Soft	Slight	1	0/0	1	1.0'	13, 13, 17	Brown SILTY CLAY with gravel, roots, mottled orange.
						2		6, 6, 7, 8	Same as above, trace sand.
Dry	Poor	Soft	Slight	2	0/0	3	0.5'		Orange mottles.
						4		4, 6, 7, 8	Brown SILTY CLAY with gray mottles, gray silt laminae ~1 IN. thick.
Dry	Well	Soft	Non	3	0/0	5	0.9'		
						6		3, 7, 9, 10	
Dry	Well	Soft	Non	4	0/0	7	1.4'		Same as above.
						8		3, 3	
Dry	Well	Soft	Non Plast.	5	0/0	9	1.4'		Same as above.
						10		5, 7, 2, 4, 4, 6	Gray SILTY CLAY, brown silt. Gray SILTY CLAY.
Dry	Well	Soft	Plast.	6	0/0	11	1.0'		
						12		2, 5, 3, 5	
Dry	Well	Soft	Plast.	7	0/0	13	1.7'		Same as above.
						14		2, 2, 4, 5	Same as above.
Moist	Well	Soft	Plast	8	0/0	15	1.4'		
						16		1, 3, 3	Same as above.
Dry to Moist	Well	Soft	Plast.	9	0/0	17	1.8'		
						18		6, 4	Gray SILT.
W	Well	Soft	Non	10	0/0	19	1.6'	4, 1, 3	Gray CLAY, moist, no sand.
						20			

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ L-VF1

ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
Dry	Poor	Soft	Slight	11	0	20	1.1'	5	Gray CLAY, moist, no sand.		SAND
						21		5			SUMP
						22			Total Depth 22 FT.		SAND
						23					
						24					
						25					
						26					
						27					
						28					
						29					
						30					
						31					
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					
						41					
						42					
						43					
						44					
						45					
						46					

WELL NUMBER ▶ J-VF4

ERM–MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG	WELL COMPLETION
Dry	Poor	Stiff	Slight	11	OVA/Anu 0/1	45	1.5'	12	Gray SILTY CLAY with gravel.		SAND / SUMP / SAND
						46		22			
						47					
						48			Total Depth 48 FT.		
						49					
						50					
						51					
						52					
						53					
						54					
						55					
						56					
						57					
						58					
						59					
						60					
						61					
						62					
						63					
						64					
						65					
						66					
						67					
						68					
						69					
						70					

LOCATION MAP

ERM–MIDWEST WELL LOG

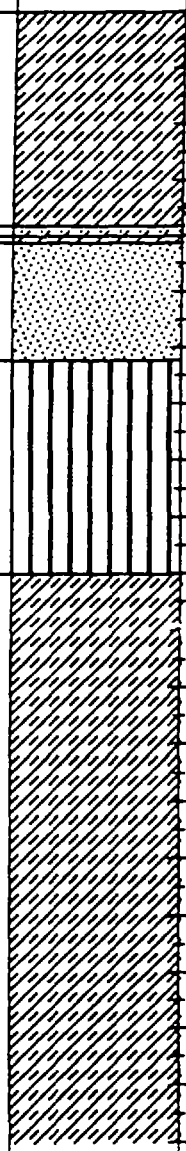
BORE NUMBER ► K-VF2	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/15/90	WEATHER ► Overcast, 70F
LOGGED BY ► JDK	DRILLED BY ► Mathes
DRILLING METHOD ► 4 1/4 IN. Hollow Stem Auger	SAMPLING METHOD ► Split Spoon
ELEVATION ► 1135.70 FT.	GRAVEL PACK ► #5 Sand
	SEAL ► Bentonite

CASING ► TYPE DIAMETER LENGTH | WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. | HOLE DIA. 8.25 IN.

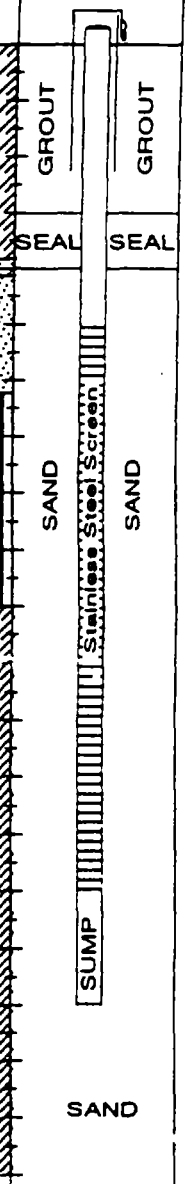
SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT. | WATER LEVEL AT COMPLETION H.M.P. | TOTAL DEPTH 38 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	0			
Damp	-	Soft	Very	1	0/0	1	1.5'	2, 2, 2, 4	Orange to medium brown SILTY CLAY, some gray mottling, roots
						2		1	
Very Moist	-	Soft	Very	2	0/0	3	1.0'	3, 3, 3	Same with fine sand and orange/rust staining.
						4		1	Gray CLAYEY SAND fine grain. / Gray SILTY CLAY.
Wet	Poor	Soft	Non	3	0/0	5	1.5'	3, 6, 6	Medium brown SAND, fine to medium grain, with rock fragments.
						6		2	
Wet	Mod.	Soft	Non	4	0/0	7	1.5'	4, 8, 10	Grades into gray SILT
						8		8	Same as above.
Wet	Good	Soft	Non	5	0/0	9	1.6'	10, 8, 8	
						10		1	Gray SAND, very fine to medium grain.
Wet	Mod.	Soft	Non	6	0/0	11	1.5'	1, 5, 6	
						12		2	Gray SAND, fine to coarse grain with some gravel up to 3 cm.
Wet	Poor	Soft	Non	7	0/0	13	0.7'	4, 6, 6	
						14		3	Same as above.
Wet	Poor	Soft	Non	8	0/0	15	1.0'	10, 10, 10	
						16		1	Same as above, coarser with depth.
Wet	Poor	Soft	Non	9	0/0	17	1.0'	4, 4, 8	
						18		7	Scattered coarse SAND and rounded gravels.
Wet	Poor	Soft	Non	10	0/0	19	0.3'	13, 10, 8	
						20			

GRAPHIC LOG



WELL COMPLETION



ATION MAP

ERM–MIDWEST WELL LOG

BORE NUMBER ► J-VF4	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 9/22/91	WEATHER ► Cool, Clear 65F
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ► 12 1/4, 10 1/4 4 1/4 Hollow Stem Auger	SAMPLING METHOD ► 24 IN. Split Spoon
ELEVATION ► 1144.30 FT.	GRAVEL PACK ► #5 Sand
	SEAL ► Bentonite

CASING ► TYPE Steel\Steel\S.S. DIAMETER 16"/10"/2" LENGTH 23'/29'/36'

WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.

HOLE DIA. 8 IN.

SCREEN ► TYPE 304 Stainless Steel SLOT 0.01 DIAMETER 2 IN. LENGTH 10 FT.

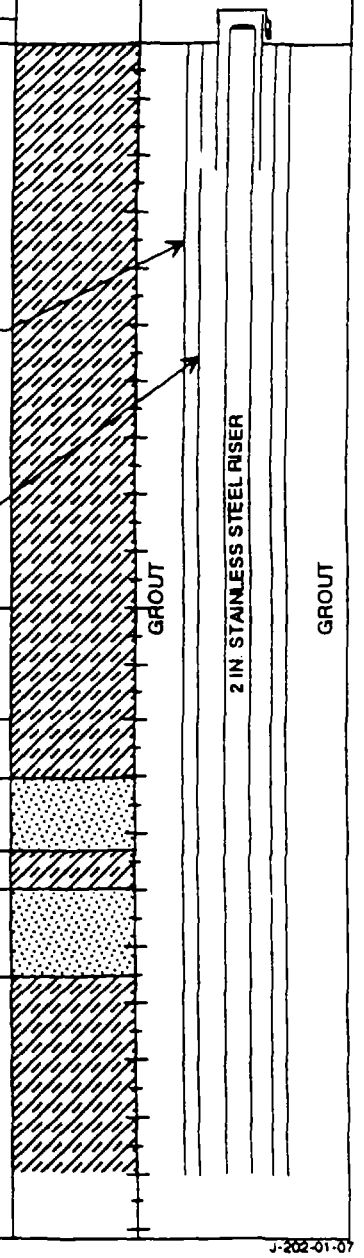
WATER LEVEL AT COMPLETION H.M.P.

TOTAL DEPTH 48 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry		Soft	Slight	1	OVA/Hnu 0/1.0	0–1	1.9'	1, 3, 4, 5	Medium brown SILTY CLAY with some fine-medium sand, some orange mottles, some pebbles.
Dry		Soft	Slight	2	0/0	2–3	1.0'	3, 4, 4, 5	Same as above.
Dry		Soft	Slight	3	0/0.2	4–5	1.1'	4, 4, 5, 7	Same as above, getting stiffer with depth. 16 IN. Steel
Dry to Moist		Soft	Slight	4	3.0/0	6–7	2.0'	4, 3, 4, 4	Same, with gray mottles. Bottom 3 IN. has more fine sand and is moist. 10 IN. PVC
Dry to Damp		Soft	Slight	5	0/0	8–9	1.1'	2, 4, 7, 7	Medium brown SILTY CLAY, damp. Bottom 3 IN. brown to gray SILTY CLAY with roots.
Dry		Soft	Slight	6	0/0	10–11	1.2'	4, 6, 9, 7	Medium brown-dark gray SILTY CLAY, stiff.
Dry to Wet	Poor	Soft	Slight	7	0.6/0	12–13	1.7'	4, 2, 2, 3	Medium gray sandy SILTY CLAY(dry-damp). Gray SAND, silt medium grained.
Dry	Poor	Soft	Slight	8	0/0	14–15	1.2'	4, 4, 7, 10, 15	Gray SILTY CLAY, very plastic. Gray SAND with some clay and rock fragments.
Dry	-	Stiff	Slight	9	0/0	16–17		6, 8, 14	Gray SILTY CLAY, plastic.
	Well	Soft	Slight	10	0/0	18–19	1.2'	10, 7, 7, 7, 6	Brown fine grain SILT with CLAY.

GRAPHIC LOG

WELL COMPLETION

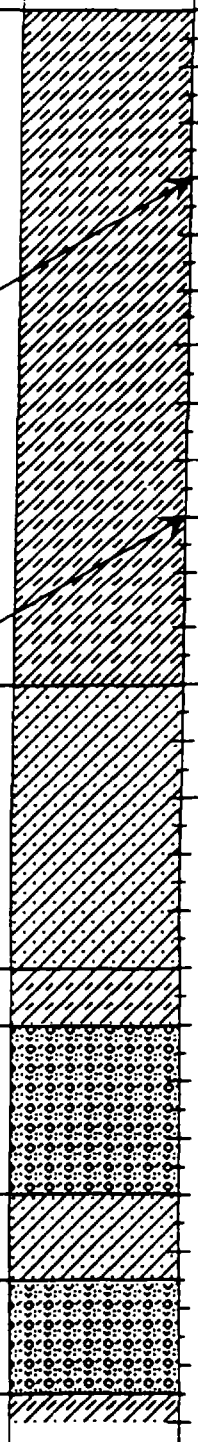


WELL NUMBER ▶ J-VF4

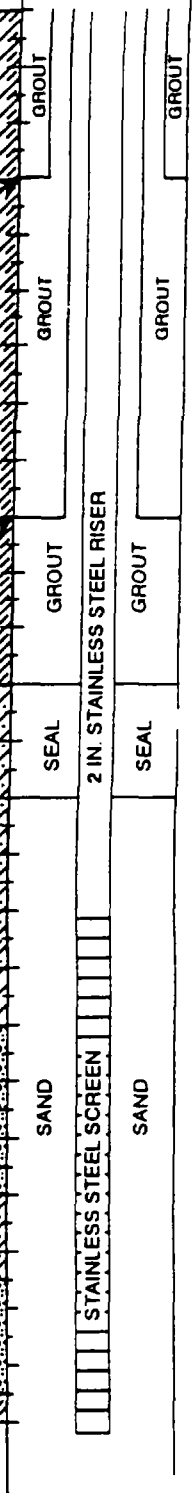
ERM—MIDWEST WELL LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					OVA/Hnu	20			
Dry to Damp	Well	Soft	Very	2	0/0	21	1.2'	2, 4, 6, 6	Gray SILTY CLAY, no sand or gravel.
						22			
						23			
						24			Same as above.
						25			End of 6 IN. Steel
						26			
						27	1.25'		
						28		1	Gray SILTY CLAY, gravel, trace sand.
Damp	Poor	Soft	Very	3	0/0	29	1.4'	4, 5	
						30		22, 16	Same as above.
Damp	Poor	Soft	Very	4	0/2	31	1.0'	16, 9, 7	End of 10 IN. Steel
						32		4	Grades to SANDY CLAY, abundant gravel >1/4", sandstone fragments.
Damp	Poor	Soft	Slight	5	0/-	33	1.4'	5, 4	
						34		5	
Damp to Wet	Poor	Soft	Slight	6	0/-	35	2.0'	2, 3, 3	Becomes gray SANDY CLAY with abundant sand, sand seams which are wet, gravel, sandstone fragments.
						36		4	
Damp	Poor	Soft	Very	7	0/-	37	2.0'	1, 1	Same as above.
						38		1, 2	Grades to SILTY CLAY with sand, gravel, sand is wet.
Wet	Well	Soft	Non	8	0/-	39	2.0'	1, 1, 2	Fine grain SAND with GRAVEL, trace clay, gray.
						40		4	
Wet	Well	Soft	Non to Slight	9	0/-	41	1.5'	2, 6, 7	Same as above.
						42		10	Gray SANDY CLAY with gravel, abundant sand.
Wet	Well	Soft	Non to Slight	10	0/-	43	2.0'	Wt., 5, 7	Brown fine SAND with GRAVEL, trace clay.
						44		10	
Wet	Well	Soft	Non	11	0/-	45	1.5'	10, 9	Gray SILTY CLAY with gravel, sandstone fragments.

GRAPHIC LOG



WELL COMPLETION



WELL NUMBER ▶ RW-1

ERM–MIDWEST WELL LOG

Run	Depth	Rec.	RQD
7	69.5-77.5	100%	81%

Depth	LITHOLOGY / REMARKS
70–72	Siltstone to fine grain SANDSTONE, numerous clay partings, coal laminae, slight chemical odor.
73	SANDSTONE.
74	SILTSTONE, cross bedded.
74–75	Gray coarse grain SANDSTONE, hard, mica rich, damp, cross bedded.
76–77	Fine SANDSTONE/siltstone with coal on cross bed laminae, damp, no odor.
78	Gray coarse grain SANDSTONE.
78–83	Gray CLAY STONE, soft, dry, abundant horizontal and vertical fractures, massive, slight chemical odor.
83	Total Depth 83 FT.

GRAPHIC LOG

WELL COMPLETION: 10 IN. OPEN HOLE

F: OFF-SITE SOIL BORING LOGS

APPENDIX F

OFF-SITE SOIL BORING LOGS

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-01	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/03/90	WEATHER ▶
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 2 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown and dark brown TOPSOIL with roots.	
				2		1				
						2	1.1'		Brown SILTY CLAY with sandstone fragments.	
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► RNS-SB-02	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/03/90	WEATHER ►
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ►	SAMPLING METHOD ► Split Spoon
ELEVATION ►	GROUT ► Soil
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 2 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown silty TOPSOIL with roots.	
Dry				2	0 / 0	1			Brown SILTY CLAY with sandstone fragments, trace sand.	
						2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-03	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/03/90	WEATHER ▶
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 2 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown SILTY CLAY with roots and wheat seeds, no odor.	
						1				
Dry				2	0 / 0	2	0.7'		Brown SILTY CLAY.	
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-04	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/03/90	WEATHER ▶
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 2 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0/0	0			Brown silty TOPSOIL with grass and roots, no odor.	
Dry				2	0/0	1			Brown SILTY CLAY with sand.	
						2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-05	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/04/90	WEATHER ▶ Overcast, Raining and Cold
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 2 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown silty clay TOPSOIL with roots, no odor.	
						1			Brown SILTY CLAY, no odor.	
Dry				2	0 / 0	2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► RNS-SB-07	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/04/90	WEATHER ► Overcast, Raining and Cold
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ►	SAMPLING METHOD ► Split Spoon
ELEVATION ►	GROUT ► Soil
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 2 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown TOPSOIL with slag, no odor.	
						1			Brown SILTY CLAY.	
Dry				2	0 / 0	2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-08	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/04/90	WEATHER ▶ Overcast, Raining and Cold
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 2 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown silty TOPSOIL, no odor.	
						1			Brown SILTY CLAY.	
Dry				2	0 / 0	2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► RNS-SB-09	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/04/90	WEATHER ► Overcast, Raining and Cold
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ►	SAMPLING METHOD ► Split Spoon
ELEVATION ►	GROUT ► Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 2 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown SILTY CLAY.	
						1				
Dry				2	0 / 0	2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► RNS-SB-11	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/04/90	WEATHER ► Overcast, Raining and Cold
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ►	SAMPLING METHOD ► Split Spoon
ELEVATION ►	GROUT ► Soil
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 2 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Brown silty TOPSOIL, no odor.	
						1			Brown SILTY CLAY.	
Dry				2	0 / 0	2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-12	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/04/90	WEATHER ▶ Overcast, Raining and Cold
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 2 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 3.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry				1	0 / 0	0			Black organic rich TOPSOIL, no odor.	
						1			Brown SILTY CLAY with roots, orange mottles.	
Dry				2	0 / 0	2				
						3				
						4			End of Boring 3.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-13	LOCATION ▶ Ruetgers-Nease, Salem, Ohio
DATE ▶ 5/05/90	WEATHER ▶
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4 Hollow Stem Auger	SAMPLING METHOD ▶ Split Spoon
ELEVATION ▶	GROUT ▶ Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 7.25 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 6 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
				1	- / -	0–1	0.3'	2, 2, 2, 2	Brown silty TOPSOIL.	
				2	0 / 0	2–4	0.6'	2, 2, 2, 3	Brown to black SAND with GRAVEL, some glass.	
				3	0 / 0	4–6		8, 7, 7, 7	Black granular material and 4 IN. of sand at tip.	
						6			End of Boring 6.0 FT.	

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► RNS-SB-14	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/05/90	WEATHER ►
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ► 3 1/4 Hollow Stem Auger	SAMPLING METHOD ► Split Spoon
ELEVATION ►	GROUT ► Soil
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 7.25 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 10 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			TOPSOIL brown silty clay	
Dry				1		1	0.3'			
						2		6	Brown SILTY CLAY with roots.	
Dry				2		3		6		
								7		
						4		8		
								6		
				3	8 / 0	5	1.3'	5	12 IN. of brown SILTY CLAY with roots and 3 IN. of black sandy material.	
								13		
						6		13		
								6	Sludge.	
				4	>10 / 0	7		4		
								2		
						8		2		
								1	Sludge.	
Wet				5		9		2		
								3	SAND.	
						10		4		
									End of Boring 10.0 FT.	
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► RNS-SB-15	LOCATION ► Ruetgers-Nease, Salem, Ohio
DATE ► 5/05/90	WEATHER ►
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ► 3 1/4 Hollow Stem Auger	SAMPLING METHOD ► Split Spoon
ELEVATION ►	GROUT ► Soil
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 7.25 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 6 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0				
				1		1	0.7'	1, 2, 3, 5	6 IN. of brown SILTY CLAY with sand , 2 IN. of brown gritty material.	
						2		4, 4, 4, 5	Brown SILTY CLAY with sand.	
Damp				2		3	0.4'			
						4		6, 7, 14, 15	12 IN. of brown and black sludge. 6 IN. of coarse sand.	
Dry				3		5	1.5'			
						6			End of Boring 6.0 FT.	
				4		7				
						8				
				5		9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

G: TEST PIT LOGS

APPENDIX G

TEST PIT LOGS

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-1	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/7/90	WEATHER ▶ Warm, Clear, Sunny
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Beaver Excavation
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 6.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
		X	X	0	0	0			Brown silty TOPSOIL with angular gravel.	
		↑		0	0	1			Brown and yellow mottled SILTY CLAY with sand.	
Dry	Poor	X	X	0	0	2			Brown SILTY CLAY with trace sand.	
		↓		0	0	3				
Dry	Poor	↑		0	0	4				
		X	X	0.2	0.2	5				
Wet	Well	↓		0	0	6			Brown, fine SAND.	
						7			Total Depth 6.5 FT. Test Pit terminated at 6.5 FT. due to water.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-2	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/7/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Beaver Excavation
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
		X	X	0	0	0			Brown and black silty TOPSOIL, roots, grass.	
Dry	Poor	↑		0	0	1				
		X	X	0	0	2				
Dry	Poor	↓		0	0	3			Brown SILTY CLAY with sand.	
				0	0	4			Brown SANDY CLAY with gravel.	
Damp	Poor	↑ X	X	0	0	5				
		↓		0	0	6				
				0	0	7			Test Pit Terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-4	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/7/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Beaver Excavation
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown and black SILTY CLAY with angular gravel.	
				1.6	0	1				
		X		1.8	0	2			Brown SANDY CLAY with trace sand.	
			X	2.2	0.4	3				
Damp	Poor			51	8.4	4				
		X	X	42	20	5				
Moist	Poor			0.8	2.4	6				
				0	0	7			Test Pit Terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-5	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/8/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Beaver Excavation
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 3.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	0	1.5	0			Brown FILL, sand, clay and gravel.	
		↑		1	0	1				
Dry	Poor	X	X	1	0	2			Brown and yellow SILTY CLAY with sand and cobbles.	
		↓		0	0	3				
Wet	Poor					4			Total Depth 3.5 FT. Test Pit terminated due to water.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-6	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/8/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Beaver Excavation
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown and yellow mottled SILTY CLAY.	
Dry	Poor			0	0	1			Brown SILTY CLAY with black streaks.	
Dry	Poor	X	X	0	0	2			Brown and orange mottled SILTY CLAY,	
Dry	Poor			0	0	3				
Dry	Poor			0	0	4			Same as above.	
Dry	Poor	X	X	0	0	5				
Dry	Poor			0	0	6				
Dry	Poor			0	0	7			Test Pit Terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-7	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/8/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Beaver Excavation
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown SILTY CLAY with gravel and orange mottling.	
Dry	Poor	↑		0	0	1				
Dry	Poor	X	X	0	0	2			trace sand.	
Dry	Poor	↓		0	0.6	3			gray mottles.	
Dry	Poor	↑		0	9	4			Gray SILTY CLAY with cobbles. cobbles.	
Dry	Poor	X	X	0	0	5			Brown SILTY CLAY, orange mottles, sand and cobbles.	
Wet	Poor	↓		0.6	0	6				
				0	0	7			Test Pit Terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-8	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/14/90	WEATHER ▶ Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown silty TOPSOIL.	
Dry	Poor	↑		0	0	1			Brown SILTY CLAY with gravel.	
Dry	Poor	X	X	0	0	2				
Dry	Poor	↓		0	0	3				
Dry	Poor	↑		0	0	4				
Damp	Poor	X	X	0	0	5			Trace sand.	
Damp	Poor	↓		0	0	6				
Damp	Poor			0	0	7				
						8			Test Pit Terminated at 7.0 FT.	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-9	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/14/90	WEATHER ▶ Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown silty clay TOPSOIL.	
Dry	Poor	↑		0	0	1			Brown SILTY CLAY.	
Dry	Poor	X	X	0	0	2				
Dry	Poor	↓		0	0	3				
Dry	Poor	↑		1	0	4				
Dry	Poor	X	X	8.5	4	5			Sandy	
Dry	Poor	↓		2.5	10.5	6				
Dry	Poor					7			Test Pit Terminated at 7.0 FT.	
						8			Split Samples with B&VWST.	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM—MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-10	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/14/90	WEATHER ▶ Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Bac:.hoe	
	TOTAL DEPTH ▶ 4.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Old road bed material, fist sized gravel.	
						1				
Dry	Poor	X	X	1	0	2			Black to brown SILTY CLAY, sweet odor.	
Wet	Well	X	X	-	1	3			Brown SANDY CLAY, grading to clayey sand.	
						4			Brown fine SAND.	
									Test Pit Terminated at 4.0 FT.	
						5			Water Encountered at 3.5 FT.	
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-11	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/15/90	WEATHER ▶ Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown TOPSOIL, silty, clayey soil, roots.	
Dry	Poor	↑		0	0	1			Brown SILTY CLAY, gravel, roots.	
Dry	Poor	X	X	0	0	2				
Dry	Poor	↓		0	0	3				
Damp	Poor	↑		0	0	4				
Damp	Poor	X	X	0	0	5			Brown and orange mottled SANDY CLAY.	
Dry	Poor	↓		0	0	6				
Dry	Poor			0.2	0	7			Test Pit Terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-12	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/17/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	0	0	0			Brown sandy, silty, clayey TOPSOIL, roots.	
Dry	Poor	↑		0	0	1			Brown SILTY CLAY, trace sand.	
Dry	Poor	X	X	0	0	2				
Damp	Poor	↓		0	0	3				
Damp	Poor	↑		0	0	4			Brown SANDY CLAY, black and gray mottles.	
Damp	Poor	X	X	0.2	0	5				
Damp	Poor	↓		0	0	6				
Damp	Poor			0	0	7			Total Depth 7.0 FT	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-13	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/21/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	2.5	-	0			Brown SILTY CLAY with roots, white mottles, grades to dark brown.	
Dry	Poor	↑		0	-	1				
Dry	Poor	X	X	0	-	2				
Dry	Poor	↓		0	-	3			Orange mottles.	
Dry	Poor	↑		0	-	4			Same.	
Dry	Poor	X	X	0	-	5			Same.	
Dry	Poor	↓		0	-	6			Same.	
Wet	Poor			0	-	7			Brown fine SAND, trace silty clay, no odor.	
						8			Test pit terminated at 7.0 FT. due to presence of water. Collect matrix spike at 3.5 FT.	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-14	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/11/90	WEATHER ▶ Clear, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 8.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Black stained gravel, white granular solid.	
Dry	Poor	X	X	0	0	1			Brown SANDY CLAY, gravel, slight sweet odor.	
Dry	Poor	X		0	0	2			Brown and orange SILTY CLAY, no odor.	
Dry	Poor			0	0	3			Slight sweet odor.	
Dry	Poor		X	2	1	4			Grades to gray.	
Dry	Poor			9	0.8	5				
Dry	Poor	X	X	10	4	6			Sweet odor.	
Dry	Poor			3	2	7				
Wet	Well			0	1.6	8			Brown fine SAND.	
									Test Pit Terminated at 8.0 FT. Due to Water.	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM—MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-15	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 8/18/90	WEATHER ▶ Clear, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 5.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0.6	0			Dark brown silty clay TOPSOIL with roots.	
Dry	Poor	↑		1	0.2	1			Brown SILTY CLAY with gravel.	
Damp	Poor	X	X	0	0	2				
Damp	Poor	↓		0	0	3				
Damp	Poor	X	X	0	0	4			Brown SANDY CLAY with gravel.	
Wet	Poor					5			Fine brown SAND.	
									Test pit terminated due to presence of water at 4.75 FT.	
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-16	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/18/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 6.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	2.5	0	0			Brown SILTY CLAY with cobbles, sand.	
Damp	Poor	↑		0	0	1				
Damp	Poor	X		0	0	2				
Damp	Poor	↓	X	1	1.2	3				
Dry	Poor	↑		83	64	4			Sweet odor.	
Dry	Poor	X	X	146	>1000	5			Sweet odor.	
Dry	Poor	↓		-	380	6			Sweet odor.	
Wet	Poor					7			Brown CLAYEY SAND.	
						8			Test pit terminated at 6.5 FT. due to presence of water. Split Sample with B&VWST	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-17	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/11/90	WEATHER ▶ Clear, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	0	0	0			Brown SILTY CLAY, roots, gravel, no odor.	
Dry	Poor	↑		0	4	1			Brown and orange mottled SILTY CLAY, slight sweet odor.	
Dry	Poor	X		1	1	2				
Dry	Poor	↓	X	2	0.7	3				
Dry	Poor	↑		4	29	4			Gray and brown SILTY CLAY, trace sand, sweet odor.	
Dry	Poor	X	X	5	37	5				
Damp	Poor	↓		6	21	6			Grades to gray, trace fine silt, black oil present, strong sweet odor.	
Damp	Poor					7			Test pit terminated at 7.0 FT. due to presence of water and free product.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-18	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/17/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	-	0	0			Black silty TOPSOIL, roots.	
Dry	Poor	↑		-	0	1			Brown SILTY CLAY, black mottles, trace sand.	
Dry	Poor	X		-	0	2				
Dry	Poor	↓	X	-	0	3			Brown SANDY CLAY, roots, clayey sand zone.	
Damp	Poor	↑		-	12	4				
Damp	Poor	X	X	-	24	5			Brown SILTY CLAY with black mottles, trace sand, sweet odor	
Moist	Poor	↓		-	38	6				
Wet	Poor	X	X	-	290	7			Brown SANDY CLAY.	
						8			Test pit terminated at 7.5 FT. due to water.	
						9			Duplicate RNS-TP-42 collected at 0.5 FT.	
									Rinse blank collected.	
									Matrix Spike collected at 3.5 FT.	
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-19	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/20/90	WEATHER ▶ Partly Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	-	0			Brown SILTY CLAY, roots,trace sand, no odor.	
Dry	Poor			0	-	1				
Dry	Poor	X	X	0	-	2			Brown SANDY CLAY, no odor, orange mottles.	
Dry	Poor			0	-	3				
Dry	Poor		X	0.6	-	4				
Dry	Poor	X		0	-	5				
Dry	Poor			0	-	6			Brown SILTY CLAY with sand, no odor.	
Dry	Poor			0	-	7			Test pit terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-20	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/17/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	0	0	0			Brown SANDY CLAY, no odor.	
Dry	Poor	↑		0	0	1			Dark brown CLAYEY SAND and gravel.	
Dry	Poor	X		0	0	2			Brown and gray SILTY CLAY, trace sand, gravel.	
Damp	Poor	↓	X	1	0	3			Brown clayey SAND and GRAVEL.	
Moist	Poor	↑		0	0	4			Black stained clayey SAND and GRAVEL.	
Damp	Poor	X	X	0	0	5			Gray clayey SAND and GRAVEL.	
		↓		0	0	6				
				0	1.2	7			Test pit terminated at 7.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-21	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/18/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown, sandy, silty TOPSOIL.	
Dry	Poor	↑		0	0	1			Brown and orange mottled SILTY CLAY, trace sand.	
Dry	Poor	X	X	0	0	2				
Dry	Poor	↓		0	0	3				
Dry	Poor	↑		0	0	4				
Dry	Poor	X	X	0	0	5			mottling dissappears.	
Dry	Poor	↓		0	0	6				
Dry	Poor			0	0	7			Test pit terminated at 7.0 FT. Collect duplicate RNS-TP-43 at 0.5 FT. Split samples with B&VWST.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-22	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/12/90	WEATHER ▶ Clear, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown and orange SILTY CLAY, roots, no odor.	
Dry	Poor	↑	X	0	1	1				
Dry	Poor	X		0	0.2	2				
Dry	Poor	↓		0	0.2	3			Gray-brown SILTY CLAY, trace sand, no odor, black mottles.	
Dry	Poor	↑		0	0	4				
Dry	Poor	X		0	0	5				
Damp	Poor	↓		0	0	6			Grades to gray.	
Damp	Poor			0	0	7				
						8			Test pit terminated at 7.5 FT. due to presence of water.	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-23	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/21, 8/1/90	WEATHER ▶ Partly Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS, Whan
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 12.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Light brown SILY CLAY, trace sand, roots, orange and black mottles, no odor.	
Dry	Poor	↑		1	0	1				
Dry	Poor	X		0	0.4	2			Same, no roots.	
Dry	Poor	↓	X	0	0.6	3			Same.	
Dry	Poor	↑		0	0.4	4			Same.	
Dry	Poor	X		0	1.2	5			Same.	
Dry	Poor	↓	X	17	27	6			Sweet odor.	
Dry	Poor	↑		17	18	7			Brown SANDY CLAY, slight sweet odor, grades to SILTY CLAY.	
Dry	Poor	X		12	7	8				
Dry	Poor	↓	X	22	-	9			Grades back to SANDY CLAY, slight sweet odor.	
Dry	Poor	↑	X	18	2	10			Brown and gray SILTY CLAY, gravel, hard soil, sweet odor.	
Damp	Poor	X		2	0	11			Blue gray SILTY CLAY with gravel, trace sand, very hard, slightly sweet odor.	
Dry	Poor	↓		0.5	0	12				
				0	0	13			Original test pit excavated to 10.0 FT. on 5/21/90, Resampling for volatiles required the continuation of test pit to 13.0 FT. on 8/1/90. Collected duplicate RNS-TP-46 at 0.5 FT. on 5/21/90 Expanded analyses. collect field blank RNS-TP-23-105 on 8/1/90 collect duplicate TP-49 at 12.5 FT. on 8/1/90 collect matrix spike at 12.5 FT. on 8/1/90.	
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-24	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/20/90	WEATHER ▶ Partly Cloudy, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 3.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	-	0			Brown SANDY CLAY, roots.	
Dry	Poor	↑		0	-	1			Brown and orange mottled SILTY CLAY, sweet odor, grades brown.	
Dry	Poor	X	X	3	-	2				
Damp	Poor	↓		1	0	3			Brown SANDY CLAY with gravel, trace sand.	
						4			Test pit terminated at 3.5 FT. due to water	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-25	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/12/90	WEATHER ▶ Clear, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Rob Ferree, ERM-Midwest, Inc.
EXCAVATION METHOD ▶ Hand Auger	

TOTAL DEPTH ▶ 3.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	-	-	0			Brown SILTY CLAY, roots, gravel, no odor.	
Dry	Poor	↑		0	0.2	1			Same mixed with black SILTY CLAY.	
Damp	Poor	X	X			2			Brown and orange mottled SILTY CLAY, sand, gravel no odor.	
Moist	Poor	↓				3			Dark brown SILTY CLAY, weathered shale fragments, no odor.	
						4			Test pit terminated at 3.5 FT. due to water of 2.5 FT.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-26	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/19/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	3	6	0			Brown SILTY CLAY, roots, gravel, no odor.	
Dry	Poor	↑		0	0	1				
Dry	Poor	X		0	1.5	2			Light brown and orange SILTY CLAY, trace sand, cobles, no odor.	
Damp	Poor	↓	X	0	67	3			Gray SILTY CLAY with black streaks, no odor.	
Dry	Poor	↑		0	0.8	4			Brown and orange mottled SILTY CLAY, sand, cobbles.	
Dry	Poor	X	X	0	6.8	5			Brown SANDY CLAY mixed with brown silty clay.	
Dry	Poor	↓		0	0	6			Gray SILTY CLAY, trace gravel, no odor, grades sandier.	
						7			Test pit terminated at 7.0 FT. Matrix spike collected at 0.5 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-27	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/20/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Damp	Poor	X	X	0	0	0			Brown SILTY CLAY, trace sand, no odor.	
Dry	Poor	↑		0	0	1			Light brown and gray SILTY CLAY, no roots, no odor.	
Dry	Poor	X	X	0	0	2			No roots.	
Dry	Poor	↓		0	0	3				
Damp	Poor	↑		0	0	4			Brown fine SANDY CLAY, clayey fine sand, no odor.	
Damp	Poor	X	X	0	0	5			Brown fine SAND and SILT, no odor.	
Damp	Poor	↓		0	0	6			Brown and gray SILTY CLAY, trace sand, no odor.	
				0	0	7			Test pit terminated at 7.0 FT. Duplicate RNS-TP-45 collected at 0.5 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-28	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/19/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Rob Ferree, ERM-Midwest, Inc.
EXCAVATION METHOD ▶ Bucket Auger	

TOTAL DEPTH ▶ 0.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Wet	Poor	X	X	0	0	0			Black organic rich SILTY CLAY, sour odor.	
						1			Test pit terminated due to presence of water at 0.5 FT.	
						2				
						3				
						4				
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-29	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 5/19/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	EXCAVATION BY ▶ WMMS
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 4.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor	X	X	0	0	0			Brown SILTY CLAY, trace roots.	
Dry	Poor			0	0	1			Light brown SILTY CLAY with orange mottles, roots.	
Damp	Poor	X	X	0	5	2			Black organic rich clay with wood, roots, sour odor, gray silty clay mixed with white sludge (FILL).	
Damp	Poor			0	3	3				
Damp	Poor	X	X			4			Gray SANDY CLAY with gravel, no odor.	
						5			Test pit terminated at 4.5 FT. due to water at 4.5 FT.	
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-50	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/15/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 5.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor			-	0	0			Dark brown SILTY CLAY, gravel, roots, cinders, no odor.	
Damp	Poor			-	0	1				
Damp	Poor			-	0	2			Grades to chocolate brown, no gravel.	
Damp	Poor			-	0	3			Becomes soft.	
Wet	Well	X	X	-	-	4			Brown CLAYEY SAND with silt, gravel.	
						5			Brown fine SILT	
						6			Test pit terminated at 5.0 FT. PVC Pipe present at 3.5 FT.	
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-51	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/15/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 4.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Poor					0			Railroad ballast, black sand, FILL.	
						1				
Dry	Poor			-	0.5	2			Brown SILTY CLAY with orange mottles, roots, slag, gravel.	
Damp	Poor			-	4.5	3			Black plastic SILTY CLAY, slight odor.	
Damp to Wet	Poor	X	X	-	14	4				
						5			Test pit terminated at 4.5 FT. due to water. PVC pipe present at 4.0 FT.	
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-52	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/15/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 4.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad gravel ballast (FILL).	
Damp	Poor			0	0	1			Brown SILTY CLAY mixed with brown sand, gravel, no odor.	
Damp	Poor			0	0	2				
Damp	Poor	X	X	4	0.2	3			Same.	
Wet	Poor					4			Brown SAND and GRAVEL	
						5			Test pit terminated at 3.5 FT. due to water at 3.5 FT. PVC pipe present at 3.0 FT.	
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-53	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/16/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 6.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
Dry	Well			0	0	0			Railroad ballast (FILL).	
Damp	Poor			0	0	1			Gray and brown silty clay, gravel, roots, railroad ballast, no odor, (FILL).	
Damp	Poor			0	0	2				
Damp	Poor			0	0	3			Same,	
Damp	Poor	X	X	1	1	4			Same,	
Dry	Poor			1	0.8	5			Brown and orange mottled SILTY CLAY, no odor.	
						6			Test pit terminated at 6.0 FT. PVC pipe present at 4.5 FT.	
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-54	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/15/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 6.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
						1				
Dry	Poor			0	0	2			Brown and orange mottled SILTY CLAY, gravel.	
Dry	Poor			0	0	3				
Damp	Poor	X	X	0	6	4			Black SILTY CLAY, brown SILTY CLAY, soft, no odor.	
Damp	Poor			0	0.2	5				
						6			Test pit terminated at 5.5 FT. PVC pipe present at 4.0 FT.	
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-55	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/16/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
Dry	Poor			0	0	1			Black SAND, ballast (FILL).	
Dry	Poor			0	0	2			Chocolate brown SILTY CLAY, trace clay, no odor.	
Dry	Poor			0	0	3				
Dry	Poor			0	0	4			Grades to brown and orange mottled SILTY CLAY, black sand.	
Dry	Poor	X	X	0	0	5			Black SAND and GRAVEL	
Dry	Poor			0	0	6			Chocolate brown SILTY CLAY, gravel, trace sand, no odor.	
						7			Test pit terminated at 7.0 FT. PVC pipe present at 5.0 FT.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-56	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/17/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 6.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
						1				
						2				
Dry	Poor			-	0	3			Brown SILTY CLAY, gravel, trace sand, no odor.	
Dry	Poor			-	0.7	4				
Dry	Poor	X	X	-	0.5	5				
Dry	Poor			-	0	6			Test pit terminated at 6.0 FT. PVC pipe not present at this location Split sample with B&VWST.	
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-57	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/17/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 4.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
Damp	Poor			0	0	1			Brown and orange SILTY CLAY, gravel, slight sweet odor.	
Damp	Poor	X	X	0	0	2				
Wet	Poor			0	0	3			Brown SAND and GRAVEL.	
						4			Test pit terminated at 4.0 FT. due to water PVC pipe present at 2.5 FT. Split sample with B&VWST.	
						5				
						6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-58	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/17/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 6.5 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
						1				
Dry	Poor			0	0	2			Brown SILTY CLAY, gravel, trace sand, cinders.	
Dry	Poor			0	0	3			Same.	
Dry	Poor	X	X	1	0	4			Same.	
Dry	Poor			2	0	5			Same.	
Dry	Poor			2	0	6			Same.	
						7			Test pit terminated at 6.5 FT. PVC pipe present at 4.0 FT. split sample with B&VWST.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-59	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/18/90	WEATHER ▶ Warm, Clear
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	
	TOTAL DEPTH ▶ 7.0 FT.

MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
						1				
Dry	Poor			0	0	2			Brown SILTY CLAY, sand, gravel, no odor.	
Damp	Poor			0	0	3			Interbedded brown fine sand laminae and gray and brown SILTY CLAY laminae, (like pages in a book), plastic.	
Damp	Poor			0	0	4				
Damp	Poor			3.5	0	5				
Wet	Poor	X	X	4.5	0	6			Gray SILTY CLAY mixed with black sand, gravel (FILL).	
Damp	Poor								Gray SILTY CLAY, plastic.	
Wet	Well			1	0	7			Gray medium grained SAND.	
						8			Test pit terminated at 7.0 FT. due to water. PVC pipe preser.. .. 6.0 FT.	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST TEST PIT LOG

TEST PIT NUMBER ▶ RNS-TP-60	LOCATION ▶ Ruetgers Nease - Salem, Ohio
DATE ▶ 6/18/90	WEATHER ▶ Clear, Warm
LOGGED BY ▶ RAF	EXCAVATION BY ▶ Whan Construction
EXCAVATION METHOD ▶ Ford Backhoe	

TOTAL DEPTH ▶ 4.5 FT.

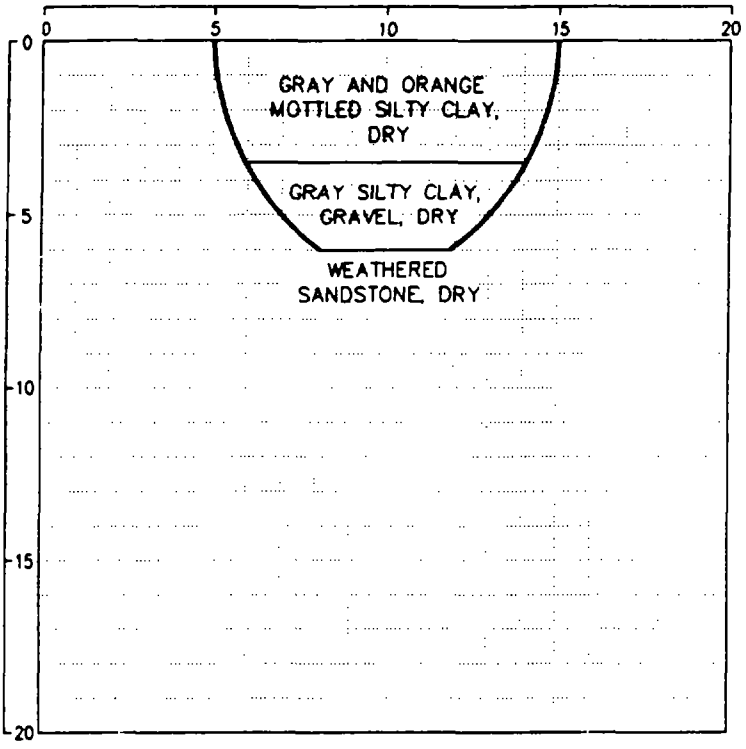
MOISTURE CONTENT	SORTING	NON-VOLATILE	VOLATILE	HNU (ppm)	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Railroad ballast (FILL).	
						1				
Dry	Poor			0	0	2			Brown and orange mottled SILTY CLAY, roots, no odor.	
Wet	Poor			0	0	3			Brown SILTY CLAY with clayey sand seam, no odor.	
Wet	Poor	X	X	0	0	4			Brown CLAYEY SAND, gravel, no odor.	
						5			Test pit terminated at 4.5 FT. due to water. PVC pipe present at 4.0 FT.	
					0	6				
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

FIELD TEST PIT LOG

Job No. 933-6154 Project SALEM RI Test Pit No. TP-30
Contractor ERM-MIDWEST Operator _____ Equipment BACK HOE
Insp. RAF Elevation _____ Started 15:10/11-09-92
Weather OVERCAST, COLD Completed 15:30/11-09-92
Location NEASE SITE, SALEM OHIO

TEST PIT SKETCH

NW ← SCALE: 1 INCH= 5 feet → SE



NOTES / STRATA DESCRIPTIONS
0-4.5 ft. Gray and Orange Mottled SILTY CLAY, dry
4.5-6.0 ft. Gray SILTY CLAY, Gravel, dry
6.0 ft. Weathered Sandstone, dry
AIR SAMPLING
0.0 - 0.5' OVA = 0 ppm HNu = 1.0 ppm
0.5 - 3.5' OVA = 0.1 ppm HNu = 1.0 ppm
3.5 - 6.5' OVA = 0 ppm HNu = 0 ppm

SAMPLES

NO.	DEPTH (bgs)	NOTES

NOTES

Field Test Pit TP-30 created on 10/14/94 from Ruetgers-Nease Salem RI/FS Field Notebook RAF #5, Pages 132 - 136.

WATER LEVELS

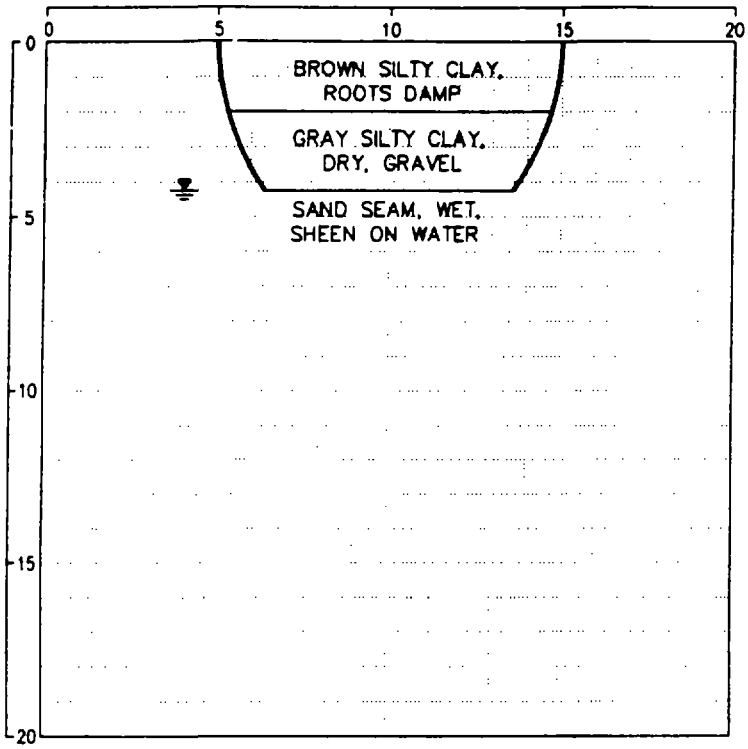
TIME	WATER DEPTH (bgs)
	Not Encountered

FIELD TEST PIT LOG

Job No. 933-6154 Project SALEM RI Test Pit No. TP-31
Contractor ERM-MIDWEST Operator _____ Equipment BACK HOE
Insp. RAF Elevation _____ Started 14:00/11-09-92
Weather OVERCAST, COLD Completed 14:20/11-09-92
Location NEASE SITE, SALEM OHIO

TEST PIT SKETCH

NW ← SCALE: 1 INCH= 5 feet → SE



NOTES / STRATA DESCRIPTIONS
0-2.0 ft. Brown SILTY CLAY, Roots, damp.
2.0-4.2 ft. Gray SILTY CLAY, dry, Gravel
4.2 ft. Sand Seam, Wet, Sheen on Water
TEST PIT TERMINATED DUE TO WATER ENCOUNTERED AT 4.2'
AIR SAMPLING
0.0 - 0.5' OVA = 0 ppm
HNu = 1 ppm
0.5 - 3.5' OVA = 0 ppm
HNu = 4 ppm
3.5 - 6.5' NOT SAMPLED
WATER

SAMPLES

NO.	DEPTH (bgs)	NOTES

NOTES

Field Test Pit TP-31 created on 10/14/94
from Ruetgers-Nease Salem RI/FS Field
Notebook, RAF #5, Pages 132 - 136.

WATER LEVELS

TIME	WATER DEPTH (bgs)
	Encountered at 4.2 ft

H: ON-SITE POND BORING LOGS

APPENDIX H

ON-SITE POND BORING LOGS

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-29	LOCATION ▶ Salem, Ohio
DATE ▶ 6/30/90	WEATHER ▶ Hot, Humid, Overcast
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1174.20 FT.	GROUT ▶ 18 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 8 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 18 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					0	0		PUSH	FILL: Brown silty clay, gravel, trace sand.
Dry	Poor	Soft	Slight	1	1	1	1.8'		
						2			FILL: Dry, sludge in tip.
Dry	Poor	Soft	Slight	2	0.2	3	1.0'		FILL: Light brown silty clay mixed with light tan silty clay.
Dry	Poor	Soft	Slight	3	6	4	2.0'		Same as above.
					1	5			
imp	Poor	Soft	Non	4	18	6	0.8'		Same as above.
					75				FILL: White and tan sludge.
Wet	Poor	Soft	Non	5	12	7	1.7'		Same as above.
Dry	Poor	Soft	Slight	6	11	8	1.0'		FILL: Brown and light brown mottled silty clay, 1 mm silt stringers, gravels, trace sand.
					55	9		PUSH	Gray and light brown mottled SILTY CLAY, 1 mm silt stringers, gravel, trace sand.
Dry	Poor	Soft	Slight	7	12	10	1.8'		
Dry	Poor	Soft	Slight	8	35	11	1.0'		Same as above.
Wet	Poor	-	-	9	20	12	0.25'		Fine and medium grain SAND and GRAVEL.
Dry	Well	Soft	Plast.	10	35	14	0.8'		Gray SILTY CLAY.
Dry	Poor	Soft	Plast.	11	55	15			
					22	16	1.5'		Same as above. 2 mm SAND stringers at 16.5 FT.
Dry	Poor	Soft	Plast.	12	23	17	1.0'		Same, 2-3 IN. sand and gravel seams at 17.3 and 17.8 FT.
						18			Total Depth 18.0 FT.
						19			
						20			

GRAPHIC LOG

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► SB-30	LOCATION ► Salem, Ohio
DATE ► 6/30/90	WEATHER ► Hot, Clear
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ► 3 1/4" Hollow Stem Auger	SAMPLING METHOD ► 3 IN. Split Spoon
ELEVATION ► 1175.40 FT.	GROUT ► 19 - 0 FT.
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 6 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 19 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0		PUSH	FILL: Brown silty clay with black mottles, sand, gravels, roots.
Dry	Poor	Soft	Slight	1	0/0, 0/0	1	1.8'		
Dry	Poor	Soft	Slight	2	2/0	2	1.0'		Same as above.
Dry	Poor	Soft	Slight	3	3/0, 4/10	3, 4	1.4'		
Damp	-	-	-	4	6/10	5	1.0'		Same as above.
						6			FILL: Gray and black silty clay, gravel.
Damp	-	-	-	5	4/8, 6/15	7	2.0'		FILL: White, marshmallow cream sludge. Same as above.
Wet	-	-	-	6	12/30	8	1.0'		Same as above.
Dry	Poor	Hard	Non	7	15/10, 20/55	9, 10	1.8'		Same as above.
						11			Brown SILTY CLAY, sand.
Dry	Poor	Hard	Non	8	50/10	12	1.0'		Gray SILTY CLAY.
Wet	Poor	Hard	Non	9	200/15, 150/18	13	2.0'		Same as above. 1 IN. sand seam at 13 FT.
Dry	Poor			10	60/140	14, 15	1.0'		Same with trace medium sand.
Dry	Poor			11	2/2, 0/3	16, 17	2.0'		
						17			Gray fine SILT, bulls liver.
Wet to Dry	Well			12	50/5, 10/7	18	2.0'		Gray SILTY CLAY with sand.
						19			Total Depth 19.0 FT.
						20			

GRAPHIC LOG

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-31	LOCATION ▶ Salem, Ohio
DATE ▶ 7/10/90	WEATHER ▶ Overcast, Humid
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ Shelby Tube
ELEVATION ▶ 1184.00 FT.	GROUT ▶ 16 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 16 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0		ST	FILL: Brown silt.	
				1	2000/50	1	3.5'	ST		
						2		ST	FILL: Gray silty clay and tan sludge.	
						3		ST	FILL: Tan sludge.	
Damp	-	-	-	2	>1000/150	4	0.25'	ST		
						5		ST	Sludge too wet to stay in shelby tube.	
Wet						6	0	ST		
						7		ST	Sludge too wet to stay in shelby tube.	
						8	0	ST		
						9		ST		
				3	>1000/480	10	2.0'	ST	Brown SILTY CLAY with oil, gravel.	
						11		ST	Gray SILTY CLAY.	
				4		12	1.5'	ST		
						13		ST	Same as above.	
				5		14	1.5'	ST		
						15		ST	Same as above.	
							1.0'	ST		
						16			Refusal, Total Depth 16.0 FT.	
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-32	LOCATION ▶ Salem, Ohio
DATE ▶ 7/10/90	WEATHER ▶ Overcast
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ Shelby Tube
ELEVATION ▶ 1193.40 FT.	GROUT ▶ 9 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 9 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0				
Damp	-	-	-	1	2/0	1	1.0'	ST ST ST ST	FILL: Gray and tan sludge, roots.	
						2			Too soft to stay in shelby tube.	
						3	0			
						4			Too soft to stay in shelby tube.	
						5	0			
						6			FILL: Tan sludge and black sludge.	
Damp	-	-	-	2	3/1	7	2.0'			
				3	3/7.5	8			Same as above.	
						9			Refusal, Total Depth 9.0 FT.	
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-32-A	LOCATION ▶ Salem, Ohio
DATE ▶ 7/18/90	WEATHER ▶ Partly Cloudy, 70F
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ Shelby Tube
ELEVATION ▶ 1199.40 FT.	GROUT ▶ 21 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 21 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0			Boring advanced to the south of pond 7, on levee.	
						1				
						2				
						3				
						4				
						5				
						6			**Drill to approximate depth of the base of pond 7.**	
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14			No recovery;saturated sample, slipped out of tube.	
				1		15	0'			
						16			Gray SILTY CLAY.	
				2	0.0	17	1.9'			
						18			Same with some sand.	
				3	0.0	19	2.0'			
						20				

PROJECT\202-01\-07\SB-32-A.DRW

BORE NUMBER ▶ **SB-32-A**

ERM–MIDWEST SOIL BORING LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						20				
				4	0.0		0.8'		(push 1 IN. only). Brown-gray SILTY CLAY, very tight.	
						21			Refusal of augers (bedrock). Total Depth 21.0 FT.	
						22				
						23				
						24				
						25				
						26				
						27				
						28				
						29				
						30				
						31				
						32				
						33				
						34				
						35				
						36				
						37				
						38				
						39				
						40				
						41				
						42				
						43				
						44				
						45				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-33	LOCATION ▶ Salem, Ohio
DATE ▶ 7/14/90	WEATHER ▶ Raining, Overcast, Humid
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ Shelby Tube
ELEVATION ▶ 1170.80 FT.	GROUT ▶ 7.5 - 0 FT.
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 6 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 7.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0				
				1	0	1	1.0'		FILL: Tan sludge.	
						2				
				2	0	3	1.7'		Brown SILTY CLAY with orange mottles.	
						4				
				3	0	5	1.9'		Same as above.	
						6				
				4	0	7	1.25'		Same as above.	
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

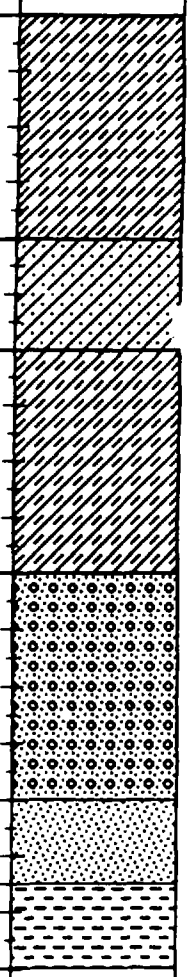
LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ RNS-SB-33A	LOCATION ▶ Salem, Ohio
DATE ▶ 7/18/90	WEATHER ▶ Sunny, 60F
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 4 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ Shelby Tube
ELEVATION ▶ 1167.30 FT.	GROUT ▶ 17 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 8 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 17 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
Dry	-	-	-	1	0/0	0–1	1.5'		Orange-brown SILTY CLAY with gray mottles.
Dry	-	-	-	2	0/0	2–3	1.6'		Same as above.
Dry	-	-	-	3	0/0	4–5	2.0'		Brown SANDY CLAY, fine grain.
Dry to Moist	-	-	-	4	1.0/0	6–7	1.7'		Gray SILTY CLAY.
Dry to Wet	-	-	-	5	0.5/0	8–9	1.7'		Same as above.
				6	0.5/0	10–11	2.0'		Gray SAND and GRAVEL.
—	-	-	-	7	—	12–13	0'		No recovery(~1 IN. of heave when augered).
Wet to Dry	-	-	-	8	0.2/0	14–15	2.0'		Gray SAND.
Dry	-	-	-	9	0.2/1.5	16–17	1.0'		SHALE, gray.
						17–20			Total Depth 17.0 FT.

GRAPHIC LOG



PROJECT\202-01\-07\RNSSB33A.DRW

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-34	LOCATION ▶ Salem, Ohio
DATE ▶ 7/03/90	WEATHER ▶ Hot, Clear
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ Shelby Tube
ELEVATION ▶ 1174.60 FT.	GROUT ▶ 41.5 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 41.5 FT.

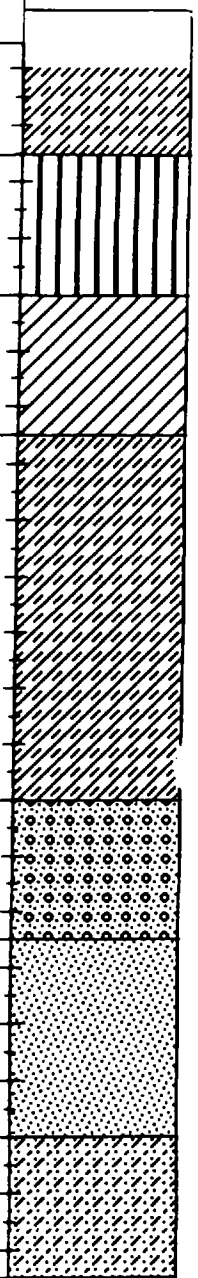
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
						0		ST	FILL: Dry sludge.	
								ST		
				1		1	2.1'	ST		
								ST		
						2		ST		
						3		ST	FILL: Dry sludge.	
								ST		
				2		4	1.25'	ST		
								ST		
						5		ST		
								ST	FILL: Wet sludge, fell out of tube.	
						6		ST		
				3			2.1'	ST		
						7		ST		
								ST	FILL: Wet sludge, fell out of tube.	
						8		ST		
				4			0	ST		
								ST		
						9		ST	Gray SILTY CLAY.	
								ST		
				5		10	1.5'	ST		
								ST		
						11		ST	Same as above.	
								ST		
				6		12	1.5'	ST		
								ST		
						13		ST		
							0	ST		
								ST		
						14		ST	Same as above.	
								ST		
				7		15	1.8'	ST		
								ST		
						16		ST		
								ST	Same as above.	
						17		ST		
				8			2.1'	ST		
						18		ST		
								ST		
						19		ST	Same as above, sample continued on next page.	
								ST		
				9		20	2.3'			

BORE NUMBER ▶ **SB-34**

ERM–MIDWEST SOIL BORING LOG

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
				9	0/0	20–21	2.3'		Gray SILTY CLAY with gravel.
Wet	Poor	-	-	10	10/0	22–23	2.5'		Gray SILT.
Wet	-	-	-	11	0/0	24–26	1.9'		Gray CLAY and medium grain sand.
Damp	-	-	-	12	0/0	27–28	1.7'		Gray SILTY CLAY, sand, gravel.
Damp	-	-	-	13	0/1	29–31	1.7'		Same as above.
Damp	-	-	-	14	0/0	32–33	1.2'		Same as above.
Dry	-	-	-	15	0/0	34–35	2.0'		Gray clayey SAND and GRAVEL.
Wet	-	-	-	16	0/0	36–38	2.5'		Gray fine SAND and silt. Same as above.
Damp	-	-	-	17	0/1	39–41	2.5'		Brown CLAYEY SAND. Same as above.
						42–45			Total Depth 41.5 FT

GRAPHIC LOG



LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► SB-19	LOCATION ► Salem, Ohio
DATE ► 6/27/90	WEATHER ► Hot, Clear
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ► 2 1/4" Hollow Stem Auger	SAMPLING METHOD ► 2 IN. Split Spoon
ELEVATION ► 1186.50 FT.	GROUT ► 17.5 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 17.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					0/0	0		Wt	Brown TOPSOIL, grass, roots.
Dry	Non	Soft	Non	1	10/0	1	1.7'	Wt. Wt. Wt.	FILL: Brown and black silty clay, gravel.
Dry	Non	Soft	Slight	2	160/62	2	0.9'	Wt. Wt.	Same as above.
Dry	Non	Soft	Slight	3	92/70	3	0.7'	Wt. Wt.	Same as above.
Dry	Non	Soft	Slight	4	52/70	4	2.0'		Same as above.
Damp	Non	Soft	Slight	5	720/>2000	5	2.0'		Damp at 6.5 FT. Same as above.
Damp	Non	Soft	Slight	6	42/22	6	1.0'		FILL: Brown SILTY CLAY, gravel, sheen on soil.
Damp	Non	Soft	Non	7	70/55	7	1.3'	Wt.	FILL: Brown and yellow sludge, oily sheen on sludge, gravel mixed with sludge at 12 FT.
Wet	Non	Soft	Non	8	560/220	8	1.0'		
Dry	Non	Hard	Slight	9	990/150	9	1.7'	Push	Brown fine SAND, silty clay.
Dry	Non	Hard	Slight	10	>1000/220	10	1.0'		Brown SILTY CLAY, brown oil. Brown SILTY CLAY mixed with fine grained sand.
Damp	Poor	Hard	Non	11	>1000/500	11	1.0'	60/6 100/6	Same as above, with oily sheen.
					>1000/500	12	1.25'	21 113 170	Dark brown CLAY SAND and gravel, oil present.
					>1000/520	13			Brown-gray SHALE, shale pieces in tip of spoon. Total Depth 17.5 FT.
					>1000/520	14			
					>1000/520	15			
					>1000/750	16			
						17			
						18			
						19			
						20			

GRAPHIC LOG

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ► SB-20	LOCATION ► Salem, Ohio
DATE ► 6/27/90	WEATHER ► Warm
LOGGED BY ► RAF	DRILLED BY ► Mathes
DRILLING METHOD ► 3 1/4" Hollow Stem Auger	SAMPLING METHOD ► 3 IN. Split Spoon
ELEVATION ► 1185.00 FT.	GROUT ► 17.0 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 17.0 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					45/2	0			FILL: Brown silty clay with gravel, roots.
Dry	Poor	Soft	Slight	1	32/17.5	1	1.7'	Push	
Dry	Poor	Soft	Slight	2	750/300	2	0.9'	Push	FILL: Gray silty clay with gravel, sand and black staining.
Dry	Poor	Soft	Slight	3	200/200	3	0.7'	Push	Same as above.
Damp	Poor	Soft	Slight	4	58/16	4	2.0'	Push	Same as above.
Damp	Poor	Soft	Slight	5	74/8.5	5	2.0'	Push	Same, brown oil at 7.5 FT.
Wet	Poor	Soft	Slight	6	58/11.5	6	1.0'	Push	FILL: Light tan granular sludge, interbedded layers of pure sludge, granular and gray at 9.0 FT., brown oil in sludge.
Wet	Poor	Soft	Slight	7	400/150	7	1.2'	Push	FILL: Granular material, dry.
Dry	Poor	Hard	Non	8	>1000/250	8	1.0'		Brown SILTY CLAY with gravel, oil, sand.
Damp	Poor	Hard	Slight	9	>1000/250	9	2.0'		Same as above.
Damp	Poor	Hard	Slight	10	>1000/200	10	2.0'	99	3 IN. SAND at layer at 13.5 FT. Same as above.
Wet	Poor	Hard	Non	11	>1000/200	11	1.0'		SANDY CLAY with gravel, silt at 16.5 FT.
					880/240	12			
					>1000/200	13			
					>1000/360	14			
					>1000/200	15			
					>1000/50	16			SAND.
					>1000/400	17			Spoon refusal, SHALE bedrock. Total Depth 17.0 FT.
						18			
						19			
						20			

GRAPHIC LOG

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-17	LOCATION ▶ Salem, Ohio
DATE ▶ 7/01/90	WEATHER ▶ Overcast, Hot
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1189.80 FT.	GROUT ▶ 14.5 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 14.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0		Push	FILL: Large gravel rip rap.
Dry	Poor	Stiff	Slight	1	14/14	1	1.7'		FILL: Brown and orange mottled silty clay, 1 mm white specks
					30/20	2			
Dry	Poor	Soft	Non	2	200/600	3	2.0'		FILL: Light gray sludge, black mottles, granular.
					600/600	4		Push	
Damp	Poor	Soft	Slight	3	200/45	5	2.0'		Same, mixed with brown silty clay.
						6			Brown SILTY CLAY, gravel, trace sand.
Dry	Poor	Soft	Slight	4	9.5/50		1.0'		Same as above.
Dry	Poor	Stiff	Plast.	5	110/150	7			Same, orange mottles.
Dry	Poor	Stiff	Plast.		94/500	8	2.0'		Brown SILTY CLAY, gravel, trace sand.
Damp	Poor	Stiff	Slight	6	>1000/900	9	1.0'		
					>1000/400	10			SANDY CLAY and gravel.
Damp	Poor	Stiff	Slight	7	570/600	11	2.0'		
						12			
Wet	Poor	Stiff	Non	8	320/400	13	1.0'		CLAYEY SAND and gravel.
Wet	Mod.	Soft	Non	9	>1000/700	14	2.0'		Medium grain SAND and GRAVEL, oily sheen. Grades into sandy clay with sand seams, sand where present has brown oil.
						15			Total Depth 14.5 FT.
						16			
						17			
						18			
						19			
						20			

GRAPHIC LOG

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-18	LOCATION ▶ Salem, Ohio
DATE ▶ 6/29/90	WEATHER ▶ Warm
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1191.50 FT.	GROUT ▶ 19.5 - 0 FT.
WATER LEVEL INITIAL	☐ B.G.S. ☐ B.M.P.
WATER LEVEL AT COMPLETION	H.M.P.
HOLE DIA. 6 IN.	TOTAL DEPTH 19.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					0/0	0		PUSH	FILL: Brown silty clay, gravel, trace sand.
Dry	Poor	Soft	Slight	1	0/0	1	2.0'		
						2			Grades to sandy clay at 2.5 FT.
Dry	Poor	Soft	Slight	2	0/0		1.0'		
					0/0	3		PUSH	
Damp	Poor	Soft	Slight	3	0/0	4	1.75'		Same as above.
						5			Same as above.
				4	0.2/1		1.0'		
					5/4	6			
Damp	Poor	Soft	Slight	5	18/14	7	1.6'		Same, but with black staining.
						8			
Damp	Poor	Soft	Slight	6	320/30		1.0'		Same as above.
					520/400	9			
Dry	Poor	Hard	Slight	7	>1000/700	10	1.8'		Same to 11.75 FT. sandstone clast at 11.0 FT.
						11			FILL: Dark gray silty clay with gravel, trace sand.
				8	18/45		2.0'		
					68/5	12			Dark gray SILTY CLAY with gravel, trace sand.
Dry	Poor	Hard	Non	9	6.2/3	13	0.08'		
						14			Fine SAND, gravel, shale fragments. Fine SAND.
Wet	Poor	Soft	Non	10	-/-		1.3'		
					0.5/1	15			
Wet	Well	Soft	Non	11	0/1	16	1.0'		Fine SAND.
						17			
Wet	Well	Soft	Non	12	0/1		1.0'		
					0/1	18			
							1.2'		
Damp	Poor	Soft	Non	13		19			Gray SILTY CLAY.
						20			Gray weathered SHALE. Total Depth 19.5 FT.

GRAPHIC LOG

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-27	LOCATION ▶ Salem, Ohio
DATE ▶ 7/13/90	WEATHER ▶ Overcast, Cool, Drizzling
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1170.7 FT.	GROUT ▶ 13 - 0 FT.
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 6 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 13 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
					0.5/0	0			FILL: White, yellow, tan sludge.	
Damp	-	-	-	1	1/1	1	2.0'		FILL: Red, brown sludge.	
Wet	-	-	-	2	1.2/0	2	1.0'		FILL: Marshmallow cream sludge.	
					0/0	3			FILL: Sludge.	
Dry	Poor	Stiff	Slight	3	3/1.5	4	2.0'		Brown and gray SILTY CLAY, gravel, sand at 5.0 FT.	
				4	3/9	5	1.0'			
Dry	Poor	Stiff	Slight	5	14/1	6	1.0'		Brown SILTY CLAY with gravel.	
					6/34	7			Sandstone gravel.	
Dry	Poor	Stiff	Slight	6	4/10	8	2.0'		Gray SILTY CLAY with gravel.	
Dry	Poor	Stiff	Slight	7	0/2	9	1.0'			
Dry	Poor	Hard	Slight	8	0.5/5	10				
					0.5/6	11	2.0'		Same as above.	
Dry	Poor	Hard	Slight	9	0.2/6	12	1.0'		2 IN. sand seam at 12.5 FT.	
						13			Total Depth 13.0 FT.	
						14				
						15				
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-28	LOCATION ▶ Salem, Ohio
DATE ▶ 7/13/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1170.10 FT.	GROUT ▶ 13 - 0 FT.
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 6 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 13 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					0.5 / 0.5	0			FILL: Tan sludge with orange and dark brown sludge.
Damp	-	-	-	1	10 / 1	1	2.0'		FILL: Brown sandy clay, gravel, black staining at 2.0 FT., roots, 3 IN. of sludge at 3.5 FT.
Dry	Poor	Stiff	Slight	2	9 / 1.5	2	1.0'		
Dry	Poor	Stiff	Slight	3	12 / 1	3	1.0'		
Dry	Poor	Stiff	Slight	4	5 / 2	4	2.0'		Brown SANDY CLAY, sand seams at 4.5 and 5.75 FT.
					2 / 1	5			
Damp	Poor	Stiff	Plast.	5	2 / 5	6	1.0'		Gray SILTY CLAY with sand seam at 6.5 FT.
Damp to Wet	Poor	Soft	-	6	4 / 2	7	1.75'		Fine SILT and SAND, medium grain sand, black stains.
Wet	Poor	Soft	-	7	2 / 8	8	1.0'		Same as above.
					2 / 2	9			
				8	0 / 0	10	2.0'		Gray SILTY CLAY with gravel.
					1.2 / 6	11			Same, 1 IN. sand seam. at 11.5 FT.
				9	1 / 9	12	1.0'		Same, 3 IN. SILT seam at 12.2 FT.
						13			Total Depth 13.0 FT.
						14			
						15			
						16			
						17			
						18			
						19			
						20			

GRAPHIC LOG

LOCATION MAP

ERM—MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-23	LOCATION ▶ Salem, Ohio
DATE ▶ 7/16/90	WEATHER ▶ Cool, Hot
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1205.50 FT.	GROUT ▶ 15 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 15 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
					0/0	0				
Damp	-	Soft	Non	1	1/0	1	2.0'		FILL: Tan, brown, red sludge.	
Damp	-	Soft	Slight	2	0/0	2	1.0'			
Damp	-	Soft	Slight	3	0/0 0.2/1	3 4	2.0'		FILL: Gray silty clay with black streaks, sand, gravel.	
amp	-	Soft	Slight	4	0/0	5	1.0'		Same as above.	
Dry	-	Stiff	Slight	5	0.5/0 0.8/1	6 7	2.0'		F Same as above. M Brown and orange mottled SILTY CLAY, trace sand, gravel.	
Dry	-	Stiff	Slight	6	0.5/1	8	1.0'		Same as above.	
Dry to Damp	-	Stiff	Slight	7	2/1 3.5/1	9 10	2.0'		Grades to a brown SANDY CLAY, gravel, black streaks.	
Wet	-	Stiff	-	8	1/0	11	1.0'		Same as above.	
									Brown SAND and GRAVEL, trace clay.	
Damp	-	Stiff	-	9	1.5/0 1.5/1	12 13	2.0'		Gray SILTY CLAY mixed with brown sandy clay, silt seams, wet at seams.	
				10	1/1	14	0.25'			
						15			Total Depth 15.0 FT.	
						16				
						17				
						18				
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-24	LOCATION ▶ Salem, Ohio
DATE ▶ 7/02/90	WEATHER ▶ Hot, Clear
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Spilt Spoon
ELEVATION ▶ 1193.00 FT.	GROUT ▶ 17 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 17 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
					0/0	0			FILL: White, tan sludge.	
Wet	-	Soft	-	1	0/2	1	2.0'			
						2			Red at 1.5 to 2.0 FT.	
Wet	-	Soft	-	2	0/0		1.0'		FILL: Orange sludge.	
					0/0	3				
Wet		Soft		3	0/2	4	2.0'			
						5			Orange.	
					0/0				Tan	
Wet		Soft		4	0/0	6	2.0'		Peanut butter brown in color.	
					0/2	7			FILL: Tan sludge.	
Wet		Soft		5	30/6	8	2.0'		Brown SANDY CLAY, with gravel, trace sand.	
						9			Gray SILTY CL[illegible] and gravel, 1mm black seam at 9.75 FT.	
Dry	Poor	Hard	Slight	6	30/0		1.0'			
Dry	Poor	Hard	Slight	7	32/0	10	1.0'			
						11			Gray SILTY CLAY. 4 IN. of fine sand at 12.5 FT.	
Dry	Poor	Hard	Slight	8	52/2	12	2.0'		Gray and brown mottled SANDY CLAY, gravel.	
					36/4					
Dry	Poor	Hard	Slight	9	12/4	13	1.0'			
					30/2	14				
Dry	Poor	Hard	Non	10	35/2	15	1.3'		Gray SANDY CLAY, trace silt, gravel.	
				11	0/4	16	1.0'		Same as above.	
						17			Total Depth 18.0 FT.	
						18				
						19				
						20				

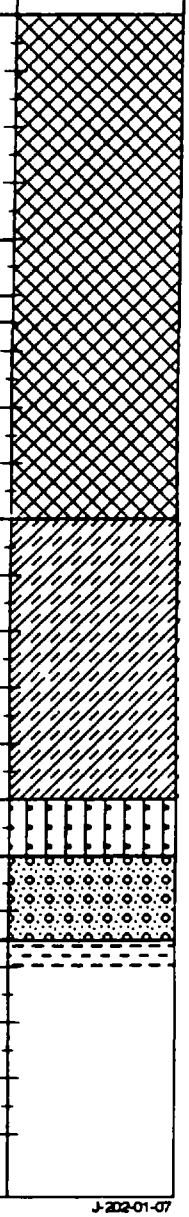
LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-21	LOCATION ▶ Salem, Ohio
DATE ▶ 6/28/90	WEATHER ▶ Hot, Humid
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1183.40 FT.	GROUT ▶ 16.5 - 0 FT.
	WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P. / HOLE DIA. 6 IN.
	WATER LEVEL AT COMPLETION H.M.P. / TOTAL DEPTH 16.5 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			FILL: Light to dark brown silty clay, gravel, roots, trace sand.
Dry	Poor	Soft	Non	1	16 / -	1	2.0'	Push	
						2			
Dry	Poor	Soft	Slight	2	12 / -		1.0'		Same as above.
					32 / 15	3			Same as above.
Dry	-	-	-	3		4	2.0'		FILL: Light tan bedded sludge, oily sheen.
					48 / 25				
						5			FILL: Light brown silty clay, dry.
Wet	-	-	-	4	80 / 50		1.0'		FILL: Light tan sludge, oily sheen, cream sludge.
					10 / 5	6			
Wet	-	-	-	5	28 / 14	7	1.8'		Becomes gray granular sludge, damp.
						8			FILL: Tan sludge.
Wet	-	-	-	6	38 / 14		1.0'		FILL: Granular sludge.
					800 / 150	9			Dark gray SILTY CLAY, gravel, trace sand, oily sheen.
Dry	Poor	Soft	Non	7	400 / 550	10	2.0'		
						11		10	Same, oily sheen.
Dry	Poor	Soft	Non	8	12 / 4		1.0'		
					24 / 45	12			
				9	450 / 70	13	1.75'		
						14			
Damp	Poor			10	40 / 10		1.0'		Gray SILTY SAND, silt, oily sheen.
						15			SAND and GRAVEL, shale fragments, wood fragments.
Damp	Poor			11	>1000 / 300	16	1.25'		
						17			Gray SHALE, fissle, bedding plane breaks.
									Total Depth 17.0 FT.
						18			
						19			
						20			

GRAPHIC LOG



LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-22	LOCATION ▶ Salem, Ohio
DATE ▶ 7/16/90	WEATHER ▶ Cool, Clear
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes-ATV
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1206.70 FT.	GROUT ▶ 18.0 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 18 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
					1/4	0			FILL: Light tan sludge.	
Dry	-	Soft	Slight	1	2/3	1	2.0'		Brown SILTY CLAY mixed with sludge, with gravel.	
Dry	-	Soft	Slight	2	1/2	2	1.0'			
Dry	-	Soft	Slight	3	1/0	3	2.0'		Same as above.	
Dry	-	Soft	Slight	4	1.2/0	4	1.0'		Brown SILTY CLAY with gravel, some sludge.	
Dry	-	Soft	Slight	5	0.8/0	5	2.0'		Same, large cobbles.	
Dry	-	Hard	Slight	6	1/0	6	1.0'		Same as above.	
Dry	-	Hard	Slight	7	1/0	7	2.0'		Brown SANDY CLAY, with gravel, cobbles.	
Wet	-	-	-	8	0/0	8	1.0'		Same as above.	
					0/1	9			Brown CLAYEY SAND and gravel.	
Dry	Poor	Hard	Slight	9	0/2	10	2.0'		Brown SILTY CLAY with gravel, trace sand.	
Dry	Poor	Hard	Slight	10	3/1	11	1.0'		Gray SILTY CLAY with gravel.	
Dry	Poor	Poor	Slight	11	5/1	12	2.0'		Same as above.	
				12	0.5/1	13	2.0'		Brown SILTY CLAY with gravel, 3 IN. brown sand and gravel, wet.	
					0/2	14				
					0/4	15				
						16				
						17				
						18			Total Depth 18.0 FT.	
						19				
						20				

LOCATION MAP

ERM–MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-25	LOCATION ▶ Salem, Ohio
DATE ▶ 7/11/90	WEATHER ▶ Overcast, Cool
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1192.20 FT.	GROUT ▶ 15 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 15 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	GRAPHIC LOG
					0/0	0			FILL: White, tan sludge, roots.	
Damp	-	Soft	-	1	0/0.5	1	2.0'			
Damp	-	Soft	-	2	0/0	2	1.0'		Same as above.	
Damp	-	Soft	-	3	64/5	3			Same as above.	
					0/0	4	2.0'		FILL: 4 IN. of black sludge at 4.5 FT.	
amp	-	Soft	-	4	42/42	5	1.0'		FILL: Tan sludge with brown gravel, granular.	
Dry	Poor	Hard	Slight	5	18/-/42/-	6	2.0'		Brown SILTY CLAY with gravel, trace sand, strong sharp odor.	
				6	11/-	7	1.0'		Same as above.	
Dry	Poor	Hard	Non	7	24/-/20/-	8	1.75'		Gray SILTY CLAY with gravel.	
Dry	Poor	Hard	Non	8	6/-/-/0	9	1.0'		Same as above.	
Dry	Poor	Hard	Non	9	-/0	10	1.75'		3 IN. sand seam at 13 FT.	
Damp	Poor	Hard	Non	10	-/0.5	11	1.0'		5 IN. sand seam at 14 FT. Brown SILTY CLAY, gravel	
						12				
						13				
						14				
						15			Total Depth 15.0 FT.	
						16				
						17				
						18				
						19				
						20				

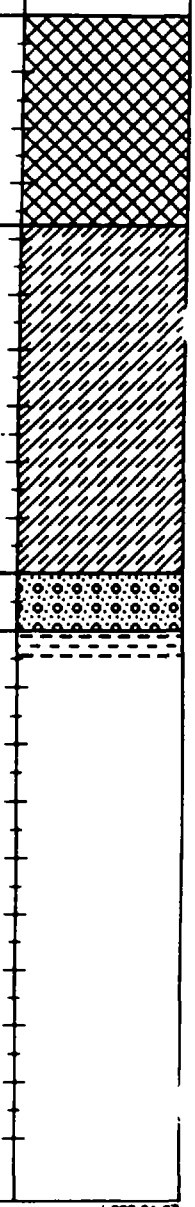
LOCATION MAP

ERM—MIDWEST SOIL BORING LOG

BORE NUMBER ▶ SB-26	LOCATION ▶ Salem, Ohio
DATE ▶ 7/14/90	WEATHER ▶ Rain
LOGGED BY ▶ RAF	DRILLED BY ▶ Mathes
DRILLING METHOD ▶ 3 1/4" Hollow Stem Auger	SAMPLING METHOD ▶ 3 IN. Split Spoon
ELEVATION ▶ 1171.2 FT.	GROUT ▶ 11 - 0 FT.
WATER LEVEL INITIAL ☐ B.G.S. ☐ B.M.P.	HOLE DIA. 6 IN.
WATER LEVEL AT COMPLETION H.M.P.	TOTAL DEPTH 11 FT.

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	OVA (ppm) / Hnu	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
					1	0			
Damp	-	-	-	1	1	1	2.0'		FILL: Brown, tan to dark brown sludge.
Damp	-	-	-	2	3	2	1.0'		Same as above.
Wet	-	-	-	3	13 / 35	3	1.7'		Same as above. Brown and orange mottled SILTY CLAY.
Dry	Poor	Soft	Slight	4	2 / 2	5 / 6	2.0'		Same as above. Gray 2 IN. sand seams at 5.5 and 6.5 FT.
Damp	Poor	Soft	Slight	5	38 / 56	7 / 8	2.0'		Grades to a gray SILTY CLAY with gravel.
Dry	-	Hard	Slight	6	4	9	1.0'		Same as above.
Wet	Poor	Soft	-	7	4	10 / 11	1.0'		Brown SAND and GRAVEL, shale fragments.
						12			Shale bedrock at 11.0 FT. Total Depth 11.0 FT.
						13			
						14			
						15			
						16			
						17			
						18			
						19			
						20			

GRAPHIC LOG



ii RESIDENTIAL WELL QUESTIONAIRES

APPENDIX I

RESIDENTIAL WELL QUESTIONNAIRES

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Frank Mozina Phone number: 337-9853

Address: 1441 Pine Lake Road

Contacted by: phone ___ mail ___ in person X Came to Site

Water Source:

public water ___ well X cistern X hauled water ___ spring ___

If public, how many years? ___

Used Cistern as Needed

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? 20 feet ___ don't know

What is the diameter of the well? 60 inches ___ don't know

How old is the well? ___ years >100 yrs

Does the well have a pump? yes ___ no ___

Does the pump work? yes___ no___

Where is the well located?

inside ___ pumphouse ___ basement X outside ___

pit ___ buried ___

Was the well: dug X drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other X (Stone)

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Rena Dunlop Phone number: 337-6156

Address: 1456 Allen Road

Contacted by: phone _X_ mail ___ in person ___

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? 1984

How was water obtained prior to current sources? Well

Is well water used for other purposes other than drinking water? yes _X_ no___
If yes, what are those uses? Washing trucks

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other _X_, explain
(Testing Results)

Reported by: Salem Water Department ___ landowner _X_

Well Characteristics:

How deep is the well? ____ feet _x_ don't know

What is the diameter of the well? _6_ inches ____ don't know

How old is the well? _20_ years

Does the well have a pump? yes _X_ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside _x_
pit ___ buried ___

Was the well: dug ___ drilled _X_ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel _X_ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Walters Phone number: 337-8498

Address: 1210 Bentori

Contacted by: phone _x_ mail ___ in person ___

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? _3 yrs_

How was water obtained prior to current sources? well

Is well water used for other purposes other than drinking water? yes___ no_X_
If yes, what are those uses?

If well is not used, when was it used last? 1987

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _x_

Well Characteristics:

How deep is the well? appr.100 feet ___ don't know

What is the diameter of the well? _6_ inches ___ don't know

How old is the well? ___ years No Idea

Does the well have a pump? yes ___ no _X_ (Pulled in 1987)

Does the pump work? yes___ no_x_

Where is the well located?
inside ___ pumphouse ___ basement ___ outside _X_
pit ___ buried ___

Was the well: dug ___ drilled _x_ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel _x_ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Paul Von Tuchlinski Phone number: 337-6987

Address: 1217 Beechwood Road

Contacted by: phone ___ mail ___ in person X

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no X
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? 175 feet ___ don't know

What is the diameter of the well? ___inches X don't know

How old is the well? ? years

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse X basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ?

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: TJ Leibert/Cindy Phone number: 385-3397

Address: 1202 Benton

Contacted by: phone X mail ___ in person X
4/19/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? 58 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes ___ no ___

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel X PVC ___ other ___

Driller's name: (Burton Drilling [Well])

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: RD Franks Phone number: 337-9284

Address: 1200 Benton

Contacted by: phone X mail ___ in person ___

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? apprx. 40 feet ___ don't know

What is the diameter of the well? 8-12 inches ___ don't know

How old is the well? 53 years

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Reliable Welding Phone number: 337-6344

Address: 1185 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

Brew coffee with water from home

How deep is the well? apprx. 60 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? ___ years 1972

Does the well have a pump? yes X no ___ Building

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:** Has been

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Chuck Dustman/Dustwell Industries Phone number: 332-5991

Address: 1201 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes X no___
If yes, what are those uses? restroom toilets

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics: Haul water from home for drinking at plant

How deep is the well? 16 feet ___ don't know

What is the diameter of the well? 4-6 inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes X no ___ (in building)

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X near ditch
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Hazel Ewing Phone number: 332-4866

Address: 1263 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water X well ___ cistern ___ hauled water ___ spring ___
If public, how many years? 10

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? ___ feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes ___ no ___

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Robert Hergenroder Phone number: 337-7245

Address: 1522 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water ___ well ___ cistern ___ hauled water ___ spring X
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: John Walters Phone number: 337-8498

Address: 1210 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water X well ___ cistern ___ hauled water ___ spring ___
If public, how many years? 3

How was water obtained prior to current sources? well

Is well water used for other purposes other than drinking water? yes___ no X
If yes, what are those uses?

If well is not used, when was it used last? 3 years ago

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other X, explain
(hooked to Salem Water)

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? >100 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes ___ no X

Does the pump work? yes___ no X

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel X PVC ___ other ___

Driller's name:

Notes:

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Carl Sebrell Phone number: 337-9984

Address: 1155 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes X no ____

Does the pump work? yes X no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside X
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Donald Greenmyer Phone number: 332-0181

Address: 1118 Benton

Contacted by: phone X mail ___ in person ___ (talked to neighbor)

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 50 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? 28 years 1962

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Richard Franks Phone number: 337-9284

Address: 1200 Benton

Contacted by: phone _x_ mail ___ in person ___

Water Source:

public water ___ well _x_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _X_

Well Characteristics:

How deep is the well? appr. _50_ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? _60_ years

Does the well have a pump? yes _X_ no ____

Does the pump work? yes_X_ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside _X_
pit ___ buried ___

Was the well: dug _X_ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Lester Squire Phone number: 337-8985

Disconnected (possibly vacant)

Address: 769 N. Ohio Blvd.

Contacted by: phone ___ mail ___ in person ___

Water Source:

public water ___ well ___ cistern ___ hauled water ___ spring ___

If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?

inside ___ pumphouse ___ basement ___ outside ___

pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Elainor Berry Phone number:

Address: 644 N. Ohio Blvd.

Contacted by: phone ___ mail ___ in person _X_

Water Source:

public water ___ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes _X_ no ____ (hand)

Does the pump work? yes_X_ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside _X_
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Lewis Thomas Phone number: 332-2397

Address: 1420 Benton Road

Contacted by: phone _x_ mail ___ in person ___

Water Source:

public water ___ well _x_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? _75_ feet ____ don't know

What is the diameter of the well? _8_ inches ____ don't know

How old is the well? ____ years >30

Does the well have a pump? yes _X_ no ____

Does the pump work? yes _X_ no____

Where is the well located?
inside ___ pumphouse ___ basement _X_ outside ___
pit ___ buried ___ (front stoop)

Was the well: dug ___ drilled _x_ driven ___

Type: gravel packed ___ open rock _x_

Type of casing: steel _x_ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Walter Bak Phone number:

Address:

Contacted by: phone ___ mail ___ in person _X_

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? _55_ feet ____ don't know

What is the diameter of the well? _8_ inches ____ don't know

How old is the well? ____ years >35 approx. 1943

Does the well have a pump? yes _X_ no ____

Does the pump work? yes_X_ no____

Where is the well located?
inside ___ pumphouse ___ basement ___ outside _X_
pit _X_ buried ___

Was the well: dug ___ drilled _X_ driven ___

Type: gravel packed ___ open rock _X_

Type of casing: steel _X_ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Adeline Ryan Phone number: 332-1345

Address: 13147 Benton Road

Contacted by: phone ___ mail ___ in person _X_ (12 Years) 4/12/90

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 60 feet ____ don't know

What is the diameter of the well? appr. _6_ inches ____ don't know

How old is the well? 1942 installed (i.e., when house built) ____ years

Does the well have a pump? yes _X_ no ____ (submersible)

Does the pump work? yes_X_ no____

Where is the well located?
inside ___ pumphouse ___ basement ___ outside _X_
pit ___ buried ___ (but access from basement, too)

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock _X_

Type of casing: steel _X_ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Janis Baltputnis Phone number: 332-8364

Address: 13156 Garfield Road

Contacted by: phone ___ mail ___ in person _x_

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? _50_ feet ____ don't know

What is the diameter of the well? _8_ inches ____ don't know

How old is the well? _35_ years

Does the well have a pump? yes _X_ no ____

Does the pump work? yes_X_ no____

Where is the well located?
inside ___ pumphouse ___ basement _X_ outside ___
pit ___ buried ___

Was the well: dug ___ drilled _x_ driven ___

Type: gravel packed ___ open rock _x_

Type of casing: steel _X_ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: R. Latta Phone number:

Address: 13072 Benton Road

Contacted by: phone ___ mail ___ in person X (4/12/90)

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 167 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know
Redrilled 45', deepest to 167'

How old is the well? ___ years

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit X buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Cheryl Koran Phone number: 337-6762

Address:

Contacted by: phone ___ mail ___ in person X

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 120 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? ___ years 1958, deepened in 1962

Does the well have a pump? yes X no ___ (deep well)

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel X PVC ___ other ___ (hand dug first)

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Frank & Edie Devine Phone number: 337-8265

Address: 556 Wisconsin

Contacted by: phone ___ mail ___ in person X
Date 4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Who
Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? 6 inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Mary Ann McElfresh Phone number: 332-5218

Address: 625 N. Ohio Blvd

Contacted by: phone ___ mail ___ in person _X_
4/12/90

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet _X_ don't know

What is the diameter of the well? _6_ inches ____ don't know

How old is the well? _?_ years >7 yrs.

Does the well have a pump? yes _X_ no ____

Does the pump work? yes _X_ no____

Where is the well located?
inside ___ pumphouse ___ basement ___ outside _X_
pit ___ buried ___ (by garage)

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Earl Cody Phone number:

Address: 1472 Garfield Avenue

Contacted by: phone ___ mail ___ in person X
4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Who
Reported by: Salem Water Department ___ landowner ___
~~Person as Water User~~

Well Characteristics:

How deep is the well? 92 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? ___ years 1949

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement X outside ___
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel X PVC ___ other ___

Driller's name: Gordon's check well occasionally

Notes:

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Jack Dean Phone number:

Address: 1461 Garfield Ave.

Contacted by: phone ___ mail ___ in person X

4/12/99

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___

If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 95 feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? 12+ years

Does the well have a pump? yes X no ___ (jet pump)

Does the pump work? yes X no___

Where is the well located?

inside ___ pumphouse ___ basement ___ outside X

pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Jerri Blackburn Phone number: 332-5967

Address: 1490 Garfield Ave.

Contacted by: phone ___ mail ___ in person X

4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___

If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? apprx. 100 feet ____ don't know

What is the diameter of the well? 6 inches ____ don't know

How old is the well? 1986 years

Does the well have a pump? yes Y ___ no ___

Does the pump work? yes X no___

Where is the well located?

inside ___ pumphouse ___ basement ___ outside X

pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: William & Adelle Dunn Phone number: 337-6105

Address: 13093 Benton Road

Contacted by: phone ___ mail ___ in person X

4/12/90

Water Source:

public water X well ___ cistern ___ hauled water ___ spring ___

If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 180+ feet ___ don't know

What is the diameter of the well? 2 feet ___inches ___ don't know

How old is the well? 40+ years

Does the well have a pump? yes X no ___

Does the pump work? yes X no___ (by well)

Where is the well located?

inside ___ pumphouse ___ basement ___ outside X

pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel ___ PVC ___ other ___

Driller's name: (Kendahl - Ingram redrilled several yrs. ago)

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Larry Slanker/Judy Phone number: 332-1779

Address: 1883 Allen Road

Contacted by: phone ___ (answering machine) mail ___ in person ___

4/12/90

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___

If public, how many years? _____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?

inside ___ pumphouse ___ basement ____ outside ____

pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Bill Slanker (landlord)
Slanker Farmhouse
Phone number:

Address: 1903 Allen Road

Contacted by: phone X mail ___ in person ___

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 150 - 175 ___ feet ___ don't know

What is the diameter of the well? 4-6 inches ___ don't know

How old is the well? ___ years (1945 - 1950)

Does the well have a pump? yes X no ___ (pump at 140')

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: G. Lightner (Howard) Phone number: 337-1237

Address: 1412 Benton Road

Contacted by: phone X mail ___ in person ___
4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? 152 feet X don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Dale Leyman Phone number: 332-5066

Address: 1410 Benton

Contacted by: phone X mail ___ in person ___

Water Source:

public water ___ well ___ cistern ___ hauled water ___ spring X
If public, how many years? ___ (share Hergenroder's spring)

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? ___ feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes ___ no ___

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Loris Cox Phone number: 337-3277

Address: 1422 Benton Road

Contacted by: phone X mail ___ in person ___

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? 95 feet ___ don't know

What is the diameter of the well? 6 inches ___ don't know

How old is the well? 25 years

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___ (house built on well [dining room an addition]

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Wilbur Greenmayer Phone number: 337-9659

Address: 1146 Benton Road

Contacted by: phone _x_ mail ___ in person ___

Water Source:

public water ___ well _x_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? (dug well in basement; has been sealed)

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _x_

Well Characteristics:

How deep is the well? _50_ feet ____ don't know

What is the diameter of the well? _6_ inches ____ don't know

How old is the well? ____ years 1962

Does the well have a pump? yes _x_ no ____

Does the pump work? yes _x_ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside _x_
pit ___ buried ___

Was the well: dug ___ drilled _x_ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Krizay, John Phone number: 337-3970

Address: 13406 Benton Road

Contacted by: phone X mail ___ in person ___ (by Brian Greene)
4/12/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 25-30 feet ____ don't know

What is the diameter of the well? apprx. 3 ft. ___inches ____ don't know

How old is the well? apprx. 50 years

Does the well have a pump? yes X no ____ (in basement)

Does the pump work? yes X no____

Where is the well located? Pump in Basement
inside ___ pumphouse ___ basement ____ outside X
pit ___ buried ___

Was the well: hand dug X drilled ___ driven ___ 50 years

Type: gravel packed ___ open rock X 3' diam.

Type of casing: steel ___ PVC ___ other X fired ceramic sewer pipe

Driller's name: N/A

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Schrode, Karen Phone number: 332-9146

Address: 1843 Garfield

Contacted by: phone X mail ___ in person ___ (by Brian Greene)
4/11/99

Water Source:

public water X well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ___ feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes ___ no ___

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name: (Does not believe anyone on her side of RT. 14 has wells)

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Faust, Jeff Phone number: 337-8380

Address: 1337 Benton Road

Contacted by: phone X mail ___ in person ___ (by Brian Greene)
4/11/90

Water Source:

public water X well ___ cistern ___ hauled water ___ spring ___
If public, how many years? 11

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ___ feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? ___ years

Does the well have a pump? yes ___ no ___

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name: (Built house in 1979. No well installed)

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Metts, Lloyd Phone number: 332-5782

Address: 600 N. Ohio Blvd.

Contacted by: phone X mail ___ in person ___ (by Brian Greene)
4/11/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses? watering

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? 45+ feet ___ don't know (30 yrs)

What is the diameter of the well? 6 inches ___ don't know

How old is the well? 30 years

Does the well have a pump? yes X no ___ (inside pit)

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit X buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel ___ PVC X other ___

Driller's name:

***Notes:** Chlorox in well once a year, Soften about once/2 weeks. Well reamed out once (a few years ago). Probably all residences in Salem Heights are on wells.

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Cletis & Irene Curtis Phone number: 337-0106

Address: 5692 Taylor

Contacted by: phone X mail ___ in person ___

4/11/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___

If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?

inside ___ pumphouse ___ basement ___ outside X

pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Matthew V. Tomsha Phone number: 332-0264

Address: 13429 Benton Road

Contacted by: phone X mail ___ in person ___
4/11/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? 150 feet ___ don't know

What is the diameter of the well? 4-6 inches ___ don't know

How old is the well? 39 years 1951

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled X driven ___

Type: gravel packed ___ open rock X

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Steven F. Peppel Phone number: 337-8257

Address: 13339 Benton Road

Contacted by: phone X mail ___ in person ___
4/11/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? >100 feet ___ don't know

What is the diameter of the well? 4-6 inches ___ don't know

How old is the well? ___ years > 25-30 yrs

Does the well have a pump? yes X no ___ (jet)

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse X basement ___ outside X
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel X PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Matthew Tomsha Phone number: 337-6000

Address: 13233 Benton

Contacted by: phone X mail ___ in person ___
4/11/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ___

How was water obtained prior to current sources? ___

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? <100 feet ___ don't know

What is the diameter of the well? 4-6 inches ___ don't know

How old is the well? 2 years 1988

Does the well have a pump? yes X no ___

Does the pump work? yes X no___

Where is the well located?
inside ___ pumphouse ___ basement X outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:** No rust in water

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Richard Slovak Phone number: 337-7106

Address: Beechwood

Contacted by: phone _X_ mail ___ in person ___
4/11/90

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _x_

Well Characteristics:

How deep is the well? _186_ feet ____ don't know

What is the diameter of the well? _4_ inches ____ don't know
6" casing to 184

How old is the well? ____ years

Does the well have a pump? yes _X_ no ____

Does the pump work? yes _X_ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside _X_
pit ___ buried ___

Was the well: dug ___ drilled _X_ driven ___

Type: gravel packed ___ open rock _X_

Type of casing: steel _X_ PVC ___ other ___

Driller's name: Bell - Columbiana

***Notes:** (Nothing in Writing)

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Schnorberger -- Current Owner
Marple -- previous owner

Phone number: 337-7430

Address: 1329 Benton Road

Contacted by: phone _x_ mail ___ in person ___
4/11/90

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? _____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _X_

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Evanoff Phone number: 337-8831

Address: 1297 Benton

Contacted by: phone X mail ___ in person ___
4/11/90

Water Source:

public water X well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Landlord: Bill Blanker Sox Phone number: 332-9287

Address: 1909 Allen Road

Contacted by: phone X mail ___ in person ___
4/11/90

Water Source:

public water ___ well X cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: David & Kim Snyder Phone number: 332-9553

Address: 666 Ohio Avenue

Contacted by: phone _X_ mail ___ in person ___

4/11/90

Water Source:

public water ___ well _X_ cistern ___ hauled water ___ spring ___

If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _X_

Well Characteristics:

How deep is the well? _50_ feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? _1_ years 1989

Does the well have a pump? yes _X_ no ___

Does the pump work? yes_X_ no___

Where is the well located?

inside ___ pumphouse ___ basement ___ outside _X_

pit ___ buried ___

Was the well: dug ___ drilled _X_ driven ___

Type: gravel packed ___ open rock _X_

Type of casing: steel ___ PVC _X_ other ___

Driller's name: R&S Drilling

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Daniel Maxon Phone number: 337-3883

Address: 957 Benton Road

Contacted by: phone _X_ mail ___ in person ___

4/11/90

Water Source:

public water _X_ well _X_ cistern ___ hauled water ___ spring ___

If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___

If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___

Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department ___ landowner _X_

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?

inside ___ pumphouse ___ basement ___ outside ___

pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:** Never Used Since 1983

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: AJ Merino Phone number: 337-9231

Address: 1069 Benton Road

Contacted by: phone X mail ___ in person ___
4/11/90

Water Source:

public water X well X cistern ___ hauled water ___ spring ___
If public, how many years? 1989

How was water obtained prior to current sources? well

Is well water used for other purposes other than drinking water? yes___ no X
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other X, explain
bad tasting water

Reported by: Salem Water Department ___ landowner X

Well Characteristics:

How deep is the well? <20 feet ___ don't know

What is the diameter of the well? ___inches ___ don't know

How old is the well? >36 years 40-50

Does the well have a pump? yes X no ___ Deming recipracol pump

Does the pump work? yes___ no___

Where is the well located?
inside ___ pumphouse ___ basement ___ outside X
pit ___ buried ___

Was the well: dug X drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___ None

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Gregory Phone number:

Address: 1276 Beechwood

Contacted by: phone ___ mail ___ in person ___
4/11/90

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? _____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department _X_ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Penny Phone number:

Address: 1292 Beechwood

Contacted by: phone ___ mail ___ in person ___
4/11/90

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department _X_ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ___ no ___

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ___ outside ___
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Austin Phone number:

Address: 1318 Beechwood

Contacted by: phone ___ mail ___ in person ___

Water Source:

public water _x_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department _x_ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

Notes:

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Hansel Phone number:

Address: 1368 Beechwood

Contacted by: phone ___ mail ___ in person ___

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department _X_ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Porter Phone number:

Address: 1430 Beechwood

Contacted by: phone ___ mail ___ in person ___

Water Source:

public water _X_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department _X_ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

Residential Well Survey
Ruetgers-Nease Salem, Ohio RI/FS

Owner: Name: Hodory Phone number:

Address: 1772 Allen Road

Contacted by: phone ___ mail ___ in person ___

Water Source:

public water _x_ well ___ cistern ___ hauled water ___ spring ___
If public, how many years? ____

How was water obtained prior to current sources? ____

Is well water used for other purposes other than drinking water? yes___ no___
If yes, what are those uses?

If well is not used, when was it used last?

If well is not used, what is the reason? mechanical failure ___ sand in well ___
Not enough water ___ don't know ___ other ___, explain

Reported by: Salem Water Department _x_ landowner ___

Well Characteristics:

How deep is the well? ____ feet ____ don't know

What is the diameter of the well? ____inches ____ don't know

How old is the well? ____ years

Does the well have a pump? yes ____ no ____

Does the pump work? yes____ no____

Where is the well located?
inside ___ pumphouse ___ basement ____ outside ____
pit ___ buried ___

Was the well: dug ___ drilled ___ driven ___

Type: gravel packed ___ open rock ___

Type of casing: steel ___ PVC ___ other ___

Driller's name:

***Notes:**

J: PRODUCTION WELL CLOSURE DOCUMENTATION

APPENDIX J

PRODUCTION WELL CLOSURE DOCUMENTATION

CLOSURE PLAN

ERM-Midwest, inc.

CLOSURE PLAN FOR WATER PRODUCTION WELLS AT THE RUETGERS-NEASE CHEMICAL COMPANY, INC. SITE SALEM, OHIO

Prepared for:

Ruetgers-Nease Chemical Company, Inc.
201 Struble Road
State College, PA 16801

June 19, 1989

J-202-01-02

Prepared by:

ERM-Midwest, Inc.
450 W. Wilson Bridge Road
Columbus, OH 43085

TABLE OF CONTENTS

Section	Title	Page
1.0	PLAN PURPOSE AND OBJECTIVES	1
2.0	BACKGROUND INFORMATION	2
3.0	CURRENT SITUATION	4
4.0	FIELD ACTIVITIES	5
	4.1 Attempt to Locate P3	5
	4.2 Collect Standing Water Samples	7
	4.3 Removal of Hole Blockages	8
	4.4 Geophysical Logging	9
	4.4.1 Induction Logging	10
	4.4.2 Gamma Ray	10
	4.4.3 Density	11
	4.4.4 Spontaneous Potential	11
	4.4.5 Caliper	12
	4.4.6 Sonic	12
	4.4.7 Decontamination of Logging Equipment	12
	4.5 Groundwater Sample Collection	12
	4.6 Well Closure	15
	4.6.1 Monitor Well Installation in P1	15
	4.6.2 Grout Installation	15

LIST OF FIGURES

Figure	Title	Page
1	Existing Water Supply Well Location	3
2	Magnetic Survey Grid Location	6

APPENDIX A - SITE WELL LOGS

1.0 PLAN PURPOSE AND OBJECTIVES

This plan defines the procedures to be implemented in order to close wells P1 and P2 (and P3 if such well still exists and can be located) at the closed Nease Chemical plant (the site) located in Salem, Ohio in accordance with procedures approved by U.S. EPA and Ohio EPA.

In addition to closing the wells, U.S. EPA and Ohio EPA have required that Ruetgers-Nease attempt to characterize the wells to obtain information about potential cross contamination between aquifers, potentially caused by the open rock wells.

A detailed investigatory program has been agreed to by Ruetgers-Nease and the Agencies to determine the groundwater quality in the area of the water wells prior to the final closure. A brief overview of the program is described below.

Prior to any closure activities (e.g., reaming), two samples of the standing water column will be collected from each well. One will be collected at the depth of the top of the Upper Bedrock Aquifer, and a second will be collected from a depth immediately above existing borehole blockages. The blockages reported to be present in the boreholes will then be removed prior to continuing with the well closure. After removing the blockages, geophysical logging will be conducted to gather information concerning the lithologies and physical properties of the different geologic units.

Groundwater sampling depths will be determined from the information provided by the geophysical logs. Groundwater samples will be collected utilizing a one-time packer sampling device. In order to provide a long-term Lower Bedrock Aquifer sampling point in this area, a deep monitor well will be installed in the top ten feet of the Lower Bedrock Aquifer in well P1. Finally the water wells will be sealed with cement grout and closed.

2.0 BACKGROUND INFORMATION

Water supply wells (P1 and P2) were installed by J.E. Lininger and Sons at the site in late 1960 to mid-1961 at the locations shown in Figure 1. According to the well log and drilling reports (Appendix A) submitted to the State of Ohio, Department of Natural Resources, Division of Water, well P1 was completed 375 feet below ground surface with 18-inch steel casing driven through the overburden material to a depth of 50 feet. Well P2 was completed 374 feet below ground surface with 30.5 feet of 8-inch diameter steel casing. According to J.E. Lininger and Sons, a third well (P3) was also reportedly installed in 1960, at a yet undetermined location. P3 was reportedly completed 100 feet below ground surface with 29.3 feet of 8-inch diameter steel casing. Static water levels, as recorded on the drilling reports, were 28 (P1), 30 (P2) and 14 (P3) feet below ground surface.

The wells were installed as subsurface completions, with the top of the casing located approximately three feet below ground surface. The P1 and P2 well heads are enclosed in four foot diameter concrete basins that extend from ground surface to an approximate depth of three feet. According to the drilling contractor who installed the wells, well P3 was also enclosed in such a structure. However, no evidence or remains of the casing or well basin of P3 have been found at the site.

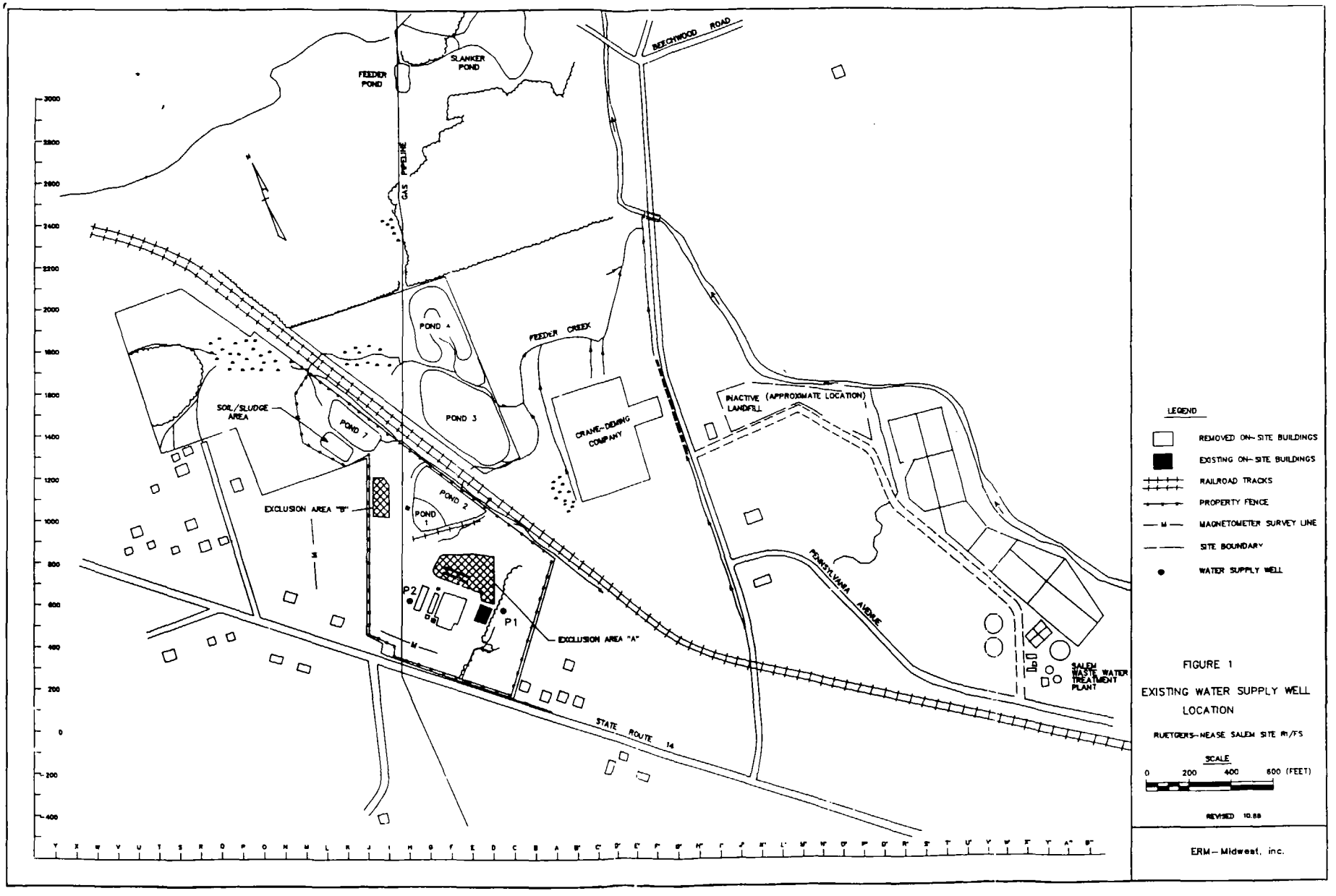


FIGURE 1

EXISTING WATER SUPPLY WELL LOCATION

RUETGERS-NEASE SALEM SITE RI/FS

3.0 CURRENT SITUATION

The total depth of wells P1 and P2 measured by Ruetgers-Nease personnel in early 1988 were 144 and 196.5 below the concrete basin, respectively. It appears, according to the drilling logs, that the strata underlying the Columbiana Shale and No. 6 Coal may have collapsed into the borehole, presumably as a result of natural deterioration. In order to facilitate completion of investigation and closure of the wells, these blockages will be removed by reaming the wells to total depth during the well closure field program.

While the locations of wells P1 and P2 have been established, the location and/or status of P3 is unknown. Ruetgers-Nease asked a Lininger & Sons representative, the company that installed the well, to attempt to locate P3 during a recent site visit, but he was unable to do so. The well may have been properly closed some time in the past, or may have been inadvertently covered during site operations.

4.0 FIELD ACTIVITIES

The following scope of the closure activities will be performed at each well location (in order of conduct):

- Attempt to Locate P3
- Sample Standing Water in P1 and P2
- Removal of Hole Blockages in P1 and P2
- Well Investigation
  - Geophysical Logging
  - Groundwater Sample Collection
- Well Closure
  - Monitor Well Installation in P1
  - Grout Installation
  - Casing Removal

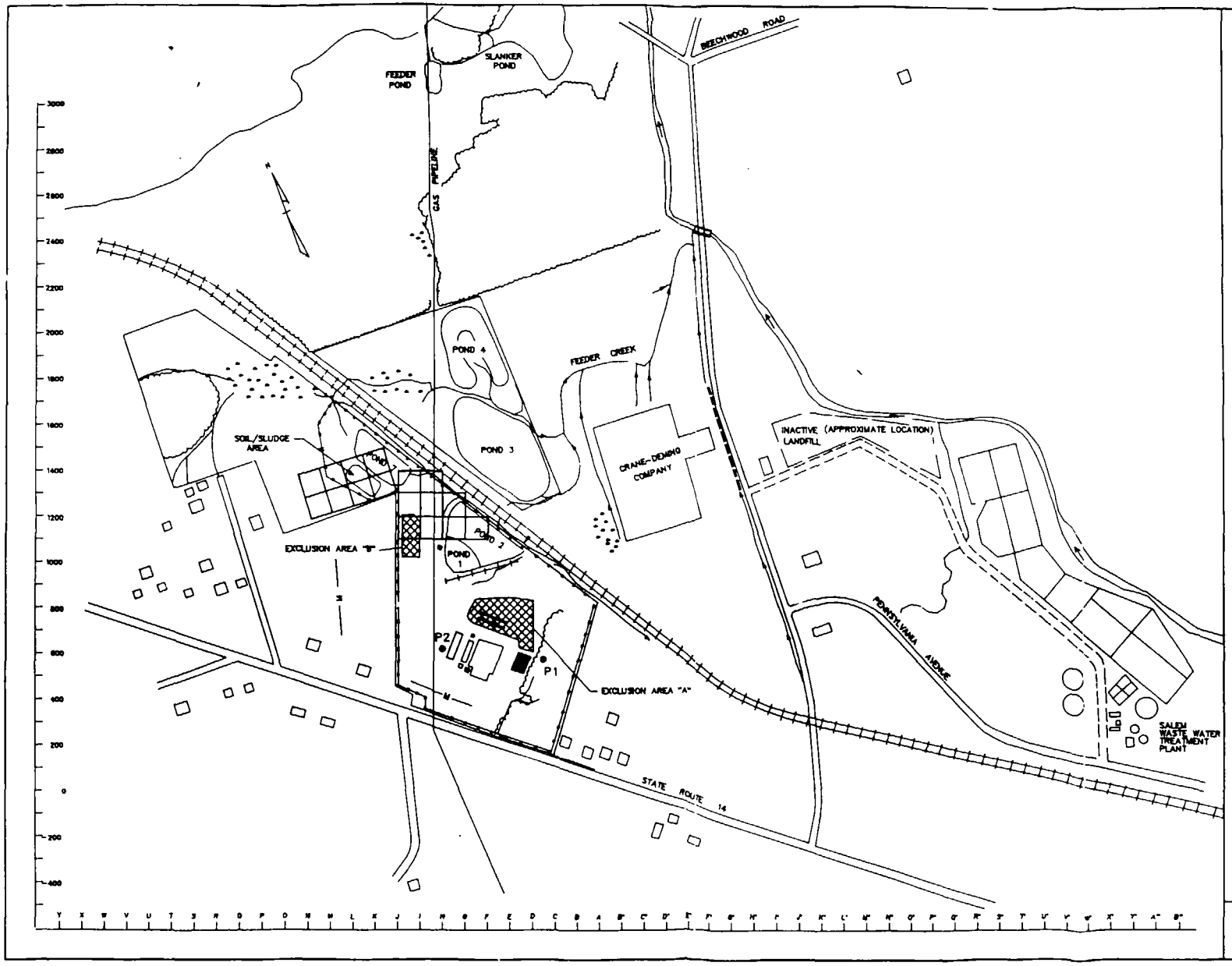
Since the historic water quality of well P2 has been cleaner than that of P1, each of the above activities will begin with well P2 and end with P1 (and include P3, if located). The procedures that will be followed during each of these investigatory/closure activities are detailed in the remaining subsections of Section 4.0.

4.1 Attempt to Locate P3

Ruetgers-Nease has attempted to locate well P3 by reviewing file information and by conducting a site visit with the driller who installed the well. There are no accurate maps available which depict the well, and the driller did not remember the exact location of the well. The driller's notes indicate that the well was installed approximately 800 feet north of the eastern-most facility building (Figure 2). The most likely location appears to be in the area between the gas pipeline and Pond 7.

Ruetgers-Nease will attempt to identify the location of Well P3 using a Magnetometer designed to indicate the presence of the steel casing and concrete basin (if still present). A Schonstedt HeliFlux Magnetic Locator, Model GA-52B will be used.

The locator unit is a hand held device that is swept from side to side as a traverse is made. The locator has two magnetic field sensors spaced 20 inches apart. Two sensors are used to balance out the effect of the earth's magnetic field. The frequency of the audio signal changes when the magnetic field at one sensor becomes stronger than at the other sensor. The tone will be at its highest frequency when the locator is directly over the target, making it easy to pinpoint the location of a target. The HeliFlux



LEGEND

- REMOVED ON-SITE BUILDINGS
- EXISTING ON-SITE BUILDINGS
- RAILROAD TRACKS
- PROPERTY FENCE
- MAGNETOMETER SURVEY LINE
- SITE BOUNDARY
- WATER SUPPLY WELL

FIGURE 2

MAGNETIC SURVEY GRID LOCATION

RUETGERS-NEASE SALEM SITE RI/FS

SCALE

0 200 400 600 (FEET)

REVISED 10.88

ERM - Midwest, Inc.

Magnetic Locator can locate metal targets at depths of up to 15 feet and concrete targets at depths of up to 8 feet.

Traverse lines will be surveyed in the property area depicted in Figure 2. A background magnetometer traverse will be conducted on the same background traverse line utilized for the RI electromagnetic survey. An additional background traverse will be performed in order to determine the magnetometer response generated by the underground gas pipeline that crosses the site. This traverse will be located on a line perpendicular to the pipeline across the front of the Ruetgers-Nease property.

Traverses will then be conducted with the magnetic locator on a 10' by 10' station/line spacing using the existing site grid network. The 10 foot spacing interval was selected based on previous experience with magnetometer surveys. Areas of strong magnetic response will be delineated, and those areas will be recorded on a site map. After the survey is completed, the response areas delineated will be investigated.

The areas with strong magnetic responses may indicate the presence of buried metal or the well casing/basin. A back hoe will be used to excavate an area to expose the potential targets.

4.2 Collect Standing Water Samples

Groundwater samples will be collected from the standing water column in each well prior to reaming. The water samples will be collected at two discrete depths from each well. Sample depths will correspond to the approximate depth of the top of the Upper Bedrock Aquifer (based on the ODNR well log), and from a depth immediately above the blockages present in each well. The blockages in P1 and P2 are believed to be present at depths of approximately 144 and 196.5 feet, respectively.

As requested by the agencies, no purging of the standing water column will be conducted prior to sampling. The standing water samples will be collected using a Kemmerer Sampler. The Kemmerer sampler is a depth discrete sampling device composed of a stainless steel bottle with Teflon^R end seals. The sampler is lowered to the desired depth in each well, and a weighted messenger is dropped down the sample line. The messenger impacts the sampler and opens the bottle, which allows water to enter the sampler. Approximately 1.2 liters of water can be collected at one time.

Procedures for groundwater sample handling will be followed per the approved RI/FS Work Plan: Volume 2, Quality Assurance Project Plan (QAPP); and Volume 3, Site Specific Sampling Plan (SSSP). Field parameters of pH, specific conductance and temperature will be measured on all samples.

The samples will be collected and transferred into clean sample jars as prepared by the laboratory. The jars will be labeled and placed in blue ice filled insulated sample containers. The samples will be included in the chain-of-custody process as defined in the approved Work Plan. The samples will be shipped to the lab via an overnight delivery service.

The groundwater samples collected from the Upper Bedrock Aquifer will be analyzed for:

CLP Organics (Volatiles, Semivolatiles, PCBs, Pesticides)
Library Search of 40 Organic Compounds
Photomirex
Mirex
Kepone
Diphenyl Sulfone (DPS)

The groundwater samples collected from above the blockages will be analyzed for:

CLP Organics (Volatiles Fraction Only)
Library Search of 15 Additional Compounds
Photomirex
Mirex
Kepone
Diphenyl Sulfone (DPS)

After the standing water samples are delivered to the laboratory, further well closure work will be delayed at the request of the agencies until the sample results are received.

4.3 Removal of Hole Blockages

As previously described, borehole blockages are believed to exist in wells P1 and P2 (144' and 196.5') at this time. All potential blockages must be removed in order perform the remaining well closure activities. The boreholes should be free of all material that may snag or bridge investigatory tools, or sampling devices that will be used to collect groundwater samples.

Air rotary drilling techniques will be utilized for the purpose of removing the hole blockages. A drill bit that is

slightly smaller than the borehole diameter in each well (a 7 7/8" bit for the 8 inch borehole and a 13 7/8" for the 14 inch borehole) will be utilized. The bit will remove any loose material from the borehole wall and any material that may be blocking the borehole. Because the inside diameter of the drill bit is smaller than the existing borehole, no additional rock will be removed. The borehole will not be enlarged during the reaming process.

All drill cuttings and water produced during the drilling will be handled as prescribed in the approved Work Plan. All drill rod and bits used in the blockage removal process will be steam cleaned between wells. Frontz Drilling of Wooster, Ohio will conduct this work.

4.4 Geophysical Logging

Following removal of borehole blockages, a geophysical logging program will be conducted at each well. Schlumberger Well Services, Northeast Division, of Wooster, Ohio will conduct the work.

Logging equipment will consist of a wireline to which a tool, or sonde is attached, and lowered into the borehole. Data will be recorded by the Schlumberger logging engineer at the surface as each tool is lowered and raised at a set speed within the borehole.

Six wireline geophysical tools will be run in each of the wells to obtain data to be used for interpretation of lithology and formation characteristics, and borehole diameter:

Dual Induction (Resistivity) Tool
Gamma Ray Tool
Lithodensity Tool
Spontaneous Potential (SP) Tool
Four-arm Caliper Tool
Sonic Tool

The July 29, 1988 draft closure plan submittal proposed the utilization of a temperature logging tool, information from which was to be used for tool reading corrections. Since all of the proposed Schlumberger logging tools have built-in automatic temperature correction devices, a temperature log will not be necessary.

The draft closure plan also proposed conducting both resistivity and conductivity of the rock formations. Since these geophysical tools yield the same information, conductivity will be excluded. (Resistivity is the inverse of conductivity.) Schlumberger's equipment is calibrated

immediately prior to departure for the site, so no on-site calibration is necessary.

Two logging runs will be performed at each well. Each of the above tools will be run as part of a "string" of tools during one of the two runs. The following tool string configurations will be utilized:

Trip #1: Lithodensity/Gamma Ray/Caliper
Trip #2: Sonic/Dual Induction/SP

General principles for each of the logging tools listed above are described in the following subsections.

4.4.1 Induction Logging

The induction logging (resistivity) tool is designed to measure rock formation resistivity. The induction sonde consists of several electrical transmitter and receiver coils and electrodes. Electrical current is passed through the formation via the transmitting set of electrodes, and resultant voltage is measured by the receiving set of electrodes.

The receiver signals are essentially proportional to the conductivity of the rock formation through which the current has passed. The measured voltages are translated into formation resistivity (which is the reciprocal of conductivity) values.

The larger the tool electrode spacing, the deeper the device investigates into the formation. The dual induction tool utilizes two complete sets of electrodes which are set at different spacings, thus resulting in two different depths of investigation and two separate sets of readings.

During the upward logging run, the tool will be raised in the borehole at a speed of no greater than 30 feet per minute.

4.4.2 Gamma Ray

The gamma ray log records the amount of natural radioactivity of the formations penetrated by the borehole. Three naturally occurring radionucleides which contribute to the gamma radiations emanating from subsurface rocks are the uranium-radium series, the thorium series, and potassium 40.

The gamma log usually reflects the shale content of sedimentary formations. Clean sandstone and carbonates exhibit a low level of natural radioactivity, while the clay minerals and fine particles in shales show higher levels of

radioactivity due to the absorption of the heavy radio-elements.

Variations in the borehole diameter and the density of borehole fluids need to be taken into consideration for correcting the log readings. The log can be used for quantitative estimation of shale volume as well as the delineation of nonradioactive minerals like halite, gypsum and coal. The gamma log can be run in cased holes, nonconductive borehole fluids, or air filled holes. In cased holes the gamma log is also used for depth correlation. The gamma ray tool will be raised at a speed of no greater than 30 feet per minute.

4.4.3 Density

The density log is designed to record bulk density of the formation. A radioactive source emits gamma rays which are scattered through collisions with the electrons in the formation. This process is commonly called Compton Scattering and results in the loss of energy by gamma rays, which is detected by the instrument. The response recorded on the log depends on the number of electrons per unit volume of the formation.

This log can be used in conjunction with the gamma log to determine porosity of the stratigraphic units penetrated by the borehole. The density tool will be raised in the borehole at a rate of no greater than 30 feet per minute.

4.4.4 Spontaneous Potential

The spontaneous potential (or SP) curve is a recording of the difference between the potential of a movable electrode in the borehole and the fixed potential of a surface electrode with depth. Shales give a generally similar and fairly constant reading defined as the shale baseline. Silty shales will give a small deflection to the left of the baseline while clean sandstones give a very strong deflection to the left of the baseline.

Deflections are measured in millivolts and are usually correlated to the resistivity log for confirmation of the stratigraphy present at that particular depth. The SP log can also be used to determine formation water resistivity and stratigraphic unit thickness and to interpret the depositional environments of the formation. The SP tool will be raised in the borehole at a speed of no greater than 30 feet per minute.

4.4.5 Caliper

Borehole diameter will be determined using a four-armed caliper tool. The tool is activated at the bottom of the borehole. When activated, four arms expand outwards until the pressure sensitive pad attached to the end of each arm comes in contact with the borehole wall. As the logging tool is raised up the borehole the pads will be in constant contact with the borehole wall. Any changes in the borehole diameter are recorded as electric impulses caused by the movement arm and pad. The caliper tool will be raised at a rate of no greater than 30 feet per minute.

4.4.6 Sonic

The sonic log utilizes a sound wave transmitter and receiver to measure sound wave travel time through rock formations. The formation travel time can be utilized to estimate formation lithology and porosity.

The sonic log may also identify velocity layers present in the formations. This information may be useful for correlation with the seismic information that will be gathered during the geophysical program portion of the remedial investigation.

The sonic tool will be raised at a rate of no greater than 30 feet per minute.

4.4.7 Decontamination of Logging Equipment

All geophysical sondes will be decontaminated between wells. The sondes will be thoroughly steam cleaned before entering each well. The winch cable will be cleaned with a cable wiper as the cable is wound onto the cable reel.

4.5 Groundwater Sample Collection

After the geophysical logging program is completed, groundwater samples will be collected at depth discrete intervals using a packer sampling system. The geophysical logs from each well will be used to select the sample points within each borehole. One sample will be collected from the Upper Bedrock Aquifer exposed in each borehole. Additional groundwater samples will be collected from the Lower Bedrock Aquifer, based on the geophysical logging results. A minimum of two samples and a maximum of five samples will be collected from each borehole. The approximate depths and number of the packer sample locations will be determined by joint decision between the Field Operations Manager and the on-site agency oversight contractor.

Layne Geosciences of Pittsburgh, Pennsylvania will conduct the groundwater sample collection process and will be directed by the Field Operations Manager. The groundwater samples will be collected using a packer sampling device. The sampling system will be composed of two inflatable packers situated above and below a sample intake area. The sampling interval between the packers will be approximately five feet. The packers will be constructed from synthetic material that will allow for expansion to fit the 8-inch and 14-inch diameter boreholes. Two separate packer sampling devices will be utilized at the site to accommodate the 8-inch and 14-inch diameter boreholes.

The packer system will be lowered to the desired sampling depth on a wireline winch mounted on a small drill rig or winch truck. When the packer system is positioned at the required sampling depth, the packers will be inflated. The packers will be inflated using carbon dioxide gas, which will not affect the groundwater chemistry if the packers leak. The packer samples will be collected starting with the deepest sample location in each well and progressing upward to the Upper Bedrock Aquifer sample.

Three pressure transducers will be located on the packer system to detect possible leaks in the packer seals and to gather water level information. The transducers will monitor water pressures outside of and within the sampling interval while the groundwater samples are being collected. One transducer will be located above the upper packer to monitor the pressure outside of the sample interval. Another transducer will be located within the sample interval between the two packers. This transducer will provide formation pressure of the selected sample interval and this value will be converted into a groundwater elevation. The third transducer will be located below the lower packer.

If the purge pump is capable of drawing sufficient water from the surrounding formation, a pressure differential should be visible between the sample interval and the water column. If the transducers indicate equal pressures in the borehole above and below the packers and in the sample interval during pumping, the packers may not have effectively sealed, and water may be flowing into the sample interval through openings between the packers and the borehole wall. If a pressure differential is present between the sample interval and the borehole, it will be assumed that the sample is being collected from the sample interval.

A combination of two pumps will be used to purge and sample the isolated zone: a high volume purge pump, and a bladder sampling pump. A turbine submersible pump will be used to purge three sample interval volumes from the isolated area.

The pump will be constructed of a stainless steel pump body with stainless steel blades. A submersible pump will purge the sample zone faster than the bladder pump. A bladder pump will be used to collect the groundwater sample after purging. The bladder pump will be constructed of a stainless steel pump body with a teflon bladder. The bladder pump design ensures that the sample will be relatively undisturbed during sample collection and that volatile organic compounds (VOCs) will not be disturbed or driven off during sampling.

The packer sampling equipment will be decontaminated between samples. The packer system will be thoroughly steam cleaned. The pumps will be decontaminated by pumping a non-phosphate soap solution through the pumps followed by a distilled water rinse. After the distilled water rinse, methanol will be pumped through the pumps, followed by a triple rinse with distilled water. Dedicated lengths of teflon lined polyethylene air source and sample discharge hoses will be used for each well. After decontamination, the pumps and tubing will be pressurized prior to lowering the assembly into the standing water. This will prevent borehole fluid from entering the pumps and tubing as the assembly is lowered into the well.

Two attempts will be made to collect a groundwater sample with the packer system at each sample depth. If the selected interval will not adequately seal, the packer system will be moved to another interval within the selected aquifer as identified on the geophysical logs. If there are no available sample zones within the selected aquifer, the sample will be eliminated.

Two of the packer system samples from each well will be analyzed for the following parameters:

CLP Organics (Volatiles, Semivolatiles, PCBs, Pesticides)
Library Search of 40 Organic Compounds
Photomirex
Mirex
Kepone
Diphenyl Sulfone (DPS)

The remainder of the packer system samples from each well will be analyzed for the following parameters:

CLP Organics (Volatiles Fraction Only)
Library Search of 15 Additional Compounds
Photomirex
Mirex
Kepone
Diphenyl Sulfone (DPS)

All samples will be collected and handled according to procedures outlined in Section 4.2 of this plan.

4.6 Well Closure

4.6.1 Monitor Well Installation in P1

In order to provide a future Lower Bedrock Aquifer groundwater quality monitoring location in the vicinity of well P1, a monitor well will be installed with a screen set within the top ten feet of the Lower Bedrock Aquifer in the P1 borehole. The bottom of the well screen will be installed at a depth of approximately 200 feet.

Installation will proceed as follows: The open borehole from 205 to 375 feet will be filled with grout. The required volume of grout will be calculated using the caliper log. This volume of grout will be placed into the hole and allowed to set up. The depth to the top of the hardened grout will be measured to verify the top of the grout seal. If the grout has not sealed the borehole to the correct depth, additional grout will be placed. The grout installation is described in the following section.

After the grout has hardened, bentonite pellets will then be installed from 200 to 205 feet to isolate the grout from the monitor well. One foot of fine-grained filter sand will then be placed on top of the bentonite seal to prevent the well from being clogged with bentonite. A monitor well string (designed as specified in the RI/FS Work Plan), will then be installed in the borehole.

The well string will be of 2-inch I.D. stainless steel construction, with a 10-foot long screen set within the top ten feet of the top of the Lower Bedrock Aquifer (as determined from the geophysical results).A sand pack will be installed in the open annular space to a depth of two feet above the top of the screen, and capped with a two-foot thick bentonite seal. The remaining open annulus will then be filled with cement/bentonite grout up to a depth of approximately two feet below the base of the concrete basin.

4.6.2 Grout Installation

The wells will be sealed with cement grout to prohibit the vertical migration of contaminants. Frontz Drilling of Wooster, Ohio, an experienced water well drilling firm, will be utilized to seal the wells. The grout composition used to seal the boreholes will be the same as that normally used to abandon oil wells and water wells, a mixture of portland cement and fly ash.

The grout will be mixed above ground until the proper thickness is attained. The grout will be pumped to the bottom of the borehole using the tremie pipe. The grout will displace the water standing in the open well bore. The displaced water will be collected and transferred to the on-site water storage tank for subsequent disposal.

In well P1, grouting procedures as described in Section 4.6.1 of this plan will be utilized. In well P2, grout will be installed in the borehole to a height 5 feet below the bottom of the steel casing. The grout will be allowed to set up overnight. This time will allow the grout to settle as it sets up. After the grout has set up in the open rock portion of each well, the driller will attempt to remove the well casing.

Removal will be attempted using two high capacity hydraulic jacks. A section of new casing will be welded to the top of the existing well casing at each well. This casing will extend approximately three feet above ground surface and two hydraulic jacks will be used to force the casing out of the ground. The jacks will lift a two-foot length of casing, and then be reset to the starting position. The extruded length of casing will be removed using a cutting torch, and the jacks will be reattached to the next section of casing. The jacks will pull another two foot length of casing and continue in this fashion until the casing is loosened from the unconsolidated material.

If the casing becomes loose, the drill rig will attempt to pull the remaining casing out of the ground using a winch. If the casing does not become loose, the hydraulic jacks will be used to pull the entire length of casing from each well. If the casing parts or separates during the removal attempt, the remainder will be grouted in place.

During the removal of the casing, the lifting force of the hydraulic jacks may cause the unconsolidated material to collapse into the borehole and cause blockage of the borehole. Prior to the beginning of the removal of the casing, grout will be placed in the casing annular space. Approximately one half of the casing will be filled with grout. The grout will drain out of the casing into the open annular space as the casing is retracted. This process should ensure that grout is present in the borehole, and that there should be no open spaces in the borehole if unconsolidated material were to collapse into the hole as the casing is removed.

Great care will be exercised during the attempt to remove the casing in P1 after the monitor well has been installed. All reasonable efforts will be used to avoid damaging the monitor well during the extraction of the casing from P1.

Grout will be installed to a depth approximately 4 feet below ground surface. This is a depth 1 foot below the bottom of the concrete basins. The remaining borehole and concrete basins will be filled with concrete to prevent frost heaving. The closure process will be complete when the cement basins are filled with concrete.

After the concrete has been installed, P2 will be permanently marked and surveyed. This location will be included on the final base map. This will ensure that the location of the abandoned well will be documented.

BIBLIOGRAPHY

1. "Well Logging and Interpretation Techniques" Dresser Atlas, Dresser Industries Inc., 1982

2. "Schlumberger Log Interpretation, Volume I - Principles" Schlumberger Limited, 1972

3. "Schlumberger Log Interpretation, Volume II - Applications" Schumberger Limited, 1974

APPENDIX A

Site Well Logs

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 224547

County COLUMBIANA Township PERRY Section of Township CENTER

Owner NEASE CHEMICAL CO. Address SALEM, OHIO

Location of property N.W. of SALEM OHIO 1½ MI RT 14

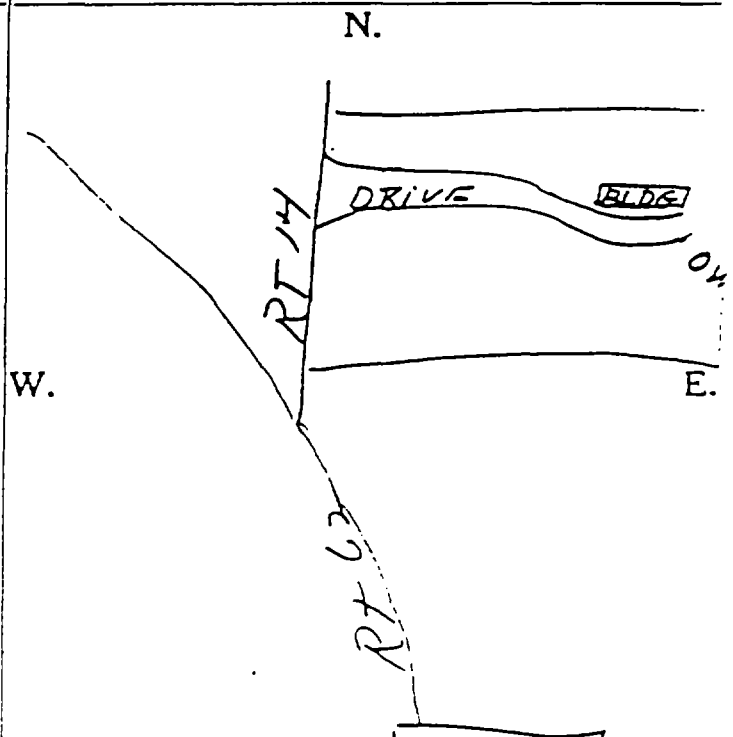
CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 18 Length of casing 50	Pumping rate 80 G.P.M. Duration of test 12 hrs.
Type of screen ____ Length of screen ____	Drawdown 200 ft. Date JAN. 26, 1961
Type of pump SUBMERSIBLE	Developed capacity 80 GPM
Capacity of pump 80 GPM	Static level—depth to water 28 ft.
Depth of pump setting 200 ft	Pump installed by J.E. LININGER
Date of completion JULY 24-61	

WELL P1 WELL LOG #2

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay & Gravel	0 Feet	46 Ft.
White Sand	46	98
Gray Slate	98	102
Coal, some fire clay	102	108
Gray Slate, coal mixed	108	125
Brown Slate & shale	125	150
White Sandy Shale	150	160
Gray Shale & Sand	160	184
Black & Gray Shale, slate	184	232
Red, Gray Shale	232	248
Gray Sand	248	305
Gray Sand	305	360
Gray Shale	360	375

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

LOCATED

Drilling Firm J.E. LININGER & SONS Date JULY 18, 1961

Address 146 COLLEGE AVE. GREENVILLE, PA. Signed Owen W. Lininger

(49)

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 224528

County COLUMBIANA Township FERRY Section of Township CENTER
Bricker & Bricker Construction Co. for
Owner MEADE CHEMICAL CO. Address PLANT AT SALEM, O.

Location of property NW of SALEM OHIO 1½ MI RT 14

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 8" Length of casing 30½	Pumping rate 50 @ 58 G.P.M. Duration of test 24 hrs.
Type of screen - Length of screen -	Drawdown 120 ft. Date Nov. 2, 1960
Type of pump SUBMERSIBLE	Developed capacity 100 G.P.M. @ 150
Capacity of pump 100 GPM	Static level—depth to water 30 ft.
Depth of pump setting 200 ft	Pump installed by J.E. LININGER & SON
Date of completion JULY 24-1961	

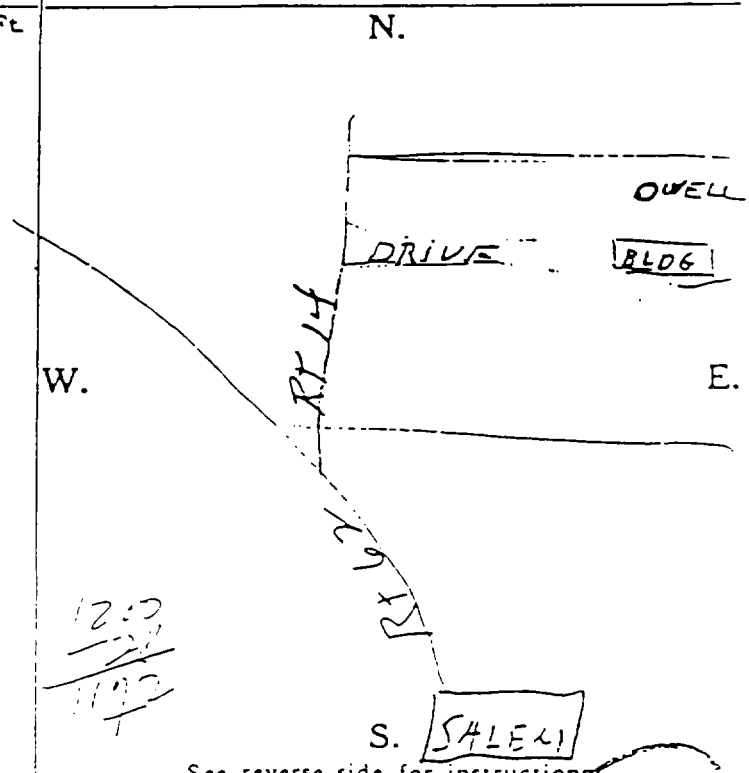
WELL P2 WELL LOG #1

Formations Sandstone, shale, limestone, gravel and clay	From	To
own Clay, Gravel	0 Feet	10 Ft.
lay, Sand & Gravel	10	15
lay, Gravel	15	20
nd & Gravel	20	25
nd, Gravel, Clay	25	28
ay Sandy Shale	28	34
ark Gray Slate	34	48
ay Sandrock	48	58
ite Sandrock	58	65
ite Sand, Black slate mixed	65	100
ay Slate, Coal	100	105
ay Slate, some coal mixed	105	128
ack Gray Slate	128	137
ay Shale	137	142
ay Slate, Fine clay	142	148
ght gray sandy shale	148	156
own, Gray sandy shale	156	170
ay Sand & Shale	170	183
ay, Black slate	183	188
ay Shale, some coal	188	194
ay Sandy Shale	194	201
ay Shale, some sand	201	214
ay Sand, Shale	214	230
own, Gray Shale	230	235

Continued on Page 2-

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

LOCATED

Drilling Firm J.E. Lininger & Son Date Nov. 26, 1960

Address 146 College Avenue Signed Owen W. Lininger

Chambers Pa.

(47)

DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 224548

County COLUMBIANA Township SALEM Section of Township CENTER

Owner NEASE CHEMICAL CO. Address PLANT AT SALEM O.

Location of property N.W. of SALEM 12 MI RT 14

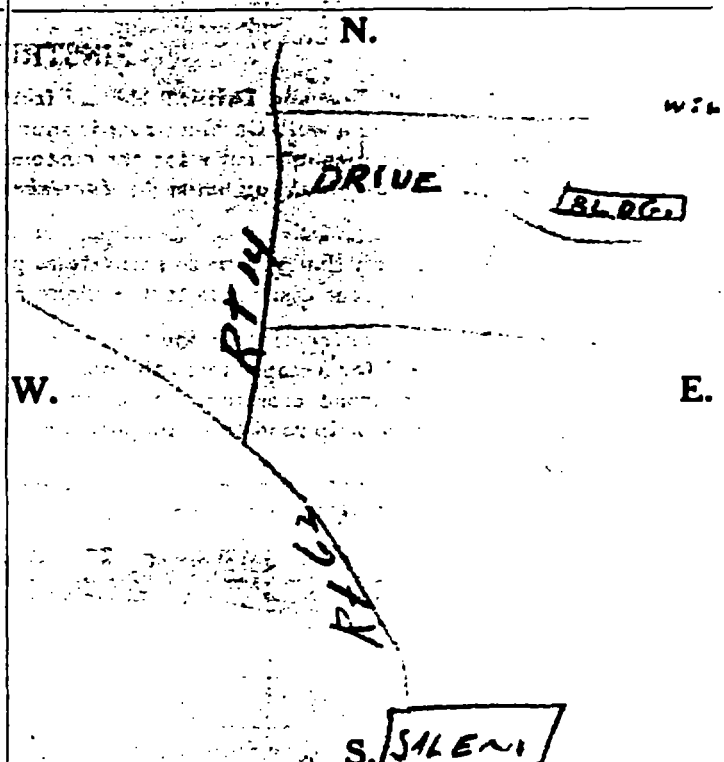
CONSTRUCTION DETAILS		BAILING OR PUMPING TEST	
Casing diameter	8" Length of casing 29'3"	Pumping rate	100 G.P.M. Duration of test 2 hrs.
Type of screen	Length of screen	Drawdown	36 ft. Date Jan 12 - 1961
Type of pump	SUBMERSIBLE	Developed capacity	100 GPM
Capacity of pump	100 GPM	Static level—depth to water	14 ft.
Depth of pump setting	84'	Pump installed by	J. E. Linninger & Sons
Date of completion	July 24 - 1961		

WELL LOG #3

Formations Sandstone, shale, limestone, gravel and clay	From	To
Yellow Clay	0 Feet	12 Ft.
Brown, Blue Clay, some sand	12	22
Gray Sandy Shale, Clay	22	25
Gray Slate	25	32
ray Slate, Sandy Shale, Coal	32	38
Gray Sand, Shale	38	54
White Sand, Some Shale	54	65
Gray Slate, Some Sand	65	70
Gray Slate, Lt. Gray Shale	70	76
Gray Slate, Soapstone	76	87
Coal, Black & Gray Shale	87	94
Light Gray Shale	94	100

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm J. E. Linninger & Sons Date July 26 - 1961

Address 146 College Ave. Greenville Pa. Signed Owen W. Linninger

" 94 Ft. to 100 Ft.-Light Gray Shale

Date _____ 19__

M Nesse Chemical Company % Otto Schnetzler

Salem, Ohio

L-10

IN ACCOUNT WITH

Owen W. Lininger **J. E. Lininger & Sons** Joe J. Lininger

WELL DRILLING CONTRACTORS

PUMPS WELL SCREENS WELL SERVICE

146 COLLEGE AVE., GREENVILLE, PA.

Phone JUniper 8-8250

Well #3

Well in Cornfield
10 HP Sub Pump
841' Setting
100 G.P.M.
~ 800 ft. From Bldg

Drill 8" Well to 100 Ft.

Furnish 29 Ft. 3 In. of 8" Casing

Furnish dynamite, shoot and develope well to maximum capacity

Total

WD page 21 L2

Formations:

From 0 Ft. to 12 Ft.-Yellow Clay

" 12 Ft. to 22 Ft.-Brown, Blue Clay, some sand

" 22 Ft. to 25 Ft.-Gray Sandy Shale, Clay

" 25 Ft. to 32 Ft.-Gray Slate

" 32 Ft. to 38 Ft.-Gray Slate, Sandy Shale, Coal

" 38 Ft. to 54 Ft.-Gray Sand & Shale

" 54 Ft. to 65 Ft.-White Sand, some Shale

" 65 Ft. to 70 Ft.-Gray Slate, Some Sand

" 70 Ft. to 76 Ft.-Gray Slate, Light Gray Sandy Shale

" 76 Ft. to 97 Ft.-Gray Slate, or Soapstone

[illegible] Ft.-Coal, Black Gray Shale

" 94 Ft. to 100 Ft.-Light Gray Shale

WELL RECORD

To Water 14 Ft.

Lowest Level 50 Ft.

PUMP TEST

100 G. P. M. @ 50 Ft.

G. P. M. @ _____ Ft.

G. P. M. @ _____ Ft.

G. P. M. @ _____ Ft.

OHIO U.S. EPA
COMMENTS

OHIO AND U.S. EPA'S COMMENTS,
JUNE AND AUGUST 1989

OhioEPA
State of Ohio Environmental Protection Agency
rtheast District Office
0 E. Aurora Road
nsburg, Ohio 44087-1969
(216) 425-9171

JUN 16

Toward A Cleaner Environment

Richard F. Celeste
Governor

13 JUN 1989

Mr. Steven Foard
Manager, Environmental Services
Ruetgers-Nease Chemical Company
201 Struble Road
State College, PA 16801

Mr. William Kennedy
Deckert, Price and Rhoads
3400 Centre Square West
1500 Market Street
Philadelphia, PA 19102

Dear Sirs,

On May 25, 1989, representatives of the U.S. Environmental Protection Agency (U.S. EPA), the Ohio Environmental Protection Agency (OEPA), and Ruetgers-Nease Chemical Company discussed the final conditions under which Nease production wells P1 and P2 shall be closed. All parties agreed that:

1. Two (2) standing water samples shall be collected from each of the two wells. No purging shall occur prior to sampling. The first sample in each case shall be obtained from the area of the Upper Bedrock Aquifer and analyzed for the full CLP parameters as described in the Consent Orders. The second sample in each case shall be taken from the bottom of the hole or, if obstructed, from the point of obstruction. These samples shall be analyzed for volatile organic compound parameters as described in the Consent Orders, and for mirex, photomirex, kepone, and diphenyl sulfone. Results of the analysis of these four samples shall be obtained prior to reaming in order to avoid exacerbating contamination problems at the site in the event that contamination levels in the wells are high.

2. Each well shall be reamed to its maximum constructed depth.

3. Logging procedures outlined in Nease's Well Closure Plan submitted July 27, 1988 shall be followed.

4. Results gleaned from logging procedures shall be examined by all three of the aforementioned parties prior to collecting packer samples in order to define zones to be tested.

5. Five packer samples shall be obtained from each of the two wells after reaming and logging. One of the five samples from each well may be taken from the area of the Upper Bedrock Aquifer. Two of the five samples from each well will be analyzed for the full CLP parameters. The remainder will be analyzed for volatile organic compound parameters as described in the Consent Orders, and for mirex, photomirex, kepone, and diphenyl sulfone. The three aforementioned parties will decide which two of the five samples will be analyzed for CO groundwater parameters.

6. A monitoring well shall be placed and screened in the Lower Bedrock Aquifer zone in well P1. The space between the monitor well casing and the original casing of P1 shall be properly closed.

7. The Agencies strongly recommend that the original casings in wells P1 and P2 be removed prior to grouting and closure. However, the Agencies also understand that the length and age of the casings may preclude their safe removal. If it becomes apparent during removal attempts that the casing may tear, the Agencies will allow Nease to leave the casings in place. In any case, pressure grouting will be utilized during well closure.

8. The Agencies reserve the option to require Nease to install deep wells downgradient of the production wells if packer samples indicate the presence of significant contamination.

9. A magnetometer shall be employed to determine the location of production well P3. Nease shall use its best efforts to locate this third production well, which could be a conduit for further cross-contamination of aquifers in the area.

It is also understood that Nease shall deliver a revised version of the P1, P2 Well Closure Plan by June 19, 1989.

If there are any questions, please contact either representative.

Sincerely,

Amy Blumberg
Remedial Project Manager
U.S. Environmental Protection Agency

Susan J. MacMillan
Project Coordinator
Ohio Environmental Protection Agency

AB:SJM.ko

cc: Jennifer Tiell, OEPA-CO, Legal
Kathy Davidson, OEPA-CO, OCA
Senator Robert Birch
Rep. John Shivers
Rod Beals, OEPA-NEDO, OCA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

RECEIVED
1 0 1989

REPLY TO THE ATTENTION OF:

5HS-11

Mr. Steven Foard
Manager, Environmental Services
Ruetgers-Nease Chemical Co.
201 Struble Road
State College, PA 16801

Mr. William Kennedy
Deckert, Price & Rhodes
3400 Centre Square West
1500 Market Street
Philadelphia, PA 19102

Re: Nease Chemical, OH

Dear Sirs:

The U.S. Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency (OEPA) have received the revised Well Closure Plan for wells P1 and P2 (and P3, if located) at the Ruetgers-Nease Chemical Co., Inc. site in Salem, Ohio.

The following represents our concerns with the revised plan:

(1) Page 1, last paragraph — It is stated that a monitoring well will be placed in the top 10 feet of the Lower Bedrock Aquifer in well P1. This deep monitor well location will be determined after the results of the geological logging have been examined for upper permeability zones.

(2) Page 12, last sentence — The approximate depths and number of the packer sample locations will be determined first by the Agencies with their contractors or experts and Ruetgers-Nease with their contractors to review logging information for greater permeability zones. After this effort, any field decisions that are necessary will occur between the Field Operations Manager and the on-site agency oversight contractor.

(3) Page 13, last sentence — Purging of three sample interval volumes from the isolated area is insufficient. This is not a controlled system and, therefore, it is necessary to purge between 5 and 10 volumes from the isolated area.

(4) Page 15, Section 4.3.1

The statement of a monitor well being placed in the top 10 feet of the Lower Bedrock Aquifer must be changed as stated in comment #1. The grout mixture of cement and flyash, typically used for solidification of ponds, may not ensure a good seal as cement contracts or shrinks when cured. An addition of bentonite will allow for any expansion, thereby alleviating this concern.

(5) Page 16, paragraph 3

Please modify sentence to read... "Prior to beginning of the removal of the casing, grout will be placed in the casing."

In addition, no work will be performed prior to the approval of the Volume II: Quality Assurance Project Plan and Volume III: Site Specific Sampling Plan of the Remedial Investigation/Feasibility Study Work Plan.

Sincerely,

Amy J. Blumberg
Remedial Project Manager
U.S. Environmental Protection Agency

Susan J. MacMillan
Project Coordinator
Ohio Environmental Protection Agency

cc: David Favero, B&V
Kathy Davidson, OEPA-CO

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 3
To Ken Richards	From Steve Foard
Co. ERM-Midwest	Co. Ruetgers-Nease
Dept.	Phone # 814-238-2424
Fax # 614-433-0886	Fax # 814-238-1567

GROUNDWATER SAMPLING LOGS

Project 44.1936

GROUNDWATER SAMPLING PROJECT
RUETGERS-NEASE CHEMICAL SITE
SALEM, OHIO

OCTOBER 1990

Prepared for:

ERM-Midwest, Inc.
450 W. Wilson Bridge Road
Columbus, Ohio 43085

Prepared by:

LGI
A division of **Layne GeoSciences, Inc.**
6 Penn Highway
Sinking Spring, PA 19608

LGI

A Division of Layne GeoSciences, Inc

6 Penn Highway • Sinking Spring, Pennsylvania 19608 • 215/670-5900 • 215/670-5903 (FAX)

October 10, 1990
Ref: Project No. 44.1936

Mr. Robert Ferree
ERM-Midwest, Inc.
450 W. Wilson Bridge Road
Columbus, Ohio 43085

Subject: Packer Sampling at the **Ruetgers-Nease** Site, Salem, OH

Dear Mr. Ferree:

LGI has completed the packer sampling project at the referenced site. The scope of the project was based upon **LGI** proposal No. 8424 (dated January 1, 1990), a letter from **ERM-Midwest** to **LGI** (dated April 10, 1990), and subsequent revisions. This letter report with attachments comprise the final report of the activities and results of the project.

INTRODUCTION

The **Ruetgers-Nease** site (**Site**) is a former chemical manufacturing facility located approximately one mile northwest of Salem, Ohio. The **Site** is on the National Priorities List of hazardous waste sites, and a Remedial Investigation/Feasibility Study is currently underway. As part of that investigation, three water supply wells were to be characterized and properly closed. One well (P1) is 14" in diameter to a depth of 200 feet and completed to 375 feet with an 8" diameter. The remaining wells (P2 and P3) are 8" boreholes completed to depths of 374 feet and 100 feet, respectively. Fourteen discrete intervals for groundwater sampling were identified in the wells using the results of a geophysical well logging program. **LGI** was retained to provide the packer devices, sampling equipment, heavy equipment, manpower, and supervision to isolate the zones and collect the groundwater samples. An initial attempt at sampling conducted the week of August 8, 1990 revealed problems with the packer design. After reconstruction of the packers, sampling was scheduled to begin the week of September 17, 1990.

SAMPLING APPARATUS

LGI subcontracted **CDS**, a division of **Layne-Western Inc.**, to provide the packers, heavy equipment, and manpower to isolate the sampling zones. A 12" OD packer assembly was provided to sample the 14" zones, and a 7" OD packer assembly was provided to sample the 8" zones. The packer assemblies were comprised of stainless steel ends approximately three feet long, an inflatable rubber packer, and a five foot interval of removable steel casing connecting the top and bottom assemblies. Waterproof connectors were used to attach nitrogen supply hoses to each packer. Two 250 psi pressure transducers, manufactured by **Thor International, Inc.**, were installed through the packers; one transducer was installed through both packers and extended approximately one foot below the packer assembly, and the other transducer was installed through the upper packer and into the sampling interval. A third transducer was suspended approximately three feet above the upper packer.

Two pumps were installed within the sampling interval. The purge pump was a 4" stainless steel Grundfos submersible pump with a 1½ horsepower Franklin environmental motor, capable of pumping approximately 15 gallons per minute. The purge pump was attached to a one-inch steel pipe with a quick-connect fitting. The steel pipe was installed through the top packer and extended approximately six inches above the packer, where another quick-connect fitting was used to attach the discharge hose. Either one-inch flexible plastic pipe or plastic garden hose was used to discharge the purge water to the surface. The power line for the pump was installed through the upper packer with a waterproof fitting and equipped with waterproof connectors.

A sampling pump was also installed within the sampling interval. A separate pump was required for sampling to preserve the integrity of the samples, particularly with respect to volatile compounds. The sampling pump was a Sample Pro Model ST1101P bladder pump, constructed of stainless steel with a Teflon bladder and a stainless steel screen. Air pressure was provided by a 175 PSI oilless air compressor and controlled by a Well Wizard Model 3013 controller. Discharge and air supply tubing was ½" by ¼" bonded Teflon tubing, utilizing stainless steel connectors and fittings. All gas supply hoses, transducer cable, electrical cable, and the sample discharge hose are stored on reels for easy transport and use.

1936:FRPT

Transducer data was collected and recorded by a Thor Model SDEE-03A Datalogger, accessed by Thor software run on a Dell 316LT 386-based portable computer. The datalogger was powered by a 12-volt marine battery, and the computer was plugged into a power line supplied by the client.

SAMPLING TECHNIQUE

To collect the sample, the following general technique was followed for each well:

- All equipment to go downhole, including packer assemblies, pumps, gas supply hoses, discharge tubing, electrical lines, transducers and transducer cable are decontaminated with a steam cleaner at the decontamination pad.

- The sampling pump is disassembled and cleaned thoroughly with the steam cleaner, including the inside of the Teflon bladder.

- The purge pump is connected to the sampling discharge tube with a special fitting, inserted into a length of 4" PVC pipe with a cap on the bottom, and decontaminated by pumping through the sampling discharge tube. A five gallon mixture of water and a non-phosphate detergent is pumped through the sample line, followed by 3 gallons of methanol and 7.5 gallons of deionized water. Deionized water is left in the sampling hose.

- The pumps are reinstalled in the packer assembly.

- The decontaminated equipment is placed on plastic sheeting and transported to the well site.

- Plastic sheeting is placed around the well site, over an area large enough to accommodate all of the equipment reels.

- All discharge hoses, transducers, and electrical cables are attached to the packer assembly.

- The packer assembly is lowered into the well on a steel support cable; a tape measure is attached to the support cable, along with the upper transducer.

- Hoses and cables are pulled taut and taped together at frequent intervals as the assembly is lowered to the desired sampling depth, determined by the tape measure.

- When the packer assembly is at the proper position, the packers are inflated with nitrogen and the datalogger is started, recording transducer data. Transducer readings are recorded at twenty second to one minute intervals. Packers are inflated to 60-80 PSI.

- The purge pump is started to purge approximately five interval volumes of water (200 gallons for the 14" zones and 80 gallons for the 8" zones). The purge water is pumped into 55-gallon drums. The transducer data is monitored for indications of packer failure.

- After purging is completed, the sampling pump is started. As the capacity of the sample hose is approximately two gallons and very little mixing takes place in the hose, three gallons of water are purged to ensure that formation water is being sampled.

- Three volatile organic samples are collected in 40 ml septum bottles.

- The remainder of the sample bottles are filled.

- After all sample bottles have been filled, including any required QA/QC samples, the sampling pump is stopped and the packers deflated. Recording of transducer data is stopped.

- The packer assembly is removed from the well, the purge pump and the sampling pump are removed, and the two pumps and the sample hose are taken to the decontamination pad for decontaminating between sample

intervals. After the pumps are decontaminated, they are returned to the well site, attached to the appropriate connections, and the packer assembly is lowered to the next sampling interval.

- After all sampling is completed at a well, the entire packer assembly and all hose and cable reels are taken to the decontamination pad and decontaminated with the steam cleaner to prepare for the next well.

FIELD SAMPLE COLLECTION

A total of fourteen (14) well intervals were sampled during this investigation; three (3) 14" zones were sampled in well P1, three (3) 8" zones were sampled in well P1, six (6) 8" zones were sampled in well P2, and two (2) 8" zones were sampled in well P3. Sample collection is summarized in the following table:

Well-Sample #	Date	Diameter	Sampling Interval	Comments
P1-3	9/18	14"	151'-156'	Purge 200 gallons
P1-2	9/19	14"	110'-115'	Low-yielding zone, purge 86 gallons
P1-1	9/20	14"	58'-63'	Purge 200 gallons
P1-6	9/21	8"	287'-292'	Slow sample rate
P1-5	9/22	8"	248'-253'	Purge 80 gallons
P1-4	9/22	8"	203'-208'	Purge 80 gallons
P2-6	9/22	8"	290'-295'	Purge 80 gallons
P2-5	9/23	8"	256'-261'	Purge 80 gallons
P2-4	9/23	8"	200'-205'	Purge 80 gallons
P2-3	9/23	8"	168'-173'	Low yielding zone, purge 80 gallons
P2-2	9/24	8"	124'-129'	Low yielding zone, purge 37 gallons
P2-1	9/24	8"	75'-80'	Low yielding zone, purge 26 gallons, matrix spike
P3-2	9/25	8"	92'-97'	Low yielding zone, purge 39 gallons
P3-1	9/25	8"	50'-55'	Purge 75 gallons, QA/QC samples

The major sampling problem encountered during the sampling was low yielding zones, including zone P1-2, the three shallowest zones sampled in well P2, and the deep zone sampled in well P3. Zone P2-1 was originally intended to encompass the interval from 50' to 55' below ground level, but the packers were moved several times because of low yield

and the sample was eventually collected from 75' to 80' below grade. At the direction of Rob Ferree, purge volumes were generally reduced for the low-yielding zones as noted in the table. The purge volume was never less than approximately 2 interval volumes.

An exceptionally low sample recovery rate was encountered sampling zone P1-6; because the problem did not occur during sampling of zone P2-6, at a similar depth, it is inferred that the cause was either an obstruction in one of the check valves or a leaking connection in the air line.

Transducer data collection was generally good, although on occasion the transducers were slow to equilibrate to hydrostatic pressures. Discussions with the manufacturer suggest that this may be due to constriction of the vent tube running the length of the transducer cable; such a constriction may be caused by a kink in the cable or compression at the waterproof connectors to the packer assembly. The data for many of the zones indicate some hydraulic connection between the isolated interval and the upper or lower zones; however, none of the data sets suggested an equilibration between zones, which would indicate packer failure. In several low-yielding zones the purge pump actually evacuated the interval, while transducer data indicated little or no change in the upper or lower zones; this development was an indication of the degree of zone isolation achieved by the packer assembly. Graphs of the transducer data are presented in Attachment 1, and tabular printouts are provided in Attachment 2. The tabular data is also enclosed as ASCII files on a floppy disk.

After all samples had been collected, a field blank was taken on September 25 after final decontamination. Deionized water was poured over and through the sampling pump, including the bladder, and collected for analysis.

SUMMARY

Fourteen groundwater samples were collected from three wells at the **Ruetgers-Nease** site near Salem, Ohio, using a packer assembly to isolate specific zones. Sampling intervals were purged with a submersible pump prior to sample collection with a bladder pump. Transducer data collected during the purging and sampling cycles indicate that the packers effectively isolated the sampled interval from the borehole above and below the zone.

If you have any questions concerning this report, please do not hesitate to call.

Sincerely,
LGI, a division of **Layne GeoSciences, Inc.**

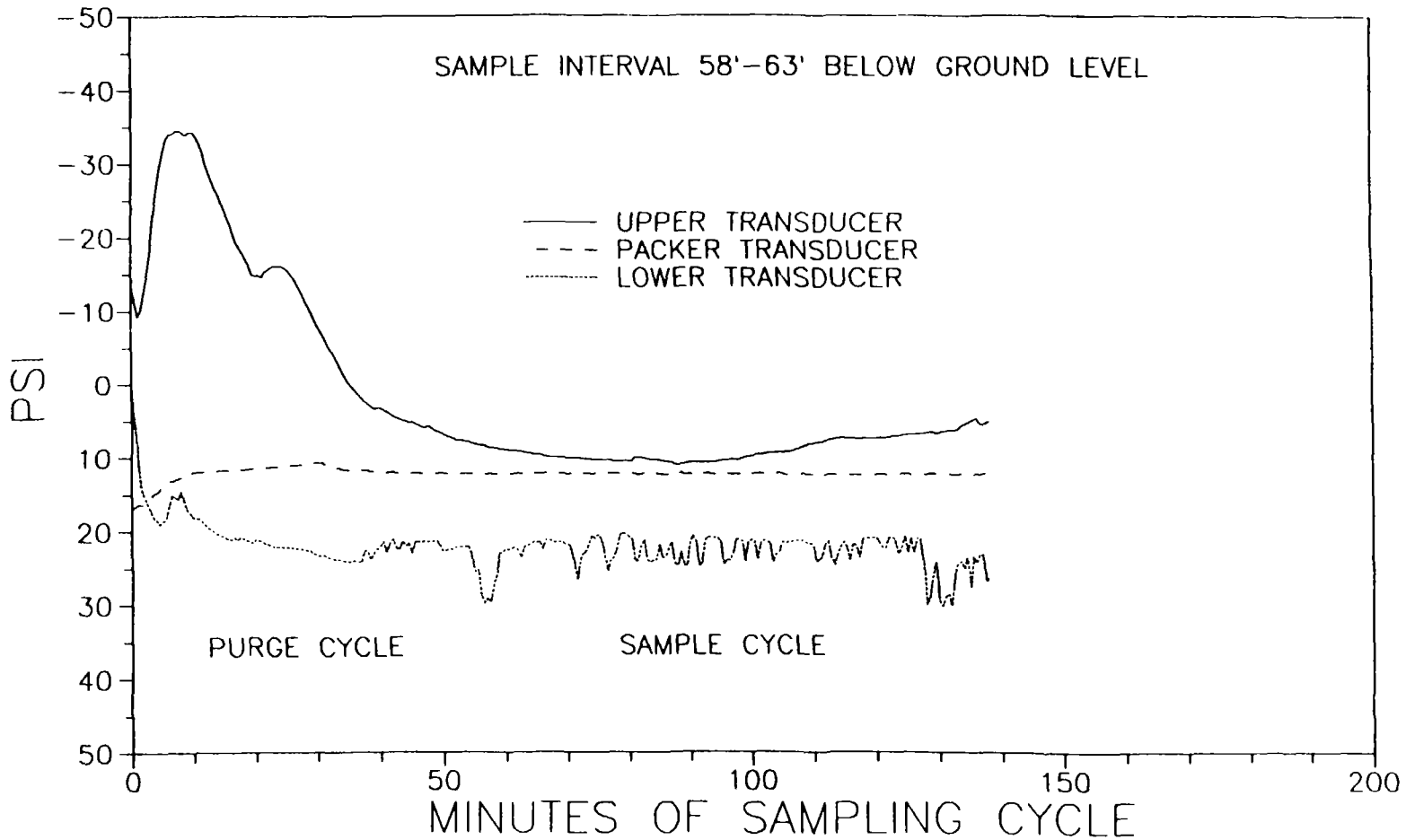
Stephen E. Tappert
Project Geologist

David C. Raymes
Project Manager

Attachments
Enclosure

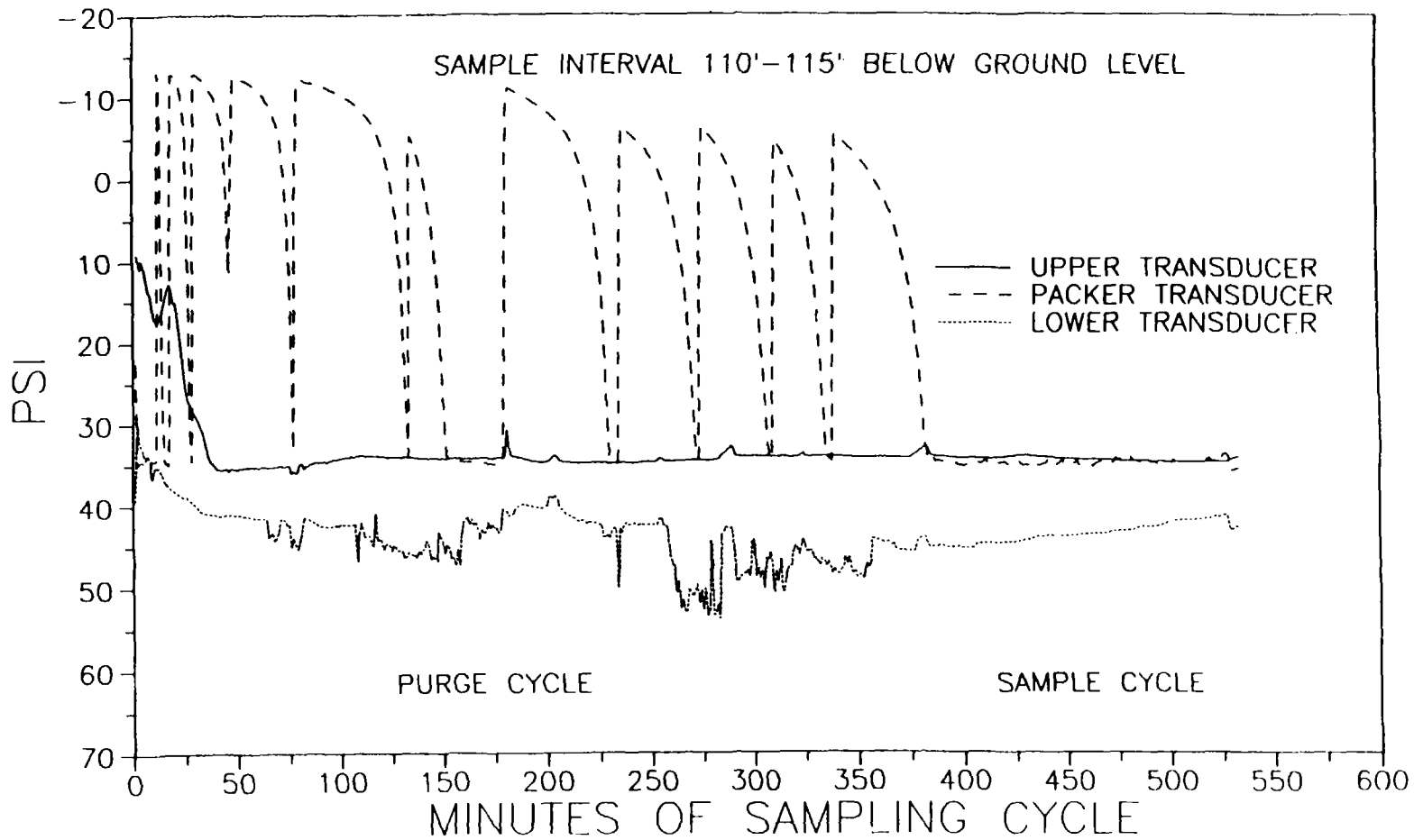
1936:FRPT

RUTGERS-NEASE SALEM SITE
PACKER TEST P1-1
9/19/90



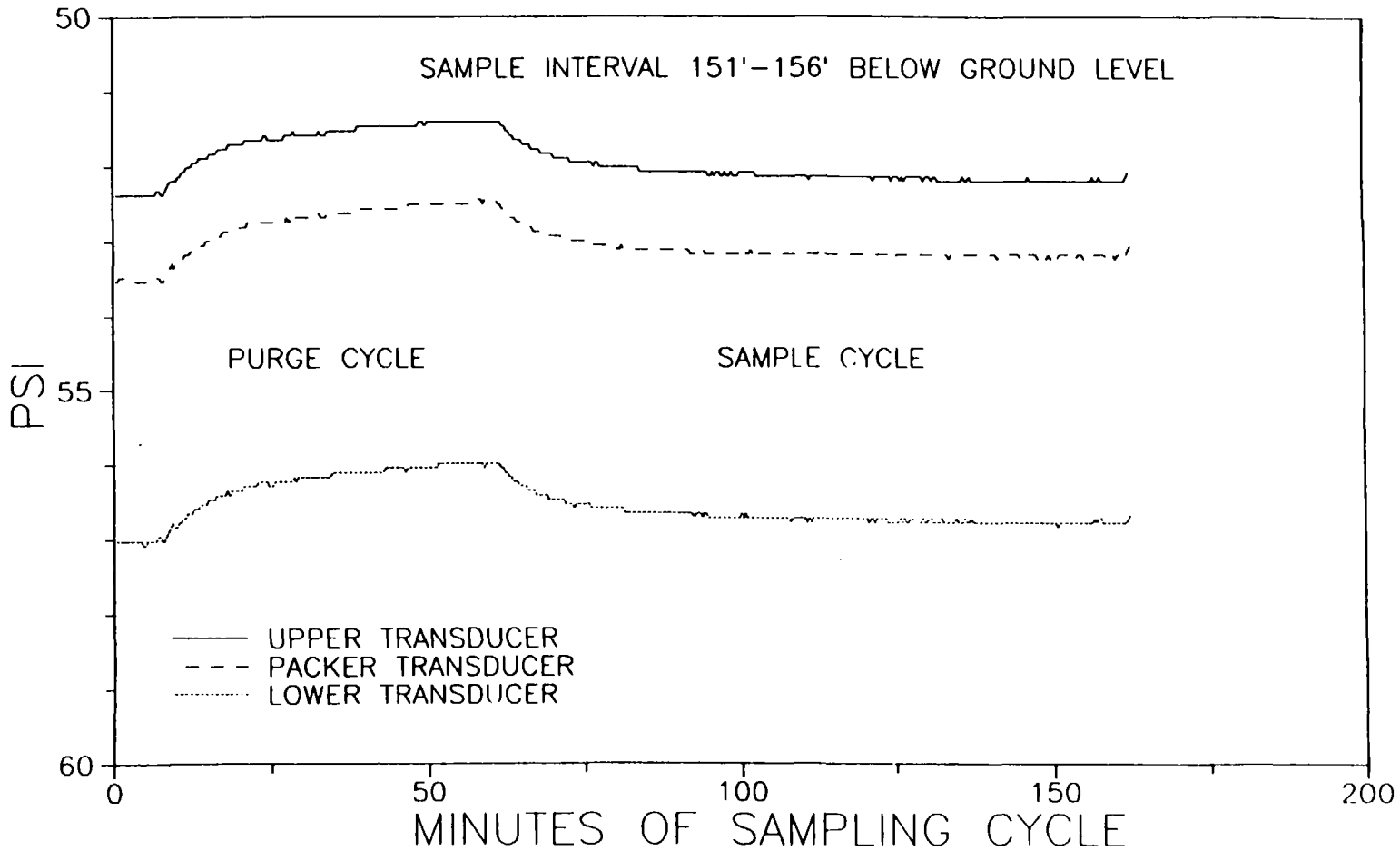
1936: P1-1B

RUTGERS-NEASE SALEM SITE
PACKER TEST P1-2
9/19/90



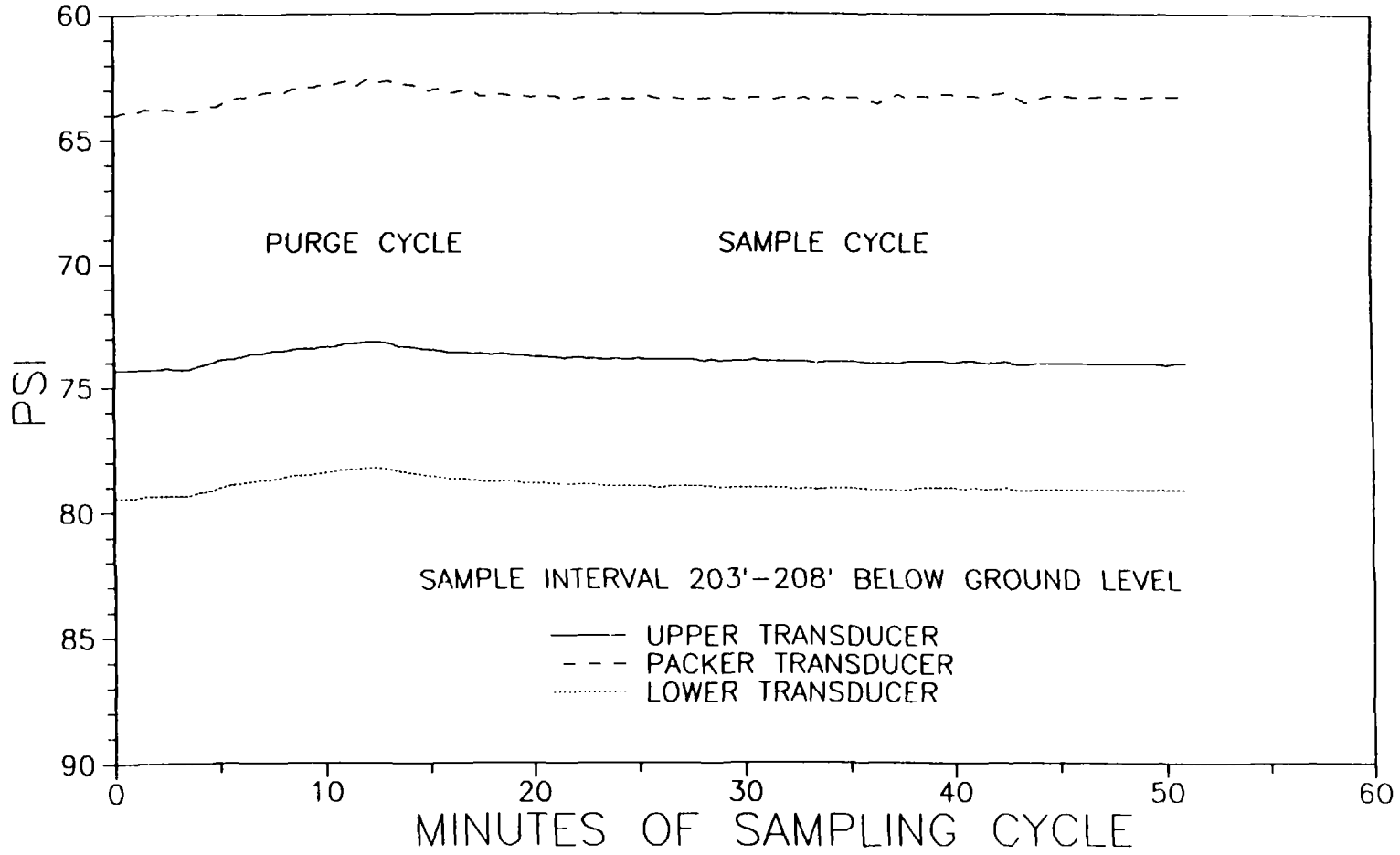
1936: P1-2B

RUTGERS-NEASE SALEM SITE
PACKER TEST P1-3
9/18/90



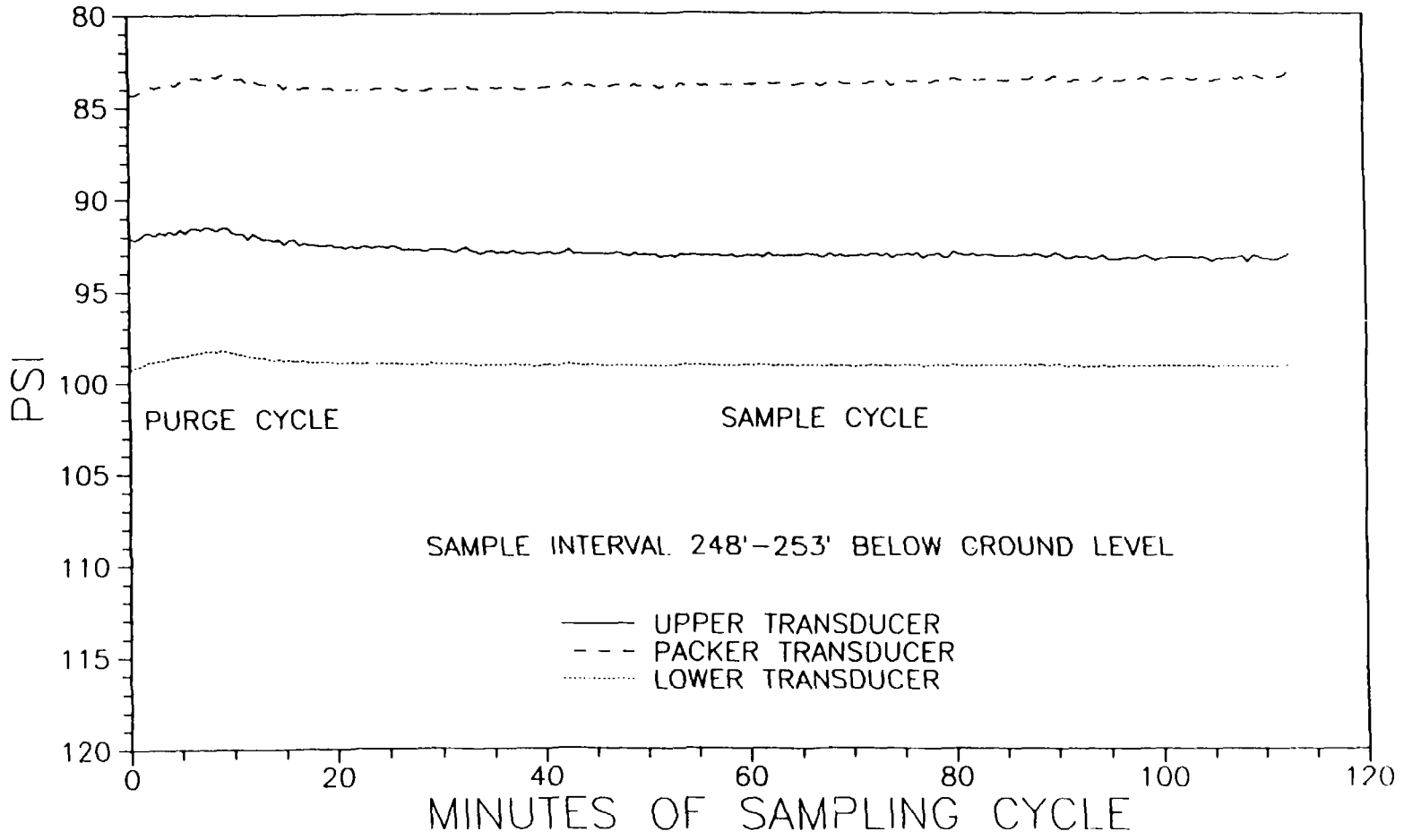
1936: P1-3

RUTGERS-NEASE SALEM SITE
PACKER TEST P1-4
9/22/90



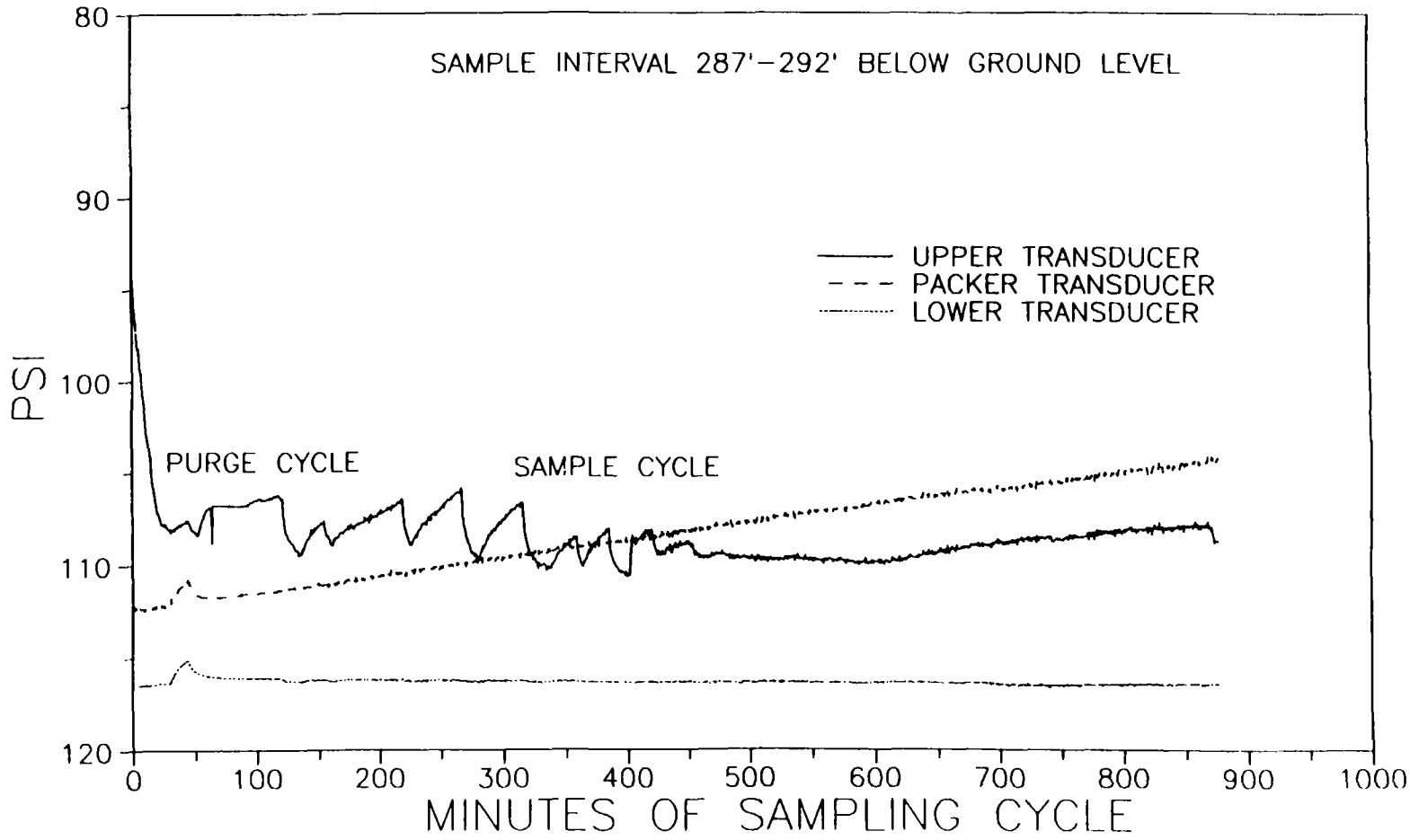
1936: P1-4

RUTGERS-NEASE SALEM SITE
PACKER TEST P1-5
9/22/90



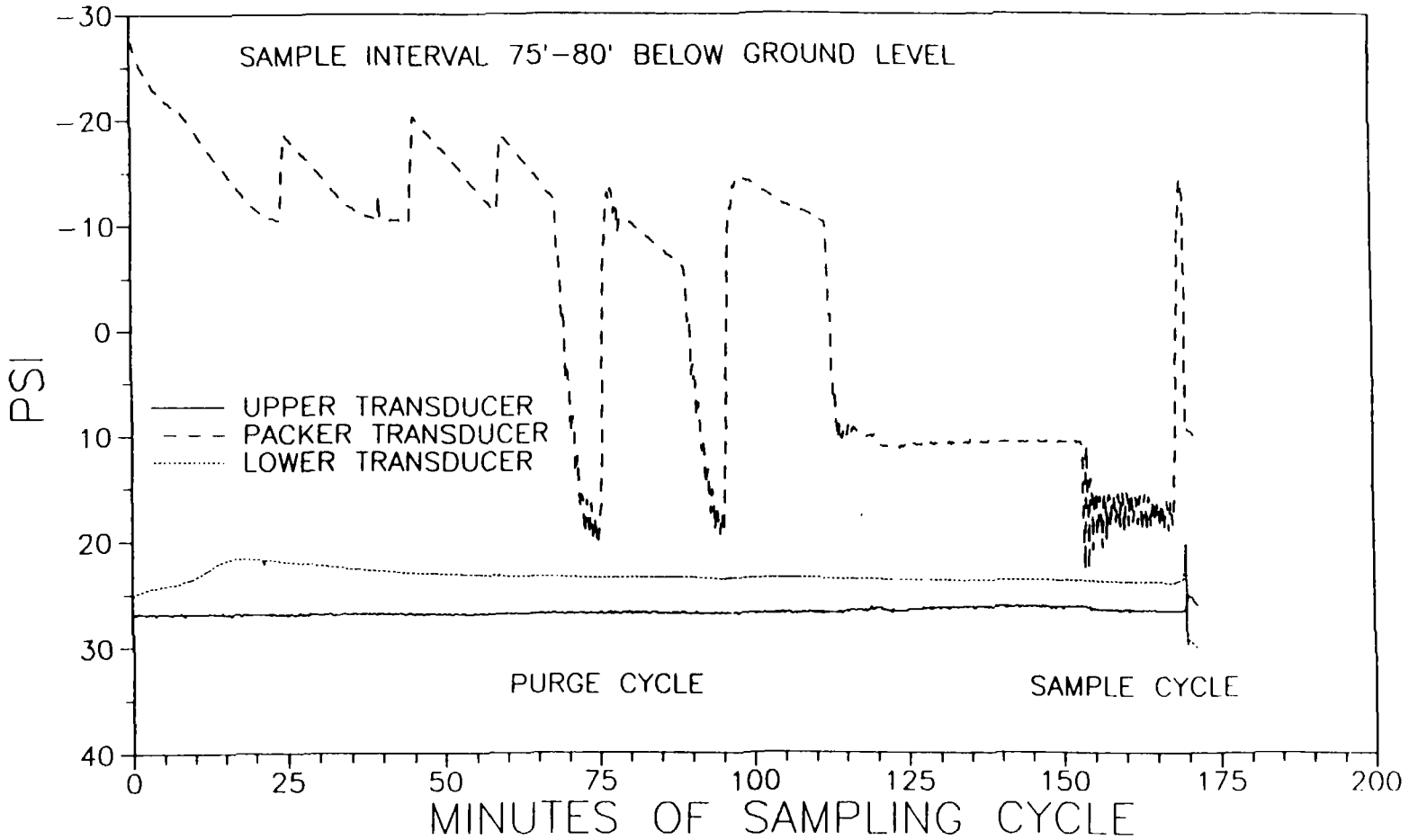
1936: P1-5

RUTGERS-NEASE SALEM SITE
PACKER TEST P1-6
9/21/90



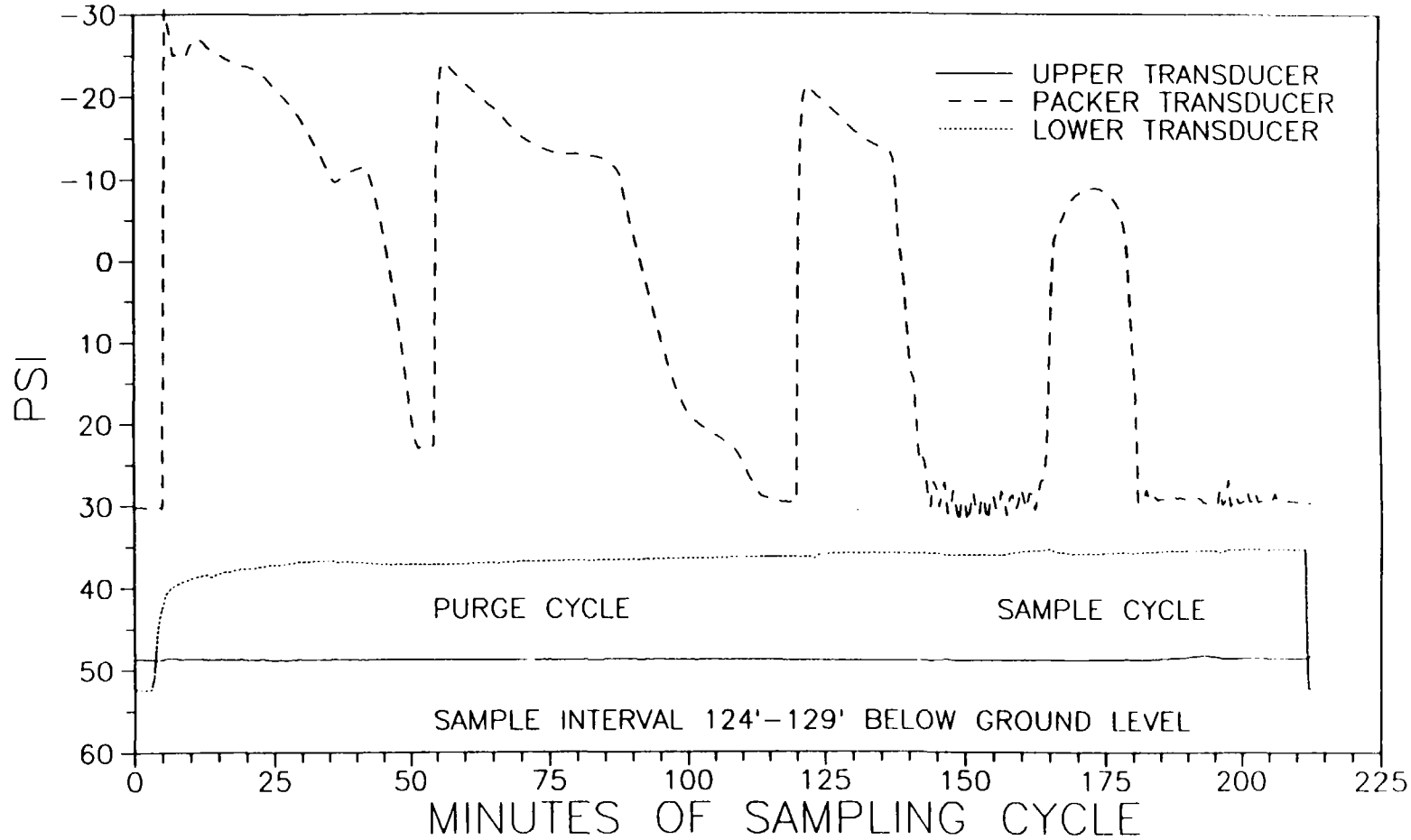
1936: P1-6

RUTGERS-NEASE SALEM SITE
PACKER TEST P2-1
9/24/90



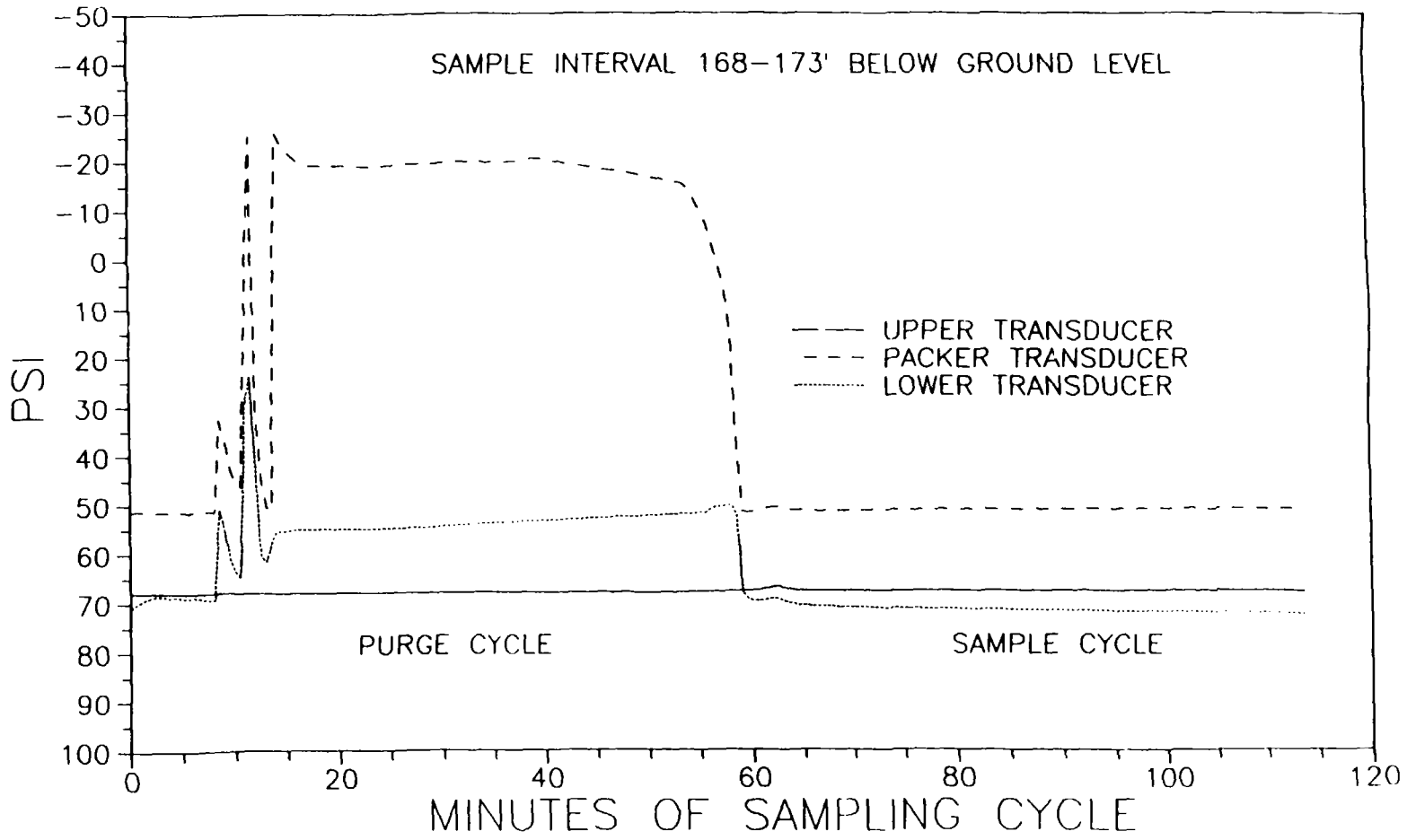
1936: P2-1

RUTGERS-NEASE SALEM SITE
PACKER TEST P2-2
9/24/90



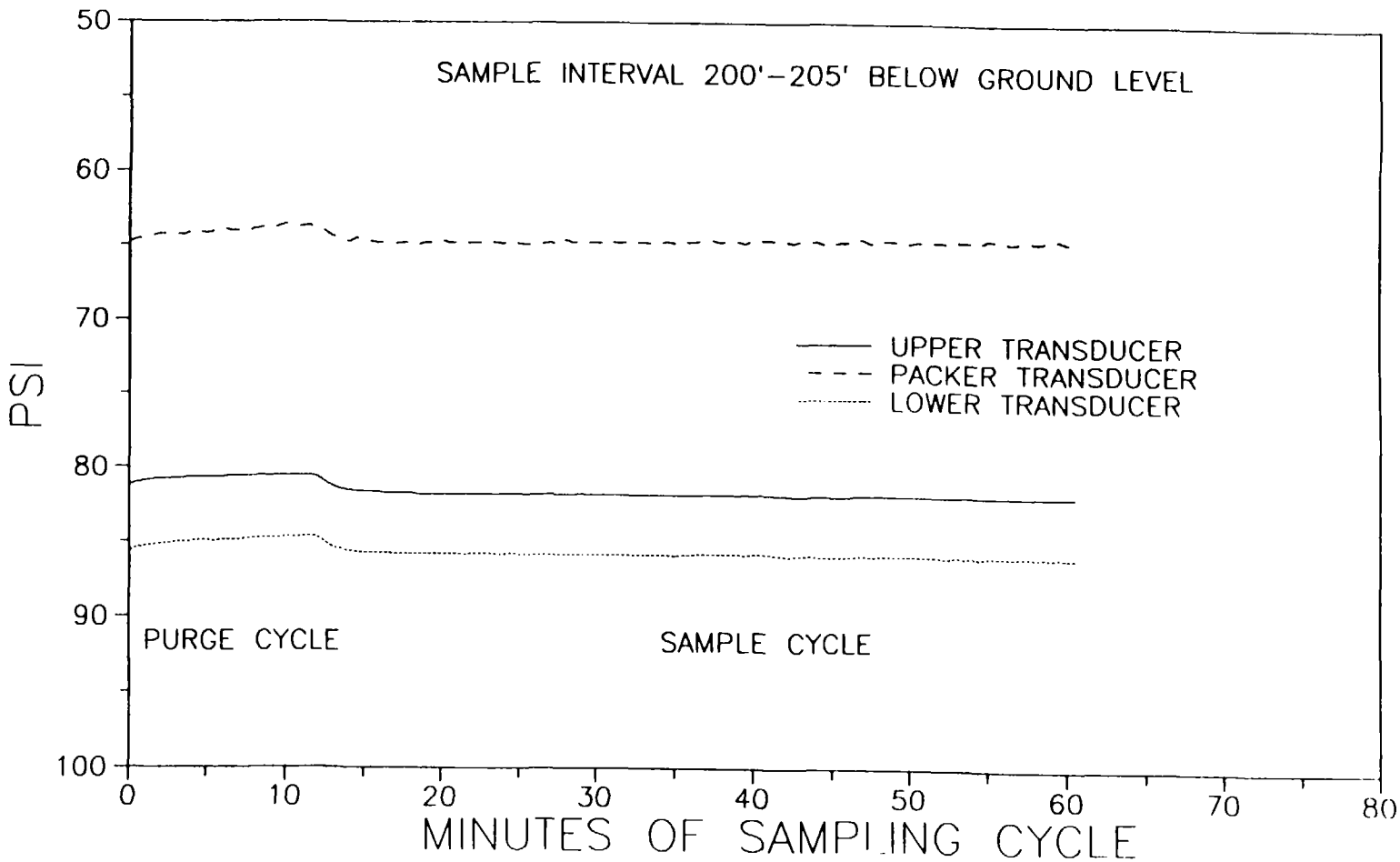
1936: P2-2

RUTGERS-NEASE SALEM SITE
PACKER TEST P2-3
9/23/90



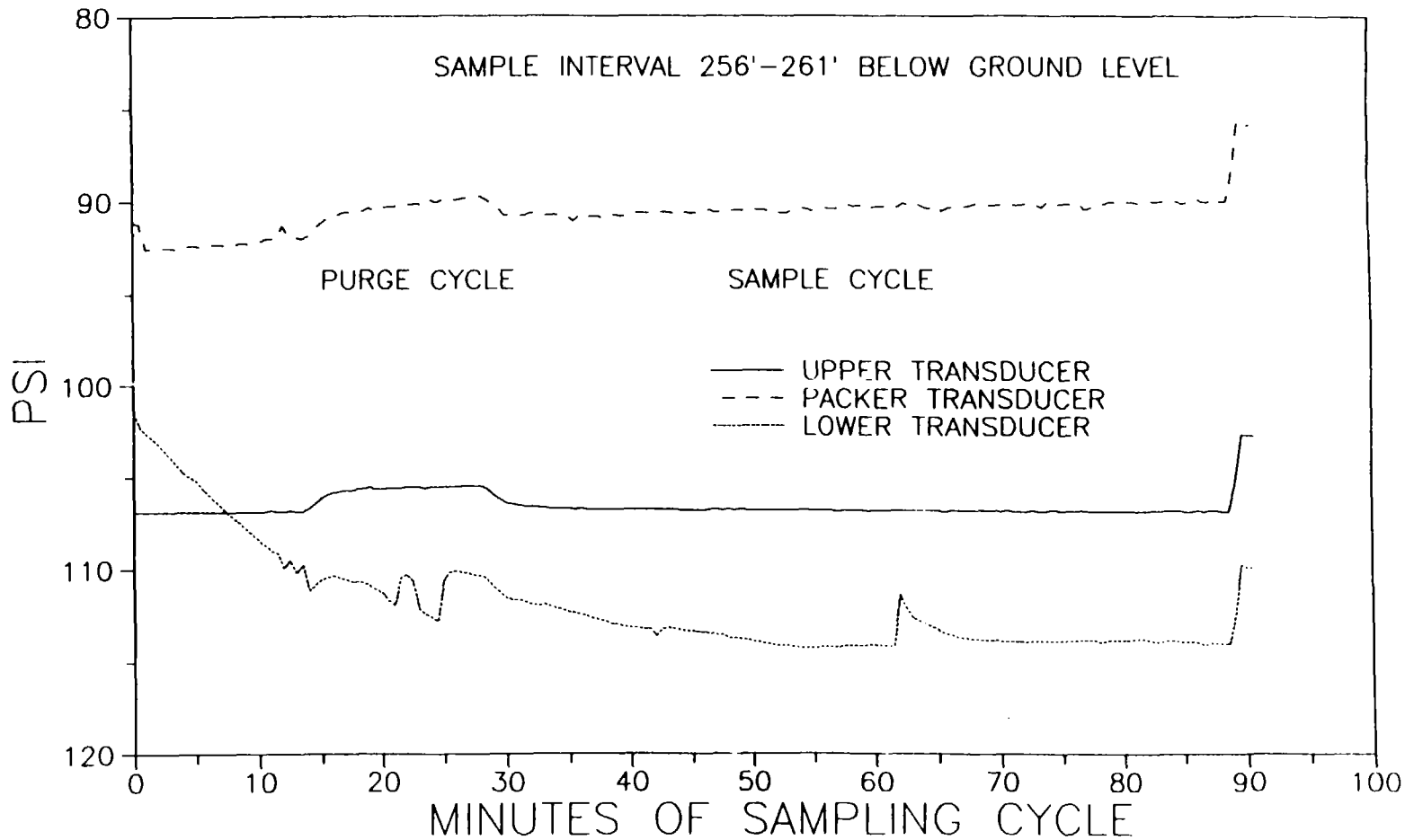
1936: P2-3

RUTGERS-NEASE SALEM SITE
PACKER TEST P2-4
9/23/90



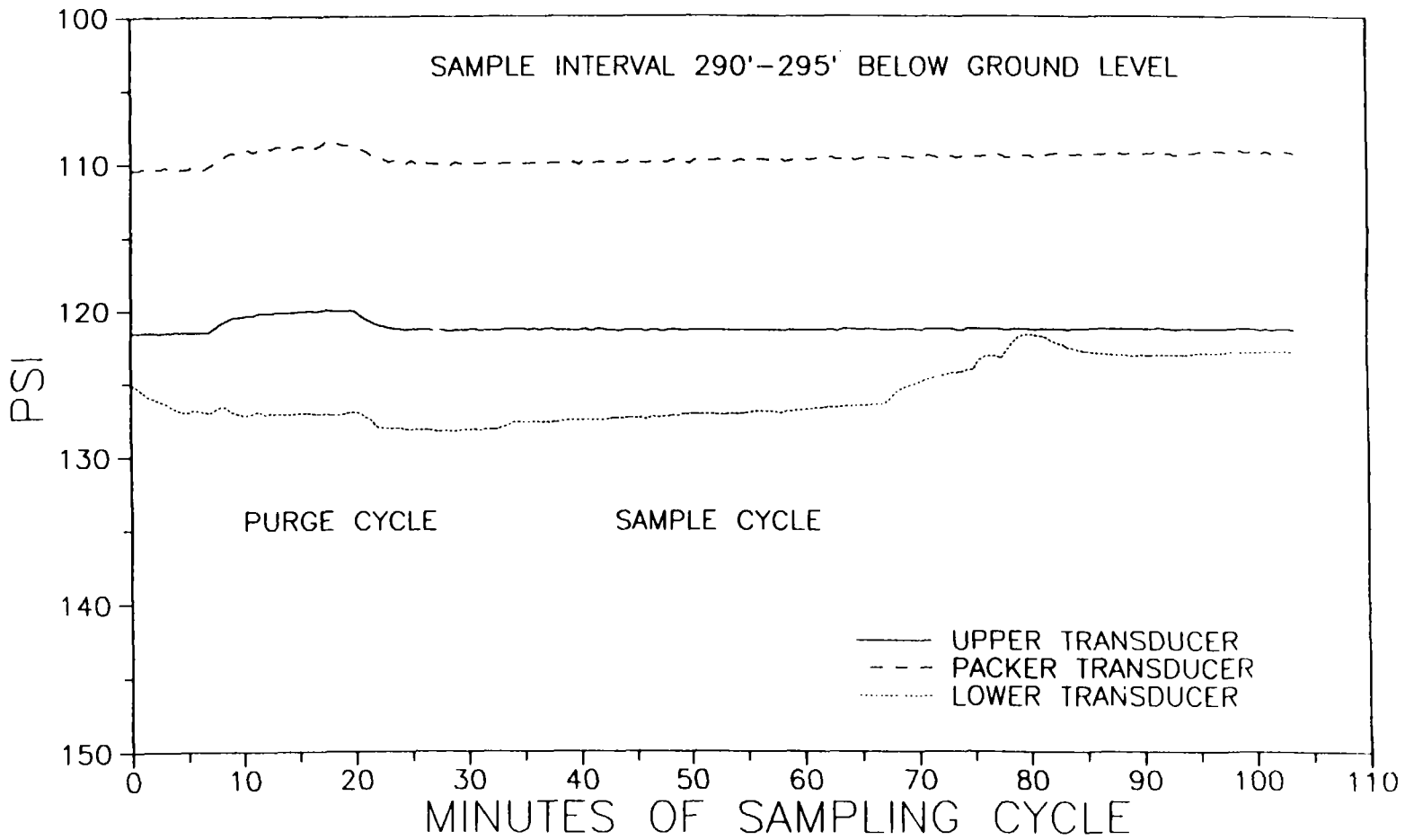
1936: P2-4

RUTGERS-NEASE SALEM SITE
PACKER TEST P2-5
9/23/90



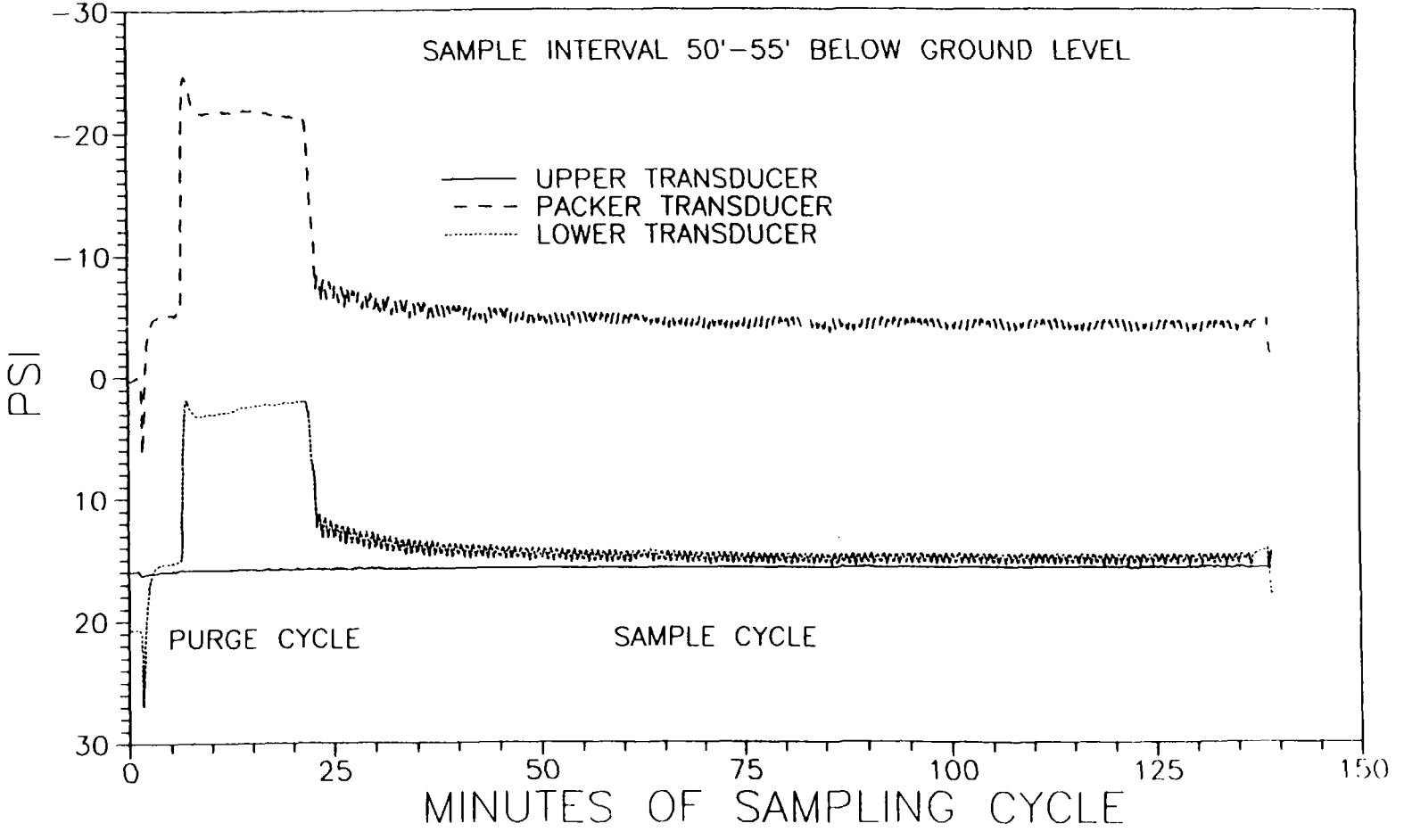
1936: P2-5

RUTGERS-NEASE SALEM SITE
PACKER TEST P2-6
9/22/90



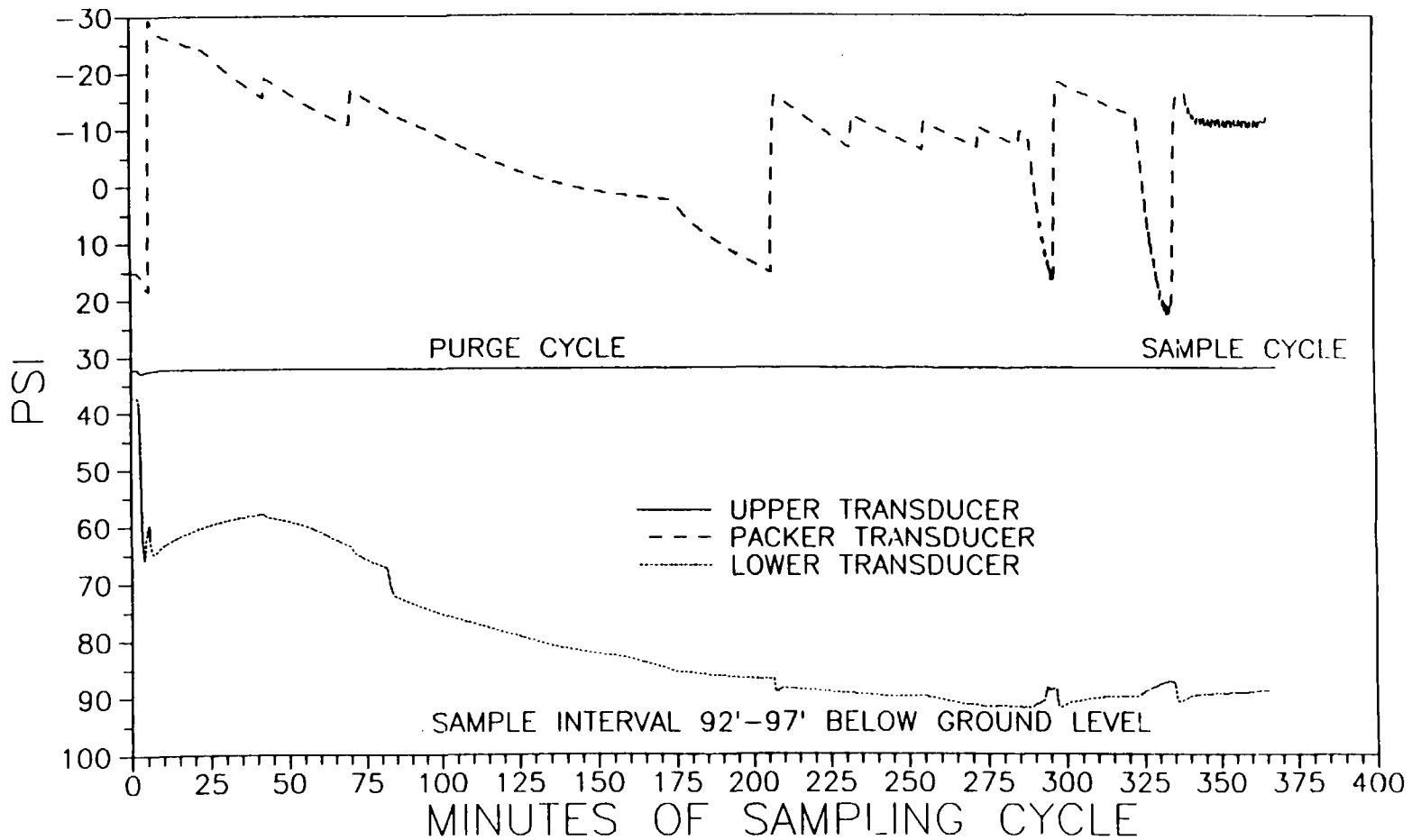
1936: P2-6

RUTGERS-NEASE SALEM SITE
PACKER TEST P3-1
9/25/90



1936: P3-1

RUTGERS-NEASE SALEM SITE
PACKER TEST P3-2
9/24/90



1936: P3-2

TRANSDUCER DATA - ZONE P1-1

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 277
Start Time: 14:15:05
Start Date: 09/20
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
14:15:05	+0.3052	+16.849	-13.186
14:15:35	+5.9218	+16.605	-11.233
14:16:05	+9.6459	+16.239	-9.2185
14:16:35	+13.797	+16.361	-9.9511
14:17:05	+15.140	+16.117	-12.515
14:17:35	+16.300	+15.750	-15.018
14:18:05	+17.094	+15.384	-17.704
14:18:35	+18.131	+14.957	-22.832
14:19:05	+18.376	+14.713	-25.885
14:19:35	+18.986	+14.407	-29.304
14:20:05	+18.498	+13.614	-31.562
14:20:35	+18.315	+13.431	-33.211
14:21:05	+16.605	+13.125	-34.004
14:21:35	+15.018	+13.186	-34.065
14:22:05	+15.384	+13.003	-34.371
14:22:35	+15.628	+12.820	-34.554
14:23:05	+14.529	+12.698	-34.432
14:23:35	+15.934	+12.637	-34.004
14:24:05	+17.094	+12.637	-34.065
14:24:35	+17.521	+12.454	-34.310
14:25:05	+18.131	+11.904	-34.188
14:25:35	+18.192	+11.965	-33.577
14:26:05	+18.315	+11.965	-32.661
14:26:35	+18.742	+11.904	-31.379
14:27:05	+19.169	+11.904	-29.914
14:27:35	+19.597	+11.843	-28.632
14:28:05	+19.902	+11.782	-27.533
14:28:35	+20.146	+11.843	-26.556
14:29:05	+20.390	+11.721	-25.824
14:29:35	+20.573	+11.721	-24.664
14:30:05	+20.818	+11.782	-23.504
14:30:35	+21.001	+11.782	-22.588
14:31:05	+21.184	+11.721	-21.672
14:31:35	+20.818	+11.660	-20.268
14:32:05	+21.123	+11.721	-19.108
14:32:35	+20.818	+11.660	-18.315
14:33:05	+21.001	+11.660	-17.582
14:33:35	+21.245	+11.599	-16.910
14:34:05	+21.428	+11.538	-15.995
14:34:35	+21.611	+11.538	-14.835
14:35:05	+21.062	+11.477	-14.713
14:35:35	+21.245	+11.477	-14.774
14:36:05	+21.489	+11.355	-14.468
14:36:35	+21.672	+11.355	-15.201
14:37:05	+21.794	+11.355	-15.506
14:37:35	+21.978	+11.294	-15.811
14:38:05	+22.161	+11.294	-15.995
14:38:35	+22.100	+11.294	-16.056
14:39:05	+22.100	+11.233	-15.995
14:39:35	+22.161	+11.233	-15.873
14:40:05	+22.222	+11.111	-15.628
14:40:35	+22.283	+11.111	-15.201
14:41:05	+22.283	+11.050	-14.652
14:41:35	+22.344	+11.050	-14.041
14:42:05	+22.344	+10.989	-13.247
14:42:35	+22.405	+10.989	-12.393
14:43:05	+22.588	+10.866	-11.538
14:43:35	+22.527	+10.866	-10.622
14:44:05	+22.710	+10.866	-9.8290
14:44:35	+23.078	+10.805	-8.9133
14:45:05	+23.321	+10.744	-8.0586
14:45:35	+23.382	+10.744	-7.3260
14:46:05	+23.321	+10.805	-6.5323
14:46:35	+23.565	+11.294	-5.6776
14:47:05	+23.687	+11.355	-4.9450
14:47:35	+23.748	+11.416	-4.2124
14:48:05	+23.931	+11.416	-3.4188
14:48:35	+23.931	+11.477	-2.6251
14:49:05	+23.992	+11.599	-1.7704
14:49:35	+24.114	+11.599	-0.9157
14:50:05	+24.175	+11.782	-0.1831
14:50:35	+24.053	+11.599	+0.3052
14:51:05	+24.175	+11.782	+0.8547
14:51:35	+24.236	+11.782	+1.4041
14:52:05	+24.175	+11.782	+1.8925
14:52:35	+22.710	+11.782	+2.3199
14:53:05	+22.649	+11.782	+2.6862
14:53:35	+23.870	+11.904	+2.9914
14:54:05	+23.015	+11.965	+3.3577
14:54:35	+22.466	+12.026	+3.2967
14:55:05	+22.100	+11.965	+3.2967
14:55:35	+21.367	+11.965	+3.5409
14:56:05	+22.832	+12.087	+3.8461
14:56:35	+21.672	+12.026	+4.1514
14:57:05	+21.123	+11.965	+4.3956
14:57:35	+22.283	+12.087	+4.6398
14:58:05	+22.527	+12.210	+4.8229
14:58:35	+21.367	+12.087	+5.0061
14:59:05	+22.039	+12.087	+5.0061
14:59:35	+21.611	+12.210	+5.3113
15:00:05	+23.015	+12.148	+5.1892
15:00:35	+21.428	+12.087	+5.4334
15:01:05	+21.489	+12.087	+5.6166
15:01:35	+21.489	+12.210	+5.9218
15:02:05	+21.306	+12.148	+5.9829
15:02:35	+21.367	+12.148	+5.7387
15:03:05	+21.428	+12.087	+5.9829
15:03:35	+21.306	+12.148	+6.3492
15:04:05	+21.306	+12.210	+6.4713
15:04:35	+21.916	+12.148	+6.5934
15:05:05	+22.710	+12.148	+6.8376
15:05:35	+22.588	+12.210	+7.0818
15:06:05	+22.405	+12.210	+7.2039
15:06:35	+22.466	+12.148	+7.3870
15:07:05	+22.161	+12.210	+7.5702
15:07:35	+22.222	+12.271	+7.6923
15:08:05	+22.161	+12.210	+7.7533
15:08:35	+22.100	+12.210	+7.8144
15:09:05	+21.978	+12.210	+7.8754
15:09:35	+22.954	+12.210	+8.0586
15:10:05	+25.641	+12.210	+8.1807
15:10:35	+25.213	+12.271	+8.3028
15:11:05	+28.876	+12.210	+8.4249
15:11:35	+29.792	+12.210	+8.3638
15:12:05	+29.059	+12.271	+8.6080
15:12:35	+29.731	+12.210	+8.7301
15:13:05	+27.045	+12.271	+8.7301
15:13:35	+25.885	+12.332	+8.7912
15:14:05	+23.015	+12.210	+8.9133
15:14:35	+22.954	+12.210	+8.9743
15:15:05	+22.466	+12.271	+9.0354
15:15:35	+22.527	+12.210	+9.0964
15:16:05	+22.344	+12.271	+9.0964
15:16:35	+22.344	+12.271	+9.1575
15:17:05	+22.710	+12.210	+9.2185
15:17:35	+23.626	+12.271	+9.2796
15:18:05	+22.100	+12.332	+9.4017
15:18:35	+22.039	+12.332	+9.4627
15:19:05	+21.794	+12.271	+9.5238
15:19:35	+21.550	+12.271	+9.6459
15:20:05	+21.672	+12.271	+9.7069
15:20:35	+21.489	+12.271	+9.7680
15:21:05	+22.466	+12.271	+9.8290
15:21:35	+21.245	+12.210	+9.9511
15:22:05	+21.306	+12.210	+10.012
15:22:35	+21.367	+12.210	+10.012
15:23:05	+21.611	+12.210	+10.012
15:23:35	+21.489	+12.271	+10.073
15:24:05	+21.550	+12.271	+10.073
15:24:35	+21.733	+12.271	+10.073
15:25:05	+21.916	+12.332	+10.134
15:25:35	+22.039	+12.332	+10.134
15:26:05	+23.809	+12.210	+10.134
15:26:35	+26.739	+12.271	+10.195
15:27:05	+24.297	+12.332	+10.195
15:27:35	+23.137	+12.271	+10.256
15:28:05	+22.954	+12.271	+10.256
15:28:35	+21.794	+12.271	+10.256
15:29:05	+20.695	+12.332	+10.317
15:29:35	+21.062	+12.271	+10.317
15:30:05	+20.512	+12.393	+10.378
15:30:35	+21.123	+12.271	+10.378
15:31:05	+22.832	+12.271	+10.378
15:31:35	+25.457	+12.271	+10.439
15:32:05	+23.931	+12.210	+10.439
15:32:35	+23.748	+12.271	+10.561
15:33:05	+22.466	+12.271	+10.561
15:33:35	+20.573	+12.271	+10.561
15:34:05	+20.268	+12.332	+10.561
15:34:35	+20.573	+12.332	+10.500
15:35:05	+20.818	+12.393	+10.561
15:35:35	+21.245	+12.271	+10.561
15:36:05	+24.236	+12.271	+10.012
15:36:35	+23.870	+12.393	+10.073
15:37:05	+21.978	+12.332	+10.134
15:37:35	+21.245	+12.271	+10.195
15:38:05	+24.114	+12.332	+10.256
15:38:35	+24.297	+12.332	+10.378
15:39:05	+23.992	+12.210	+10.378
15:39:35	+23.992	+12.271	+10.439
15:40:05	+21.978	+12.332	+10.439
15:40:35	+23.687	+12.332	+10.561
15:41:05	+23.565	+12.393	+10.622
15:41:35	+22.405	+12.332	+10.622
15:42:05	+21.611	+12.454	+10.744
15:42:35	+24.725	+12.332	+10.989
15:43:05	+24.603	+12.393	+11.050
15:43:35	+22.893	+12.210	+10.989
15:44:05	+24.908	+12.332	+10.927
15:44:35	+24.847	+12.393	+10.866
15:45:05	+21.672	+12.271	+10.805
15:45:35	+20.695	+12.454	+10.805
15:46:05	+21.550	+12.393	+10.744
15:46:35	+24.908	+12.271	+10.744
15:47:05	+24.297	+12.271	+10.744
15:47:35	+21.245	+12.271	+10.744
15:48:05	+20.879	+12.210	+10.744
15:48:35	+20.940	+12.332	+10.683
15:49:05	+21.001	+12.393	+10.683
15:49:35	+21.001	+12.393	+10.622
15:50:05	+21.550	+12.332	+10.561
15:50:35	+24.603	+12.271	+10.500
15:51:05	+23.931	+12.271	+10.439
15:51:35	+24.053	+12.332	+10.378
15:52:05	+23.321	+12.393	+10.317
15:52:35	+21.184	+12.332	+10.317
15:53:05	+21.245	+12.393	+10.378
15:53:35	+21.367	+12.271	+10.195
15:54:05	+24.175	+12.393	+10.073
15:54:35	+21.489	+12.393	+9.9511
15:55:05	+21.245	+12.271	+9.8901
15:55:35	+21.428	+12.332	+9.8290
15:56:05	+23.992	+12.332	+9.7069
15:56:35	+21.733	+12.210	+9.7069
15:57:05	+21.306	+12.332	+9.5848
15:57:35	+21.489	+12.393	+9.5238
15:58:05	+21.672	+12.393	+9.4627
15:58:35	+24.297	+12.393	+9.4627
15:59:05	+23.199	+12.332	+9.4017
15:59:35	+22.893	+12.148	+9.3406
16:00:05	+21.550	+12.271	+9.4017
16:00:35	+21.672	+12.393	+9.3406
16:01:05	+21.550	+12.393	+9.2796
16:01:35	+21.489	+12.393	+9.2185
16:02:05	+21.428	+12.271	+9.0354
16:02:35	+21.367	+12.332	+8.9133
16:03:05	+21.367	+12.332	+8.7301
16:03:35	+21.367	+12.271	+8.5470
16:04:05	+21.672	+12.332	+8.3028
16:04:35	+21.672	+12.332	+8.1807
16:05:05	+22.039	+12.332	+8.1196
16:05:35	+24.114	+12.393	+8.0586
16:06:05	+23.931	+12.332	+7.9365
16:06:35	+23.382	+12.515	+7.8754
16:07:05	+21.733	+12.393	+7.7533
16:07:35	+21.489	+12.393	+7.6923
16:08:05	+23.504	+12.332	+7.6312
16:08:35	+24.725	+12.393	+7.5091
16:09:05	+23.321	+12.393	+7.4481
16:09:35	+22.222	+12.332	+7.3870
16:10:05	+21.489	+12.393	+7.3870
16:10:35	+22.344	+12.393	+7.4481
16:11:05	+23.992	+12.393	+7.4481
16:11:35	+21.672	+12.393	+7.4481
16:12:05	+22.039	+12.393	+7.5091
16:12:35	+23.687	+12.393	+7.5091
16:13:05	+21.001	+12.454	+7.4481
16:13:35	+20.940	+12.332	+7.4481
16:14:05	+21.001	+12.332	+7.4481
16:14:35	+20.879	+12.454	+7.4481
16:15:05	+20.818	+12.332	+7.4481
16:15:35	+21.550	+12.271	+7.3260
16:16:05	+22.283	+12.332	+7.3870
16:16:35	+22.344	+12.332	+7.3260
16:17:05	+20.879	+12.454	+7.2649
16:17:35	+20.879	+12.393	+7.1428
16:18:05	+21.184	+12.332	+7.0818
16:18:35	+23.137	+12.271	+7.0818
16:19:05	+22.283	+12.271	+7.0207
16:19:35	+20.757	+12.332	+7.0207
16:20:05	+23.015	+12.210	+6.9597
16:20:35	+20.940	+12.393	+6.8986
16:21:05	+22.954	+12.393	+6.8986
16:21:35	+20.940	+12.332	+6.8376
16:22:05	+21.062	+12.393	+6.7765
16:22:35	+24.175	+12.393	+6.7765
16:23:05	+30.036	+12.332	+6.7155
16:23:35	+28.998	+12.271	+6.6544
16:24:05	+25.824	+12.271	+6.5934
16:24:35	+24.358	+12.271	+6.7765
16:25:05	+29.487	+12.271	+6.7155
16:25:35	+30.280	+12.332	+6.5323
16:26:05	+28.337	+12.271	+6.4713
16:26:35	+28.632	+12.271	+6.4102
16:27:05	+30.280	+12.332	+6.4102
16:27:35	+25.641	+12.393	+6.4102
16:28:05	+24.420	+12.332	+6.2271
16:28:35	+24.114	+12.271	+5.7387
16:29:05	+25.091	+12.332	+5.4945
16:29:35	+23.626	+12.332	+5.3724
16:30:05	+27.594	+12.332	+5.1282
16:30:35	+23.443	+12.454	+4.9450
16:31:05	+24.297	+12.332	+4.7619
16:31:35	+23.260	+12.454	+5.5555
16:32:05	+23.199	+12.271	+5.6166
16:32:35	+26.923	+12.271	+5.4334
16:33:05	+26.373	+12.393	+5.1892

TRANSDUCER DATA - ZONE P1-2

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 534
Start Time: 10:11:31
Start Date: 09/19
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:01:00

Time	Chnl 1	Chnl 2	Chnl 3
10:11:31	+610.43	+610.43	+17.399
10:12:31	+39.316	+22.466	-117.21
10:13:31	+29.914	+34.981	+9.1575
10:14:31	+32.295	+34.615	+10.989
10:15:31	+32.722	+34.493	+9.8901
10:16:31	+33.577	+34.676	+10.805
10:17:31	+34.371	+34.493	+12.454
10:18:31	+33.638	+34.737	+13.736
10:19:31	+34.310	+35.347	+13.980
10:20:31	+36.691	+34.371	+15.811
10:21:31	+35.714	+34.432	+17.032
10:22:31	+35.042	+34.371	+17.338
10:23:31	+35.286	-13.064	+17.338
10:24:31	+35.653	-6.1660	+16.788
10:25:31	+36.141	+28.510	+15.811
10:26:31	+36.935	+34.432	+14.529
10:27:31	+37.240	+34.676	+13.553
10:28:31	+37.606	+35.042	+12.759
10:29:31	+37.851	-12.698	+13.675
10:30:31	+37.973	-12.681	+15.140
10:31:31	+38.217	-12.515	+14.957
10:32:31	+38.400	-11.965	+16.910
10:33:31	+38.644	-11.233	+18.925
10:34:31	+38.766	-10.073	+21.184
10:35:31	+38.888	-8.2417	+23.687
10:36:31	+38.888	-4.5177	+25.702
10:37:31	+38.949	+6.7765	+26.984
10:38:31	+39.316	+30.341	+27.655
10:39:31	+39.560	+34.554	+28.205
10:40:31	+39.743	-12.759	+28.632
10:41:31	+40.048	-12.820	+29.120
10:42:31	+40.293	-12.637	+29.670
10:43:31	+40.659	-12.393	+30.219
10:44:31	+40.720	-12.210	+30.769
10:45:31	+40.842	-11.843	+31.807
10:46:31	+40.903	-11.599	+33.028
10:47:31	+40.903	-11.172	+33.821
10:48:31	+40.964	-10.744	+34.493
10:49:31	+41.025	-10.378	+34.798
10:50:31	+41.025	-9.8901	+35.103
10:51:31	+41.208	-9.0354	+35.470
10:52:31	+41.208	-8.1807	+35.592
10:53:31	+41.208	-7.0207	+35.653
10:54:31	+41.208	-5.1282	+35.653
10:55:31	+41.147	-2.4420	+35.531
10:56:31	+41.147	+2.3199	+35.409
10:57:31	+41.086	+11.599	+35.775
10:58:31	+41.147	+0.1221	+35.470
10:59:31	+41.086	-12.393	+35.470
11:00:31	+41.147	-12.454	+35.409
11:01:31	+41.086	-12.332	+35.653
11:02:31	+41.147	-12.271	+35.347
11:03:31	+41.208	-12.148	+35.470
11:04:31	+41.269	-12.087	+35.347
11:05:31	+41.330	-11.965	+35.225
11:06:31	+41.330	-11.843	+35.347
11:07:31	+41.391	-11.721	+35.225
11:08:31	+41.391	-11.538	+35.286
11:09:31	+41.514	-11.294	+35.286
11:10:31	+41.452	-11.111	+35.225
11:11:31	+41.514	-10.866	+35.286
11:12:31	+41.514	-10.622	+35.286
11:13:31	+41.575	-10.378	+35.225
11:14:31	+41.575	-10.073	+35.225
11:15:31	+41.636	-9.5238	+35.286
11:16:31	+43.833	-9.2796	+35.286
11:17:31	+43.589	-8.7912	+35.286
11:18:31	+43.284	-8.1807	+35.286
11:19:31	+44.383	-7.5091	+35.225
11:20:31	+43.833	-6.6544	+35.225
11:21:31	+43.101	-5.5555	+35.164
11:22:31	+41.575	-4.1514	+35.103
11:23:31	+41.697	-2.1367	+35.225
11:24:31	+41.758	+0.4273	+35.225
11:25:31	+42.368	+4.3956	+35.103
11:26:31	+42.307	+10.500	+35.103
11:27:31	+45.115	+21.184	+36.019
11:28:31	+43.894	+33.272	+35.775
11:29:31	+44.627	-1.2820	+35.958
11:30:31	+45.360	-11.843	+35.897
11:31:31	+44.627	-12.210	+34.920
11:32:31	+43.345	-12.210	+34.798
11:33:31	+41.391	-12.087	+35.531
11:34:31	+41.575	-11.904	+35.164
11:35:31	+41.636	-11.782	+35.164
11:36:31	+41.880	-11.782	+34.920
11:37:31	+41.941	-11.721	+34.859
11:38:31	+42.063	-11.660	+34.798
11:39:31	+42.124	-11.538	+34.737
11:40:31	+42.429	-11.477	+34.798
11:41:31	+42.551	-11.416	+34.676
11:42:31	+42.551	-11.294	+34.737
11:43:31	+42.612	-11.233	+34.554
11:44:31	+42.551	-11.111	+34.676
11:45:31	+42.551	-11.050	+34.554
11:46:31	+42.551	-10.927	+34.493
11:47:31	+42.490	-10.805	+34.371
11:48:31	+42.429	-10.744	+34.371
11:49:31	+42.368	-10.622	+34.371
11:50:31	+42.551	-10.500	+34.249
11:51:31	+42.246	-10.378	+34.188
11:52:31	+42.307	-10.256	+34.188
11:53:31	+42.246	-10.134	+34.126
11:54:31	+42.185	-9.9511	+34.065
11:55:31	+42.368	-9.7680	+34.126
11:56:31	+42.368	-9.6459	+33.882
11:57:31	+42.246	-9.4627	+34.065
11:58:31	+42.124	-9.3406	+33.943
11:59:31	+46.764	-9.0964	+33.943
12:00:31	+43.528	-8.7912	+33.882
12:01:31	+42.124	-8.6080	+33.821
12:02:31	+43.162	-8.3638	+33.882
12:03:31	+43.894	-7.9975	+33.943
12:04:31	+43.711	-7.6923	+33.882
12:05:31	+43.711	-7.3870	+33.882
12:06:31	+44.566	-7.0207	+33.882
12:07:31	+45.115	-6.5323	+33.943
12:08:31	+41.025	-6.1660	+34.004
12:09:31	+44.322	-5.8168	+33.882
12:10:31	+44.078	-5.0671	+33.943
12:11:31	+44.261	-4.2735	+34.004
12:12:31	+45.360	-3.7240	+33.943
12:13:31	+44.810	-2.8083	+34.065
12:14:31	+44.627	-1.8925	+34.188
12:15:31	+44.810	-0.7936	+34.065
12:16:31	+45.543	+0.5494	+34.126
12:17:31	+44.810	+2.0757	+34.065
12:18:31	+45.177	+4.0293	+34.126
12:19:31	+45.543	+6.4102	+34.126
12:20:31	+45.421	+9.8901	+34.065
12:21:31	+45.604	+14.224	+34.188
12:22:31	+46.520	+20.024	+34.065
12:23:31	+46.275	+28.083	+34.126
12:24:31	+45.726	+33.821	+34.126
12:25:31	+45.970	-5.1892	+34.126
12:26:31	+46.092	-4.7008	+34.188
12:27:31	+46.031	-4.0293	+34.188
12:28:31	+46.398	-3.4188	+34.188
12:29:31	+45.543	-2.7472	+34.249
12:30:31	+46.031	-1.8925	+34.249
12:31:31	+45.360	-1.0378	+34.249
12:32:31	+45.360	-0.0000	+34.249
12:33:31	+44.383	+1.2820	+34.249
12:34:31	+44.627	+2.5030	+34.310
12:35:31	+46.581	+4.0903	+34.310
12:36:31	+46.214	+5.9829	+34.249
12:37:31	+46.520	+8.2417	+34.249
12:38:31	+46.825	+11.111	+34.249
12:39:31	+43.284	+14.468	+34.310
12:40:31	+43.711	+18.864	+34.310
12:41:31	+44.322	+24.297	+34.249
12:42:31	+45.909	+30.402	+34.310
12:43:31	+44.810	+33.821	+34.310
12:44:31	+45.238	+34.188	+34.310
12:45:31	+46.642	+34.432	+34.310
12:46:31	+46.459	+34.371	+34.310
12:47:31	+47.435	+34.371	+34.249
12:48:31	+45.482	+34.554	+34.310
12:49:31	+47.374	+34.615	+34.249
12:50:31	+44.139	+34.615	+34.310
12:51:31	+42.185	+34.676	+34.310
12:52:31	+41.697	+34.737	+34.310
12:53:31	+41.514	+34.737	+34.310
12:54:31	+42.368	+34.737	+34.310
12:55:31	+41.697	+34.676	+34.310
12:56:31	+42.490	+34.798	+34.310
12:57:31	+42.246	+34.798	+34.249
12:58:31	+42.857	+34.798	+34.310
12:59:31	+44.200	+34.798	+34.249
13:00:31	+42.918	+34.859	+34.249
13:01:31	+43.528	+34.920	+34.249
13:02:31	+43.345	+34.859	+34.249
13:03:31	+42.124	+34.981	+34.249
13:04:31	+42.918	+34.920	+34.310
13:05:31	+42.307	+34.981	+34.310
13:06:31	+42.673	+34.981	+34.249
13:07:31	+42.857	+34.981	+34.249
13:08:31	+43.467	+34.920	+34.249
13:09:31	+43.101	+35.042	+34.249
13:10:31	+40.537	+35.042	+34.188
13:11:31	+40.720	+19.413	+34.188
13:12:31	+40.781	-8.5470	+30.830
13:13:31	+41.391	-10.989	+33.272
13:14:31	+41.147	-10.866	+33.821
13:15:31	+41.147	-10.744	+34.126
13:16:31	+40.415	-10.561	+34.065
13:17:31	+40.231	-10.439	+34.188
13:18:31	+40.048	-10.317	+34.126
13:19:31	+39.987	-10.195	+34.249
13:20:31	+39.926	-10.012	+34.310
13:21:31	+39.987	-9.8901	+34.371
13:22:31	+40.048	-9.7680	+34.432
13:23:31	+40.109	-9.6459	+34.493
13:24:31	+40.170	-9.4627	+34.554
13:25:31	+40.293	-9.2796	+34.615
13:26:31	+40.231	-9.1575	+34.615
13:27:31	+40.354	-8.9743	+34.676
13:28:31	+40.354	-8.7912	+34.676
13:29:31	+40.293	-8.6080	+34.737
13:30:31	+40.170	-8.4249	+34.737
13:31:31	+40.170	-8.2417	+34.737
13:32:31	+39.194	-7.9975	+34.615
13:33:31	+38.888	-7.8144	+34.371
13:34:31	+39.194	-7.5702	+34.126
13:35:31	+38.827	-7.3260	+33.882
13:36:31	+39.255	-7.0207	+34.188
13:37:31	+40.354	5.7155	+34.554
13:38:31	+40.537	-6.4102	+34.615
13:39:31	+40.842	-6.1050	+34.676
13:40:31	+41.086	-5.7387	+34.737
13:41:31	+41.269	-5.4334	+34.737
13:42:31	+41.391	-4.8229	+34.798
13:43:31	+41.514	-4.4566	+34.798
13:44:31	+41.575	-3.9682	+34.798
13:45:31	+41.880	-3.2967	+34.859
13:46:31	+42.002	-2.7472	+34.859
13:47:31	+41.941	-2.0146	+34.859
13:48:31	+41.880	-1.2820	+34.859
13:49:31	+42.063	-0.4884	+34.798
13:50:31	+42.246	+0.4884	+34.798
13:51:31	+42.002	+1.5873	+34.859
13:52:31	+42.124	+2.8693	+34.859
13:53:31	+42.124	+4.3345	+34.859
13:54:31	+42.307	+5.9218	+34.920
13:55:31	+42.429	+7.8754	+34.859
13:56:31	+42.429	+10.378	+34.859
13:57:31	+42.429	+13.553	+34.920
13:58:31	+43.956	+17.338	+34.859
13:59:31	+43.956	+22.771	+34.859
14:00:31	+43.711	+30.158	+34.920
14:01:31	+44.078	+34.249	+34.981
14:02:31	+43.284	+34.615	+34.920
14:03:31	+42.857	+34.859	+34.920
14:04:31	+42.918	+34.798	+34.920
14:05:31	+50.244	+34.798	+34.920
14:06:31	+42.918	+10.256	+34.859
14:07:31	+43.467	-6.2271	+34.859
14:08:31	+42.490	-6.0439	+34.859
14:09:31	+42.185	-5.8608	+34.859
14:10:31	+42.429	-5.6776	+34.798
14:11:31	+42.368	-5.4334	+34.859
14:12:31	+42.368	-5.2503	+34.859
14:13:31	+42.246	-5.0061	+34.859
14:14:31	+42.429	-4.7619	+34.798
14:15:31	+42.490	-4.4566	+34.859
14:16:31	+42.368	-4.2735	+34.798
14:17:31	+42.429	-4.0293	+34.737
14:18:31	+42.429	-3.7851	+34.737
14:19:31	+42.429	-3.4798	+34.737
14:20:31	+42.429	-3.0525	+34.737
14:21:31	+42.429	-2.6862	+34.737
14:22:31	+42.429	-2.3809	+34.737
14:23:31	+42.429	-2.0757	+34.676
14:24:31	+42.429	-1.4652	+34.615
14:25:31	+41.636	-0.9768	+34.249
14:26:31	+41.575	-0.3663	+34.310
14:27:31	+42.490	+0.1831	+34.493
14:28:31	+42.490	+0.7326	+34.615
14:29:31	+42.857	+1.5262	+34.615
14:30:31	+46.336	+2.3809	+34.615
14:31:31	+47.313	+3.3577	+34.615
14:32:31	+47.496	+4.3345	+34.615
14:33:31	+50.671	+5.5555	+34.554
14:34:31	+49.328	+6.8986	+34.554
14:35:31	+52.625	+8.4859	+34.554
14:36:31	+51.404	+10.195	+34.554
14:37:31	+52.991	+12.210	+34.554
14:38:31	+53.113	+14.652	+34.554
14:39:31	+50.183	+17.399	+34.554
14:40:31	+50.671	+20.940	+34.554
14:41:31	+51.221	+25.274	+34.493
14:42:31	+50.610	+30.525	+34.493
14:43:31	+49.816	+33.943	+34.493
14:44:31	+52.014	+34.493	+34.493
14:45:31	+50.366	+3.1135	+34.493
14:46:31	+52.869	-6.2271	+34.493
14:47:31	+50.244	-5.9218	+34.554
14:48:31	+53.601	-5.6166	+34.615
14:49:31	+52.991	-5.3724	+34.554
14:50:31	+44.444	-5.1282	+34.493
14:51:31	+53.357	-4.8229	+34.493
14:52:31	+53.357	-4.5177	+34.432
14:53:31	+52.197	-4.1514	+34.432
14:54:31	+53.846	-3.7851	+34.371
14:55:31	+43.711	-3.4798	+34.004
14:56:31	+43.467	-3.0525	+33.699
14:57:31	+42.735	-2.6251	+33.516
14:58:31	+42.796	-2.1978	+33.211
14:59:31	+42.918	-1.7094	+33.028
15:00:31	+42.796	-1.2210	+32.783
15:01:31	+44.749	-0.4884	+33.516
15:02:31	+49.084	+0.1221	+33.943
15:03:31	+49.511	+0.9768	+34.126
15:04:31	+48.962	+1.7704	+34.188
15:05:31	+48.656	+2.4420	+34.126
15:06:31	+48.351	+3.4798	+34.065
15:07:31	+48.473	+4.6398	+34.065
15:08:31	+48.046	+5.8608	+34.126
15:09:31	+48.717	+7.0207	+34.065
15:10:31	+44.444	+8.5470	+34.065
15:11:31	+44.322	+10.195	+34.065
15:12:31	+48.778	+12.393	+34.065
15:13:31	+47.802	+14.590	+34.065
15:14:31	+48.901	+17.338	+34.065
15:15:31	+48.046	+20.634	+34.065
15:16:31	+50.183	+24.481	+34.065
15:17:31	+46.520	+28.937	+34.065
15:18:31	+46.764	+32.844	+34.065
15:19:31	+45.848	+34.126	+34.126
15:20:31	+47.863	+34.493	+34.126
15:21:31	+50.732	+15.262	+34.126
15:22:31	+48.107	-4.6398	+34.126
15:23:31	+49.328	-4.2124	+34.126
15:24:31	+46.703	-3.8461	+34.126
15:25:31	+50.671	-3.4188	+34.126
15:26:31	+50.427	-2.9914	+34.126
15:27:31	+48.473	-2.5641	+34.126
15:28:31	+47.435	-1.9536	+34.188
15:29:31	+47.496	-1.4041	+34.188

15:30:31	+45.848	-0.7936	+34.188
15:31:31	+45.054	-0.2442	+34.126
15:32:31	+45.299	+0.5494	+34.126
15:33:31	+46.092	+1.4652	+34.126
15:34:31	+44.932	+2.2588	+33.882
15:35:31	+44.200	+3.2967	+33.638
15:36:31	+45.238	+4.4566	+34.065
15:37:31	+45.787	+5.7387	+34.065
15:38:31	+45.543	+7.2039	+34.126
15:39:31	+45.604	+8.9743	+34.126
15:40:31	+46.520	+10.927	+34.065
15:41:31	+46.581	+13.186	+34.065
15:42:31	+47.008	+15.995	+34.004
15:43:31	+47.374	+19.230	+34.065
15:44:31	+46.520	+23.443	+34.004
15:45:31	+46.886	+28.388	+34.004
15:46:31	+47.435	+32.844	+34.004
15:47:31	+47.008	+34.126	+34.004
15:48:31	+47.680	+34.432	+34.004
15:49:31	+48.412	+34.615	+34.065
15:50:31	+47.741	+9.0354	+34.126
15:51:31	+48.290	-5.3113	+34.126
15:52:31	+48.412	-5.0061	+34.065
15:53:31	+48.229	-4.8229	+34.126
15:54:31	+47.619	-4.5787	+34.126
15:55:31	+46.398	-4.3956	+34.126
15:56:31	+47.252	-4.1514	+34.126
15:57:31	+46.336	-3.9072	+34.126
15:58:31	+47.985	-3.6630	+34.126
15:59:31	+48.351	-3.4798	+34.188
16:00:31	+48.107	-3.1746	+34.188
16:01:31	+48.901	-2.8693	+34.188
16:02:31	+48.595	-2.6251	+34.188
16:03:31	+48.473	-2.3199	+34.188
16:04:31	+49.145	-2.0146	+34.188
16:05:31	+47.191	-1.8483	+34.188
16:06:31	+47.680	-1.3431	+34.188
16:07:31	+47.313	-0.9788	+34.188
16:08:31	+44.139	-0.5494	+34.188
16:09:31	+44.200	-0.1831	+34.188
16:10:31	+44.261	+0.3052	+34.249
16:11:31	+44.383	+0.7326	+34.249
16:12:31	+44.505	+1.2210	+34.188
16:13:31	+44.627	+1.7094	+34.249
16:14:31	+44.566	+2.2588	+34.188
16:15:31	+44.566	+2.6862	+34.249
16:16:31	+44.566	+3.4798	+34.249
16:17:31	+44.993	+4.1514	+34.249
16:18:31	+44.688	+4.8840	+34.249
16:19:31	+45.482	+5.6166	+34.249
16:20:31	+45.482	+6.5934	+34.249
16:21:31	+45.543	+7.5091	+34.249
16:22:31	+45.543	+8.4859	+34.249
16:23:31	+45.604	+9.7680	+34.249
16:24:31	+45.726	+11.050	+34.249
16:25:31	+45.665	+12.332	+34.249
16:26:31	+45.665	+13.980	+34.249
16:27:31	+45.787	+15.628	+34.004
16:28:31	+45.543	+17.521	+33.760
16:29:31	+44.627	+19.780	+33.577
16:30:31	+44.261	+22.527	+33.394
16:31:31	+44.017	+25.763	+33.150
16:32:31	+43.956	+29.670	+32.967
16:33:31	+43.894	+33.028	+32.783
16:34:31	+44.810	+34.310	+33.150
16:35:31	+45.177	+34.615	+33.760
16:36:31	+45.177	+34.676	+33.943
16:37:31	+45.115	+34.249	+34.004
16:38:31	+45.115	+34.737	+34.065
16:39:31	+45.054	+34.554	+34.065
16:40:31	+44.993	+34.615	+34.065
16:41:31	+44.993	+34.737	+34.065
16:42:31	+45.054	+34.798	+34.126
16:43:31	+45.238	+34.798	+34.126
16:44:31	+45.177	+34.737	+34.188
16:45:31	+45.177	+34.920	+34.188
16:46:31	+45.238	+34.920	+34.188
16:47:31	+45.177	+34.981	+34.188
16:48:31	+45.177	+34.920	+34.249
16:49:31	+45.115	+35.164	+34.249
16:50:31	+45.238	+35.103	+34.249
16:51:31	+45.238	+35.225	+34.249
16:52:31	+45.299	+35.164	+34.249
16:53:31	+45.238	+35.103	+34.249
16:54:31	+45.299	+35.225	+34.249
16:55:31	+45.360	+35.225	+34.310
16:56:31	+45.218	+35.042	+34.249
16:57:31	+44.871	+34.981	+34.310
16:58:31	+44.810	+34.798	+34.310
16:59:31	+44.749	+34.981	+34.310
17:00:31	+44.688	+34.859	+34.310
17:01:31	+44.688	+34.676	+34.310
17:02:31	+44.749	+34.554	+34.310
17:03:31	+44.688	+35.103	+34.310
17:04:31	+44.688	+34.981	+34.371
17:05:31	+44.688	+34.981	+34.310
17:06:31	+44.688	+34.920	+34.310
17:07:31	+44.688	+34.859	+34.249
17:08:31	+44.688	+34.920	+34.188
17:09:31	+44.627	+34.920	+34.188
17:10:31	+44.566	+34.798	+34.188
17:11:31	+44.627	+34.676	+34.126
17:12:31	+44.566	+35.042	+34.126
17:13:31	+44.566	+35.042	+34.065
17:14:31	+44.505	+35.103	+34.065
17:15:31	+44.566	+35.103	+34.065
17:16:31	+44.505	+34.981	+34.004
17:17:31	+44.505	+34.981	+34.004
17:18:31	+44.444	+34.676	+33.943
17:19:31	+44.444	+35.042	+33.943
17:20:31	+44.383	+35.164	+34.004
17:21:31	+44.322	+35.103	+34.004
17:22:31	+44.261	+35.164	+34.004
17:23:31	+44.322	+35.164	+34.065
17:24:31	+44.200	+34.859	+34.065
17:25:31	+44.139	+34.615	+34.065
17:26:31	+44.078	+35.164	+34.065
17:27:31	+43.894	+35.164	+34.126
17:28:31	+43.894	+35.164	+34.126
17:29:31	+43.956	+35.042	+34.126
17:30:31	+43.894	+35.042	+34.126
17:31:31	+43.894	+34.920	+34.188
17:32:31	+43.772	+34.493	+34.188
17:33:31	+43.772	+35.103	+34.188
17:34:31	+43.772	+35.164	+34.188
17:35:31	+43.833	+35.103	+34.249
17:36:31	+43.772	+35.103	+34.310
17:37:31	+43.772	+34.981	+34.310
17:38:31	+43.772	+34.798	+34.310
17:39:31	+43.833	+34.432	+34.310
17:40:31	+43.833	+35.164	+34.371
17:41:31	+43.833	+35.103	+34.371
17:42:31	+43.833	+35.042	+34.371
17:43:31	+43.772	+35.164	+34.371
17:44:31	+43.772	+34.981	+34.371
17:45:31	+43.772	+34.859	+34.371
17:46:31	+43.711	+34.493	+34.371
17:47:31	+43.711	+35.164	+34.371
17:48:31	+43.650	+35.103	+34.432
17:49:31	+43.650	+35.164	+34.432
17:50:31	+43.589	+35.103	+34.432
17:51:31	+43.589	+35.164	+34.432
17:52:31	+43.467	+35.042	+34.371
17:53:31	+43.528	+35.042	+34.371
17:54:31	+43.528	+35.286	+34.371
17:55:31	+43.467	+34.920	+34.371
17:56:31	+43.528	+34.859	+34.371
17:57:31	+43.467	+34.737	+34.371
17:58:31	+43.528	+34.676	+34.432
17:59:31	+43.467	+34.737	+34.432
18:00:31	+43.467	+35.042	+34.432
18:01:31	+43.406	+34.981	+34.432
18:02:31	+43.406	+34.859	+34.432
18:03:31	+43.223	+34.859	+34.493
18:04:31	+43.223	+34.676	+34.493
18:05:31	+43.223	+34.188	+34.493
18:06:31	+43.223	+34.432	+34.493
18:07:31	+43.162	+34.371	+34.554
18:08:31	+43.162	+34.554	+34.554
18:09:31	+43.162	+34.615	+34.554
18:10:31	+43.162	+34.676	+34.554
18:11:31	+43.101	+34.371	+34.554
18:12:31	+43.101	+34.126	+34.554
18:13:31	+43.101	+34.432	+34.554
18:14:31	+42.979	+34.554	+34.554
18:15:31	+42.918	+34.615	+34.554
18:16:31	+42.796	+34.676	+34.554
18:17:31	+42.673	+34.737	+34.554
18:18:31	+42.673	+33.943	+34.554
18:19:31	+42.612	+34.371	+34.554
18:20:31	+42.612	+34.493	+34.554
18:21:31	+42.735	+34.554	+34.615
18:22:31	+42.735	+34.798	+34.615
18:23:31	+42.673	+34.798	+34.615
18:24:31	+42.612	+34.737	+34.615
18:25:31	+42.612	+34.920	+34.615
18:26:31	+42.551	+34.126	+34.615
18:27:31	+42.551	+34.432	+34.615
18:28:31	+42.429	+34.615	+34.676
18:29:31	+42.490	+34.676	+34.676
18:30:31	+42.185	+34.737	+34.676
18:31:31	+42.124	+34.798	+34.676
18:32:31	+42.063	+34.859	+34.676
18:33:31	+42.002	+34.310	+34.676
18:34:31	+41.941	+34.188	+34.676
18:35:31	+41.880	+34.371	+34.676
18:36:31	+41.941	+34.432	+34.676
18:37:31	+41.819	+34.554	+34.676
18:38:31	+41.819	+34.737	+34.676
18:39:31	+41.819	+34.676	+34.676
18:40:31	+41.819	+34.676	+34.676
18:41:31	+41.819	+34.737	+34.676
18:42:31	+41.819	+34.676	+34.676
18:43:31	+41.819	+34.737	+34.676
18:44:31	+41.758	+34.737	+34.676
18:45:31	+41.758	+34.920	+34.676
18:46:31	+41.758	+34.981	+34.676
18:47:31	+41.758	+34.981	+34.676
18:48:31	+41.697	+34.981	+34.676
18:49:31	+41.697	+34.371	+34.676
18:50:31	+41.697	+34.249	+34.676
18:51:31	+41.636	+34.615	+34.676
18:52:31	+41.514	+34.554	+34.676
18:53:31	+41.391	+34.615	+34.676
18:54:31	+41.514	+34.981	+34.676
18:55:31	+41.452	+34.798	+34.676
18:56:31	+41.391	+33.943	+34.676
18:57:31	+41.208	+33.699	+34.737
18:58:31	+41.269	+33.760	+34.737
18:59:31	+41.575	+34.065	+34.737
19:00:31	+43.040	+35.653	+34.371
19:01:31	+43.040	+35.775	+34.310
19:02:31	+42.857	+35.653	+34.188
19:03:31	+42.673	+35.592	+34.126
19:04:31	+42.735	+35.531	+34.126

1936:P1-2DAT/2

TRANSDUCER DATA - ZONE P1-3

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 558
Start Time: 11:51:49
Start Date: 09/18
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:20

Time	Chnl 1	Chnl 2	Chnl 3
11:51:49	+57.020	+53.540	+52.380
11:52:09	+57.020	+53.540	+52.380
11:52:29	+57.020	+53.479	+52.380
11:52:49	+57.020	+53.479	+52.380
11:53:09	+57.020	+53.479	+52.380
11:53:29	+57.020	+53.479	+52.380
11:53:49	+57.020	+53.479	+52.380
11:54:09	+57.020	+53.479	+52.380
11:54:29	+57.020	+53.479	+52.380
11:54:49	+57.020	+53.479	+52.380
11:55:09	+57.020	+53.540	+52.380
11:55:29	+57.020	+53.540	+52.380
11:55:49	+57.020	+53.540	+52.380
11:56:09	+57.081	+53.540	+52.380
11:56:29	+57.081	+53.540	+52.380
11:56:49	+57.020	+53.540	+52.380
11:57:09	+57.020	+53.540	+52.380
11:57:29	+57.020	+53.540	+52.380
11:57:49	+57.020	+53.479	+52.380
11:58:09	+57.020	+53.479	+52.380
11:58:29	+56.959	+53.479	+52.319
11:58:49	+56.959	+53.479	+52.319
11:59:09	+57.020	+53.540	+52.380
11:59:29	+57.020	+53.540	+52.380
11:59:49	+56.959	+53.479	+52.319
12:00:09	+56.898	+53.418	+52.258
12:00:29	+56.837	+53.357	+52.197
12:00:49	+56.776	+53.296	+52.197
12:01:09	+56.837	+53.357	+52.197
12:01:29	+56.837	+53.296	+52.197
12:01:49	+56.776	+53.296	+52.136
12:02:09	+56.776	+53.235	+52.136
12:02:29	+56.715	+53.235	+52.075
12:02:49	+56.715	+53.174	+52.075
12:03:09	+56.654	+53.174	+52.014
12:03:29	+56.654	+53.174	+52.014
12:03:49	+56.654	+53.113	+52.014
12:04:09	+56.593	+53.113	+51.953
12:04:29	+56.593	+53.113	+51.953
12:04:49	+56.593	+53.052	+51.953
12:05:09	+56.532	+53.052	+51.892
12:05:29	+56.532	+53.052	+51.892
12:05:49	+56.532	+53.052	+51.892
12:06:09	+56.532	+52.991	+51.892
12:06:29	+56.471	+52.991	+51.892
12:06:49	+56.471	+52.991	+51.831
12:07:09	+56.471	+52.991	+51.831
12:07:29	+56.471	+52.930	+51.831
12:07:49	+56.410	+52.930	+51.831
12:08:09	+56.410	+52.930	+51.770
12:08:29	+56.410	+52.930	+51.770
12:08:49	+56.410	+52.869	+51.770
12:09:09	+56.410	+52.869	+51.770
12:09:29	+56.349	+52.869	+51.770
12:09:49	+56.410	+52.869	+51.709
12:10:09	+56.349	+52.869	+51.709
12:10:29	+56.349	+52.869	+51.709
12:10:49	+56.349	+52.869	+51.709
12:11:09	+56.349	+52.869	+51.709
12:11:29	+56.349	+52.808	+51.709
12:11:49	+56.349	+52.808	+51.709
12:12:09	+56.288	+52.808	+51.709
12:12:29	+56.288	+52.808	+51.648
12:12:49	+56.288	+52.747	+51.648
12:13:09	+56.288	+52.747	+51.648
12:13:29	+56.288	+52.747	+51.648
12:13:49	+56.288	+52.747	+51.648
12:14:09	+56.288	+52.747	+51.648
12:14:29	+56.227	+52.747	+51.648
12:14:49	+56.227	+52.747	+51.648
12:15:09	+56.227	+52.747	+51.648
12:15:29	+56.227	+52.747	+51.587
12:15:49	+56.227	+52.747	+51.587
12:16:09	+56.288	+52.747	+51.648
12:16:29	+56.288	+52.747	+51.648
12:16:49	+56.288	+52.747	+51.648
12:17:09	+56.227	+52.747	+51.648
12:17:29	+56.227	+52.747	+51.648
12:17:49	+56.227	+52.747	+51.648
12:18:09	+56.227	+52.747	+51.648
12:18:29	+56.227	+52.747	+51.648
12:18:49	+56.227	+52.747	+51.587
12:19:09	+56.227	+52.686	+51.587
12:19:29	+56.227	+52.747	+51.587
12:19:49	+56.227	+52.686	+51.587
12:20:09	+56.166	+52.625	+51.526
12:20:29	+56.227	+52.686	+51.587
12:20:49	+56.166	+52.686	+51.587
12:21:09	+56.166	+52.686	+51.587
12:21:29	+56.166	+52.686	+51.587
12:21:49	+56.166	+52.686	+51.587
12:22:09	+56.166	+52.686	+51.587
12:22:29	+56.166	+52.686	+51.587
12:22:49	+56.166	+52.686	+51.587
12:23:09	+56.166	+52.686	+51.587
12:23:29	+56.166	+52.686	+51.587
12:23:49	+56.166	+52.686	+51.587
12:24:09	+56.166	+52.625	+51.526
12:24:29	+56.166	+52.686	+51.587
12:24:49	+56.166	+52.686	+51.587
12:25:09	+56.166	+52.686	+51.587
12:25:29	+56.166	+52.625	+51.526
12:25:49	+56.166	+52.625	+51.526
12:26:09	+56.105	+52.625	+51.526
12:26:29	+56.105	+52.625	+51.526
12:26:49	+56.105	+52.625	+51.526
12:27:09	+56.105	+52.625	+51.526
12:27:29	+56.105	+52.625	+51.526
12:27:49	+56.105	+52.625	+51.526
12:28:09	+56.105	+52.625	+51.526
12:28:29	+56.105	+52.625	+51.526
12:28:49	+56.105	+52.625	+51.526
12:29:09	+56.105	+52.625	+51.526
12:29:29	+56.105	+52.625	+51.526
12:29:49	+56.105	+52.564	+51.525
12:30:09	+56.105	+52.564	+51.465
12:30:29	+56.105	+52.564	+51.465
12:30:49	+56.105	+52.564	+51.465
12:31:09	+56.105	+52.564	+51.465
12:31:29	+56.105	+52.564	+51.465
12:31:49	+56.105	+52.564	+51.465
12:32:09	+56.105	+52.564	+51.465
12:32:29	+56.105	+52.564	+51.465
12:32:49	+56.105	+52.564	+51.465
12:33:09	+56.105	+52.564	+51.465
12:33:29	+56.105	+52.564	+51.465
12:33:49	+56.105	+52.564	+51.465
12:34:09	+56.105	+52.564	+51.465
12:34:29	+56.043	+52.564	+51.465
12:34:49	+56.043	+52.564	+51.465
12:35:09	+56.043	+52.564	+51.465
12:35:29	+56.043	+52.564	+51.465
12:35:49	+56.043	+52.564	+51.465
12:36:09	+56.043	+52.564	+51.465
12:36:29	+56.043	+52.564	+51.465
12:36:49	+56.043	+52.564	+51.465
12:37:09	+56.043	+52.564	+51.465
12:37:29	+56.043	+52.564	+51.465
12:37:49	+56.105	+52.564	+51.465
12:38:09	+56.043	+52.564	+51.465
12:38:29	+56.043	+52.503	+51.465
12:38:49	+56.043	+52.503	+51.465
12:39:09	+56.043	+52.503	+51.465
12:39:29	+56.043	+52.503	+51.465
12:39:49	+56.043	+52.503	+51.465
12:40:09	+56.043	+52.503	+51.404
12:40:29	+56.043	+52.503	+51.404
12:40:49	+56.043	+52.503	+51.404
12:41:09	+56.043	+52.503	+51.465
12:41:29	+56.043	+52.503	+51.404
12:41:49	+56.043	+52.503	+51.404
12:42:09	+56.043	+52.503	+51.404
12:42:29	+56.043	+52.503	+51.404
12:42:49	+56.043	+52.503	+51.404
12:43:09	+55.982	+52.503	+51.404
12:43:29	+55.982	+52.503	+51.404
12:43:49	+55.982	+52.503	+51.404
12:44:09	+55.982	+52.503	+51.404
12:44:29	+55.982	+52.503	+51.404
12:44:49	+55.982	+52.503	+51.404
12:45:09	+55.982	+52.503	+51.404
12:45:29	+55.982	+52.503	+51.404
12:45:49	+55.982	+52.503	+51.404
12:46:09	+55.982	+52.503	+51.404
12:46:29	+55.982	+52.503	+51.404
12:46:49	+55.982	+52.503	+51.404
12:47:09	+55.982	+52.503	+51.404
12:47:29	+55.982	+52.503	+51.404
12:47:49	+55.982	+52.503	+51.404
12:48:09	+55.982	+52.503	+51.404
12:48:29	+55.982	+52.442	+51.404
12:48:49	+55.982	+52.442	+51.404
12:49:09	+55.982	+52.442	+51.404
12:49:29	+55.982	+52.442	+51.404
12:49:49	+55.982	+52.442	+51.404
12:50:09	+55.982	+52.442	+51.404
12:50:29	+56.043	+52.503	+51.404
12:50:49	+55.982	+52.442	+51.404
12:51:09	+55.982	+52.442	+51.404
12:51:29	+55.982	+52.442	+51.404
12:51:49	+55.982	+52.442	+51.404
12:52:09	+55.982	+52.442	+51.404
12:52:29	+55.982	+52.442	+51.404
12:52:49	+55.982	+52.503	+51.404
12:53:09	+56.043	+52.503	+51.404
12:53:29	+56.043	+52.564	+51.465
12:53:49	+56.105	+52.564	+51.465
12:54:09	+56.105	+52.625	+51.526
12:54:29	+56.166	+52.625	+51.526
12:54:49	+56.166	+52.686	+51.587
12:55:09	+56.227	+52.686	+51.587
12:55:29	+56.227	+52.686	+51.648
12:55:49	+56.227	+52.747	+51.648
12:56:09	+56.288	+52.747	+51.648
12:56:29	+56.288	+52.747	+51.648
12:56:49	+56.288	+52.747	+51.709
12:57:09	+56.288	+52.747	+51.709
12:57:29	+56.349	+52.808	+51.709
12:57:49	+56.349	+52.808	+51.709
12:58:09	+56.349	+52.808	+51.770
12:58:29	+56.349	+52.869	+51.770
12:58:49	+56.410	+52.869	+51.770
12:59:09	+56.410	+52.869	+51.770
12:59:29	+56.410	+52.869	+51.770
12:59:49	+56.410	+52.869	+51.831
13:00:09	+56.410	+52.869	+51.831
13:00:29	+56.410	+52.930	+51.831
13:00:49	+56.471	+52.930	+51.831
13:01:09	+56.471	+52.930	+51.831
13:01:29	+56.471	+52.930	+51.831
13:01:49	+56.471	+52.930	+51.892
13:02:09	+56.471	+52.930	+51.892
13:02:29	+56.471	+52.930	+51.892
13:02:49	+56.471	+52.930	+51.892
13:03:09	+56.471	+52.991	+51.892
13:03:29	+56.532	+52.991	+51.892
13:03:49	+56.532	+52.991	+51.892
13:04:09	+56.532	+52.991	+51.892
13:04:29	+56.532	+52.991	+51.953
13:04:49	+56.593	+52.991	+51.953
13:05:09	+56.532	+52.991	+51.953
13:05:29	+56.532	+52.991	+51.953
13:05:49	+56.532	+52.991	+51.953
13:06:09	+56.532	+52.991	+51.953
13:06:29	+56.532	+52.991	+51.953
13:06:49	+56.532	+53.052	+51.953
13:07:09	+56.532	+53.052	+51.953
13:07:29	+56.593	+53.052	+51.953
13:07:49	+56.593	+53.052	+51.953
13:08:09	+56.593	+53.052	+52.014
13:08:29	+56.593	+53.052	+51.953
13:08:49	+56.593	+53.052	+51.953
13:09:09	+56.593	+53.052	+52.014
13:09:29	+56.593	+53.052	+52.014
13:09:49	+56.593	+53.052	+52.014
13:10:09	+56.593	+53.052	+52.014
13:10:29	+56.593	+53.052	+52.014
13:10:49	+56.593	+53.052	+52.014
13:11:09	+56.593	+53.052	+52.014
13:11:29	+56.593	+53.052	+52.014
13:11:49	+56.593	+53.113	+52.014
13:12:09	+56.593	+53.113	+52.014
13:12:29	+56.593	+53.052	+52.014
13:12:49	+56.654	+53.113	+52.014
13:13:09	+56.654	+53.113	+52.014
13:13:29	+56.654	+53.113	+52.014
13:13:49	+56.654	+53.113	+52.014
13:14:09	+56.654	+53.113	+52.014
13:14:29	+56.654	+53.113	+52.014
13:14:49	+56.654	+53.113	+52.014
13:15:09	+56.654	+53.113	+52.014
13:15:29	+56.654	+53.113	+52.075
13:15:49	+56.654	+53.113	+52.075
13:16:09	+56.654	+53.113	+52.075
13:16:29	+56.654	+53.113	+52.075
13:16:49	+56.654	+53.113	+52.075
13:17:09	+56.654	+53.113	+52.075
13:17:29	+56.654	+53.113	+52.075
13:17:49	+56.654	+53.113	+52.075
13:18:09	+56.654	+53.113	+52.075
13:18:29	+56.654	+53.113	+52.075
13:18:49	+56.654	+53.113	+52.075
13:19:09	+56.654	+53.113	+52.075
13:19:29	+56.654	+53.113	+52.075
13:19:49	+56.654	+53.113	+52.075
13:20:09	+56.654	+53.113	+52.075
13:20:29	+56.654	+53.113	+52.075
13:20:49	+56.654	+53.113	+52.075
13:21:09	+56.654	+53.113	+52.075
13:21:29	+56.654	+53.113	+52.075
13:21:49	+56.654	+53.113	+52.075
13:22:09	+56.654	+53.113	+52.075
13:22:29	+56.654	+53.113	+52.075
13:22:49	+56.654	+53.113	+52.075
13:23:09	+56.654	+53.113	+52.075
13:23:29	+56.654	+53.174	+52.075
13:23:49	+56.715	+53.174	+52.075
13:24:09	+56.654	+53.174	+52.075
13:24:29	+56.654	+53.174	+52.075
13:24:49	+56.654	+53.174	+52.075
13:25:09	+56.715	+53.174	+52.075
13:25:29	+56.654	+53.113	+52.075
13:25:49	+56.654	+53.174	+52.075
13:26:09	+56.715	+53.174	+52.075
13:26:29	+56.715	+53.174	+52.136
13:26:49	+56.715	+53.174	+52.136
13:27:09	+56.715	+53.174	+52.075
13:27:29	+56.715	+53.174	+52.136
13:27:49	+56.715	+53.174	+52.075
13:28:09	+56.715	+53.174	+52.075
13:28:29	+56.715	+53.174	+52.136
13:28:49	+56.715	+53.174	+52.136
13:29:09	+56.715	+53.174	+52.075
13:29:29	+56.715	+53.174	+52.136
13:29:49	+56.715	+53.174	+52.136
13:30:09	+56.715	+53.174	+52.075
13:30:29	+56.715	+53.174	+52.136
13:30:49	+56.715	+53.174	+52.136
13:31:09	+56.715	+53.174	+52.136
13:31:29	+56.654	+53.113	+52.075
13:31:49	+56.715	+53.113	+52.075
13:32:09	+56.654	+53.113	+52.075
13:32:29	+56.715	+53.174	+52.075
13:32:49	+56.715	+53.174	+52.075
13:33:09	+56.715	+53.113	+52.075
13:33:29	+56.715	+53.174	+52.075
13:33:49	+56.715	+53.113	+52.075
13:34:09	+56.715	+53.174	+52.136
13:34:29	+56.715	+53.174	+52.136
13:34:49	+56.715	+53.174	+52.136
13:35:09	+56.715	+53.174	+52.136
13:35:29	+56.715	+53.174	+52.136
13:35:49	+56.715	+53.174	+52.136
13:36:09	+56.715	+53.174	+52.136
13:36:29	+56.715	+53.174	+52.136
13:36:49	+56.715	+53.174	+52.136
13:37:09	+56.715	+53.174	+52.136
13:37:29	+56.715	+53.174	+52.136
13:37:49	+56.715	+53.174	+52.136

13:38:09	+56.715	+53.174	+52.136
13:38:29	+56.715	+53.174	+52.136
13:38:49	+56.715	+53.174	+52.136
13:39:09	+56.715	+53.174	+52.136
13:39:29	+56.776	+53.174	+52.136
13:39:49	+56.715	+53.174	+52.136
13:40:09	+56.715	+53.174	+52.136
13:40:29	+56.715	+53.174	+52.136
13:40:49	+56.715	+53.174	+52.136
13:41:09	+56.715	+53.174	+52.136
13:41:29	+56.715	+53.174	+52.136
13:41:49	+56.715	+53.174	+52.136
13:42:09	+56.776	+53.174	+52.136
13:42:29	+56.715	+53.174	+52.136
13:42:49	+56.776	+53.174	+52.197
13:43:09	+56.715	+53.174	+52.136
13:43:29	+56.715	+53.174	+52.136
13:43:49	+56.715	+53.174	+52.136
13:44:09	+56.715	+53.174	+52.136
13:44:29	+56.715	+53.113	+52.136
13:44:49	+56.715	+53.174	+52.136
13:45:09	+56.715	+53.174	+52.136
13:45:29	+56.715	+53.174	+52.136
13:45:49	+56.715	+53.174	+52.136
13:46:09	+56.715	+53.174	+52.136
13:46:29	+56.715	+53.174	+52.136
13:46:49	+56.715	+53.174	+52.136
13:47:09	+56.715	+53.174	+52.136
13:47:29	+56.715	+53.174	+52.136
13:47:49	+56.715	+53.174	+52.136
13:48:09	+56.715	+53.174	+52.136
13:48:29	+56.715	+53.174	+52.136
13:48:49	+56.715	+53.174	+52.136
13:49:09	+56.715	+53.174	+52.136
13:49:29	+56.715	+53.174	+52.136
13:49:49	+56.715	+53.174	+52.136
13:50:09	+56.715	+53.174	+52.136
13:50:29	+56.715	+53.174	+52.136
13:50:49	+56.715	+53.174	+52.136
13:51:09	+56.715	+53.174	+52.136
13:51:29	+56.715	+53.174	+52.136
13:51:49	+56.715	+53.174	+52.136
13:52:09	+56.776	+53.174	+52.136
13:52:29	+56.715	+53.174	+52.136
13:52:49	+56.715	+53.174	+52.136
13:53:09	+56.776	+53.174	+52.197
13:53:29	+56.715	+53.174	+52.136
13:53:49	+56.715	+53.174	+52.136
13:54:09	+56.715	+53.174	+52.136
13:54:29	+56.715	+53.174	+52.136
13:54:49	+56.715	+53.174	+52.136
13:55:09	+56.776	+53.174	+52.136
13:55:29	+56.776	+53.174	+52.136
13:55:49	+56.776	+53.174	+52.136
13:56:09	+56.776	+53.174	+52.197
13:56:29	+56.776	+53.235	+52.136
13:56:49	+56.776	+53.174	+52.136
13:57:09	+56.715	+53.174	+52.136
13:57:29	+56.776	+53.174	+52.197
13:57:49	+56.715	+53.174	+52.136
13:58:09	+56.776	+53.174	+52.197
13:58:29	+56.776	+53.174	+52.136
13:58:49	+56.715	+53.174	+52.136
13:59:09	+56.715	+53.174	+52.136
13:59:29	+56.776	+53.174	+52.136
13:59:49	+56.776	+53.174	+52.136
14:00:09	+56.776	+53.174	+52.136
14:00:29	+56.776	+53.174	+52.136
14:00:49	+56.715	+53.174	+52.136
14:01:09	+56.776	+53.174	+52.197
14:01:29	+56.776	+53.174	+52.136
14:01:49	+56.715	+53.174	+52.136
14:02:09	+56.715	+53.174	+52.136
14:02:29	+56.776	+53.174	+52.197
14:02:49	+56.776	+53.174	+52.136
14:03:09	+56.776	+53.174	+52.136
14:03:29	+56.776	+53.174	+52.197
14:03:49	+56.715	+53.174	+52.197
14:04:09	+56.776	+53.174	+52.197
14:04:29	+56.776	+53.174	+52.197
14:04:49	+56.776	+53.174	+52.197
14:05:09	+56.776	+53.235	+52.197
14:05:29	+56.776	+53.174	+52.197
14:05:49	+56.776	+53.174	+52.197
14:06:09	+56.715	+53.174	+52.197
14:06:29	+56.776	+53.174	+52.197
14:06:49	+56.776	+53.174	+52.197
14:07:09	+56.776	+53.174	+52.197
14:07:29	+56.715	+53.174	+52.136
14:07:49	+56.776	+53.174	+52.197
14:08:09	+56.776	+53.174	+52.197
14:08:29	+56.715	+53.174	+52.136
14:08:49	+56.776	+53.174	+52.197
14:09:09	+56.776	+53.174	+52.197
14:09:29	+56.776	+53.174	+52.197
14:09:49	+56.776	+53.174	+52.197
14:10:09	+56.776	+53.174	+52.197
14:10:29	+56.776	+53.174	+52.197
14:10:49	+56.776	+53.174	+52.197
14:11:09	+56.776	+53.174	+52.197
14:11:29	+56.776	+53.174	+52.197
14:11:49	+56.776	+53.174	+52.197
14:12:09	+56.776	+53.174	+52.197
14:12:29	+56.776	+53.174	+52.197
14:12:49	+56.776	+53.235	+52.197
14:13:09	+56.776	+53.174	+52.197
14:13:29	+56.776	+53.174	+52.197
14:13:49	+56.776	+53.174	+52.197
14:14:09	+56.776	+53.174	+52.197
14:14:29	+56.776	+53.174	+52.197
14:14:49	+56.776	+53.174	+52.197
14:15:09	+56.776	+53.174	+52.197
14:15:29	+56.776	+53.174	+52.197
14:15:49	+56.776	+53.174	+52.197
14:16:09	+56.776	+53.174	+52.197
14:16:29	+56.776	+53.235	+52.197
14:16:49	+56.776	+53.174	+52.197
14:17:09	+56.776	+53.174	+52.197
14:17:29	+56.776	+53.174	+52.197
14:17:49	+56.776	+53.174	+52.136
14:18:09	+56.776	+53.174	+52.197
14:18:29	+56.776	+53.174	+52.197
14:18:49	+56.776	+53.174	+52.197
14:19:09	+56.776	+53.235	+52.197
14:19:29	+56.776	+53.174	+52.197
14:19:49	+56.776	+53.174	+52.197
14:20:09	+56.776	+53.174	+52.197
14:20:29	+56.776	+53.235	+52.197
14:20:49	+56.776	+53.174	+52.197
14:21:09	+56.776	+53.235	+52.197
14:21:29	+56.776	+53.174	+52.197
14:21:49	+56.776	+53.174	+52.197
14:22:09	+56.837	+53.235	+52.197
14:22:29	+56.776	+53.174	+52.197
14:22:49	+56.776	+53.174	+52.197
14:23:09	+56.776	+53.174	+52.197
14:23:29	+56.776	+53.174	+52.197
14:23:49	+56.776	+53.174	+52.197
14:24:09	+56.776	+53.174	+52.197
14:24:29	+56.776	+53.235	+52.197
14:24:49	+56.776	+53.235	+52.197
14:25:09	+56.776	+53.235	+52.197
14:25:29	+56.776	+53.174	+52.197
14:25:49	+56.776	+53.174	+52.197
14:26:09	+56.776	+53.174	+52.197
14:26:29	+56.776	+53.235	+52.197
14:26:49	+56.776	+53.174	+52.197
14:27:09	+56.776	+53.174	+52.197
14:27:29	+56.776	+53.174	+52.197
14:27:49	+56.776	+53.174	+52.197
14:28:09	+56.715	+53.174	+52.136
14:28:29	+56.776	+53.174	+52.197
14:28:49	+56.715	+53.174	+52.197
14:29:09	+56.715	+53.174	+52.136
14:29:29	+56.776	+53.174	+52.197
14:29:49	+56.776	+53.174	+52.197
14:30:09	+56.776	+53.235	+52.197
14:30:29	+56.776	+53.174	+52.197
14:30:49	+56.776	+53.174	+52.197
14:31:09	+56.776	+53.174	+52.197
14:31:29	+56.776	+53.235	+52.197
14:31:49	+56.776	+53.174	+52.197
14:32:09	+56.776	+53.174	+52.197
14:32:29	+56.776	+53.174	+52.197
14:32:49	+56.776	+53.235	+52.197
14:33:09	+56.776	+53.174	+52.197
14:33:29	+56.715	+53.113	+52.136
14:33:49	+56.654	+53.052	+52.075

TRANSDUCER DATA - ZONE P1-4

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 103
Start Time: 14:03:28
Start Date: 09/22
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
14:03:28	+79.426	+64.041	+74.297
14:03:58	+79.426	+63.919	+74.297
14:04:28	+79.426	+63.980	+74.297
14:04:58	+79.365	+63.797	+74.297
14:05:28	+79.365	+63.858	+74.297
14:05:58	+79.365	+63.797	+74.236
14:06:28	+79.365	+63.858	+74.297
14:06:58	+79.365	+63.919	+74.297
14:07:28	+79.242	+63.858	+74.175
14:07:58	+79.181	+63.675	+74.053
14:08:28	+79.059	+63.675	+73.931
14:08:58	+78.937	+63.431	+73.870
14:09:28	+78.876	+63.369	+73.809
14:09:58	+78.815	+63.308	+73.687
14:10:28	+78.754	+63.186	+73.687
14:10:58	+78.754	+63.125	+73.565
14:11:28	+78.632	+63.186	+73.565
14:11:58	+78.571	+63.003	+73.504
14:12:28	+78.571	+62.942	+73.443
14:12:58	+78.510	+62.942	+73.443
14:13:28	+78.449	+62.820	+73.382
14:13:58	+78.388	+62.820	+73.382
14:14:28	+78.327	+62.698	+73.260
14:14:58	+78.327	+62.942	+73.260
14:15:28	+78.266	+62.637	+73.199
14:15:58	+78.266	+62.759	+73.199
14:16:28	+78.327	+62.698	+73.260
14:16:58	+78.388	+62.820	+73.382
14:17:28	+78.449	+62.820	+73.382
14:17:58	+78.510	+62.881	+73.443
14:18:28	+78.571	+63.064	+73.504
14:18:58	+78.632	+63.003	+73.565
14:19:28	+78.693	+63.186	+73.626
14:19:58	+78.693	+63.125	+73.626
14:20:28	+78.754	+63.064	+73.687
14:20:58	+78.815	+63.308	+73.687
14:21:28	+78.815	+63.308	+73.748
14:21:58	+78.815	+63.247	+73.687
14:22:28	+78.815	+63.308	+73.748
14:22:58	+78.876	+63.308	+73.748
14:23:28	+78.876	+63.369	+73.809
14:23:58	+78.876	+63.308	+73.809
14:24:28	+78.876	+63.308	+73.809
14:24:58	+78.937	+63.431	+73.870
14:25:28	+78.937	+63.431	+73.809
14:25:58	+78.937	+63.369	+73.870
14:26:28	+78.937	+63.492	+73.870
14:26:58	+78.998	+63.431	+73.931
14:27:28	+78.998	+63.431	+73.870
14:27:58	+78.998	+63.431	+73.931
14:28:28	+78.998	+63.431	+73.870
14:28:58	+78.998	+63.308	+73.931
14:29:28	+79.059	+63.431	+73.931
14:29:58	+78.998	+63.369	+73.931
14:30:28	+78.998	+63.431	+73.931
14:30:58	+78.998	+63.431	+73.931
14:31:28	+78.998	+63.431	+73.992
14:31:58	+78.998	+63.369	+73.931
14:32:28	+79.059	+63.369	+73.992
14:32:58	+79.059	+63.431	+73.992
14:33:28	+79.059	+63.431	+73.992
14:33:58	+79.059	+63.369	+73.931
14:34:28	+79.059	+63.369	+73.992
14:34:58	+79.059	+63.431	+73.992
14:35:28	+79.059	+63.369	+73.992
14:35:58	+79.120	+63.431	+73.992
14:36:28	+79.059	+63.369	+73.992
14:36:58	+79.120	+63.492	+74.053
14:37:28	+79.059	+63.369	+73.992
*14:37:58	+79.059	+63.431	+73.992
14:38:28	+79.059	+63.369	+73.992
14:38:58	+79.059	+63.369	+73.992
14:39:28	+79.120	+63.492	+74.053
14:39:58	+79.120	+63.614	+74.053
14:40:28	+79.120	+63.369	+74.053
14:40:58	+79.181	+63.247	+74.053
14:41:28	+79.120	+63.431	+73.992
14:41:58	+79.059	+63.308	+73.992
14:42:28	+79.059	+63.369	+73.992
14:42:58	+79.059	+63.247	+73.992
14:43:28	+79.059	+63.247	+74.053
14:43:58	+79.120	+63.308	+73.992
14:44:28	+79.059	+63.308	+73.992
14:44:58	+79.120	+63.369	+74.053
14:45:28	+79.120	+63.247	+74.053
14:45:58	+79.059	+63.186	+73.992
14:46:28	+79.181	+63.369	+74.114
14:46:58	+79.181	+63.614	+74.114
14:47:28	+79.120	+63.431	+74.053
14:47:58	+79.120	+63.308	+74.053
14:48:28	+79.120	+63.308	+74.053
14:48:58	+79.120	+63.308	+74.053
14:49:28	+79.120	+63.369	+74.053
14:49:58	+79.120	+63.369	+74.053
14:50:28	+79.120	+63.308	+74.053
14:50:58	+79.120	+63.308	+74.053
14:51:28	+79.120	+63.369	+74.053
14:51:58	+79.120	+63.369	+74.053
14:52:28	+79.120	+63.369	+74.053
14:52:58	+79.120	+63.308	+74.053
14:53:28	+79.120	+63.308	+74.114
14:53:58	+79.120	+63.308	+74.053
14:54:28	+79.120	+63.308	+74.053

TRANSDUCER DATA - ZONE P1-5

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 226
Start Time: 10:30:00
Start Date: 09/22
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
10:30:00	+99.267	+84.310	+92.124
10:30:30	+99.145	+84.310	+92.185
10:31:00	+99.084	+84.188	+92.063
10:31:30	+98.962	+83.882	+91.819
10:32:00	+98.840	+83.821	+91.819
10:32:30	+98.840	+83.943	+91.941
10:33:00	+98.778	+83.821	+91.758
10:33:30	+98.717	+83.882	+91.880
10:34:00	+98.595	+83.638	+91.697
10:34:30	+98.595	+83.821	+91.880
10:35:00	+98.534	+83.577	+91.636
10:35:30	+98.534	+83.699	+91.819
10:36:00	+98.412	+83.394	+91.575
10:36:30	+98.412	+83.394	+91.575
10:37:00	+98.351	+83.516	+91.697
10:37:30	+98.290	+83.272	+91.514
10:38:00	+98.290	+83.272	+91.575
10:38:30	+98.351	+83.455	+91.758
10:39:00	+98.229	+83.272	+91.575
10:39:30	+98.290	+83.211	+91.575
10:40:00	+98.351	+83.455	+91.819
10:40:30	+98.473	+83.516	+91.880
10:41:00	+98.473	+83.455	+91.880
10:41:30	+98.595	+83.760	+92.185
10:42:00	+98.595	+83.516	+91.880
10:42:30	+98.656	+83.699	+92.063
10:43:00	+98.656	+83.760	+92.185
10:43:30	+98.717	+83.760	+92.185
10:44:00	+98.778	+83.821	+92.246
10:44:30	+98.717	+83.699	+92.185
10:45:00	+98.840	+84.004	+92.490
10:45:30	+98.778	+83.821	+92.246
10:46:00	+98.840	+83.760	+92.185
10:46:30	+98.840	+84.004	+92.490
10:47:00	+98.840	+83.943	+92.429
10:47:30	+98.901	+83.943	+92.490
10:48:00	+98.901	+84.004	+92.490
10:48:30	+98.901	+84.004	+92.551
10:49:00	+98.901	+84.004	+92.551
10:49:30	+98.901	+83.943	+92.490
10:50:00	+98.962	+84.126	+92.612
10:50:30	+98.962	+84.065	+92.612
10:51:00	+98.962	+84.065	+92.673
10:51:30	+98.962	+84.065	+92.612
10:52:00	+99.023	+84.126	+92.735
10:52:30	+99.023	+84.065	+92.612
10:53:00	+98.962	+84.065	+92.612
10:53:30	+99.023	+84.065	+92.673
10:54:00	+99.023	+84.004	+92.612
10:54:30	+98.962	+84.004	+92.612
10:55:00	+99.023	+84.004	+92.673
10:55:30	+98.962	+83.943	+92.551
10:56:00	+99.023	+84.004	+92.673
10:56:30	+99.023	+84.126	+92.796
10:57:00	+99.023	+84.065	+92.735
10:57:30	+99.023	+84.126	+92.796
10:58:00	+99.023	+84.126	+92.796
10:58:30	+99.084	+84.126	+92.857
10:59:00	+98.962	+84.065	+92.796
10:59:30	+99.023	+84.065	+92.796
11:00:00	+99.023	+84.004	+92.796
11:00:30	+99.023	+84.065	+92.796
11:01:00	+99.023	+84.065	+92.857
11:01:30	+99.023	+84.065	+92.918
11:02:00	+99.023	+83.943	+92.796
11:02:30	+99.023	+83.821	+92.673
11:03:00	+99.084	+84.065	+92.857
11:03:30	+99.084	+84.065	+92.918
11:04:00	+99.084	+84.126	+93.040
11:04:30	+99.084	+84.004	+92.918
11:05:00	+99.084	+84.004	+92.857
11:05:30	+99.084	+84.065	+92.979
11:06:00	+99.084	+84.004	+92.918
11:06:30	+99.084	+84.065	+92.979
11:07:00	+99.023	+83.943	+92.857
11:07:30	+99.084	+84.065	+92.979
11:08:00	+99.145	+84.126	+93.040
11:08:30	+99.084	+84.065	+92.979
11:09:00	+99.145	+84.065	+92.979
11:09:30	+99.145	+84.065	+93.040
11:10:00	+99.084	+84.004	+92.979
11:10:30	+99.084	+83.943	+92.918
11:11:00	+99.145	+84.065	+93.040
11:11:30	+99.145	+84.004	+93.040
11:12:00	+99.084	+83.943	+92.979
11:12:30	+99.023	+83.760	+92.796
11:13:00	+99.084	+83.943	+93.040
11:13:30	+99.084	+83.882	+92.979
11:14:00	+99.145	+83.943	+93.040
11:14:30	+99.084	+83.882	+93.040
11:15:00	+99.084	+83.943	+93.040
11:15:30	+99.145	+84.004	+93.040
11:16:00	+99.145	+83.943	+93.040
11:16:30	+99.145	+83.943	+93.040
11:17:00	+99.145	+83.882	+92.979
11:17:30	+99.145	+83.882	+92.979
11:18:00	+99.145	+83.943	+93.101
11:18:30	+99.145	+84.065	+93.162
11:19:00	+99.145	+83.821	+92.979
11:19:30	+99.145	+83.943	+93.101
11:20:00	+99.145	+83.943	+93.040
11:20:30	+99.145	+83.943	+93.101
11:21:00	+99.145	+83.882	+93.040
11:21:30	+99.145	+84.065	+93.223
11:22:00	+99.145	+83.943	+93.162
11:22:30	+99.145	+83.943	+93.162
11:23:00	+99.145	+84.065	+93.223
11:23:30	+99.084	+83.760	+93.040
11:24:00	+99.084	+83.943	+93.162
11:24:30	+99.145	+83.821	+93.101
11:25:00	+99.084	+83.821	+93.101
11:25:30	+99.145	+83.943	+93.162
11:26:00	+99.084	+83.882	+93.101
11:26:30	+99.145	+84.004	+93.162
11:27:00	+99.145	+83.882	+93.101
11:27:30	+99.145	+83.882	+93.162
11:28:00	+99.145	+83.882	+93.162
11:28:30	+99.145	+83.882	+93.101
11:29:00	+99.145	+83.943	+93.223
11:29:30	+99.084	+83.821	+93.162
11:30:00	+99.084	+83.821	+93.101
11:30:30	+99.145	+83.882	+93.162
11:31:00	+99.084	+83.821	+93.101
11:31:30	+99.084	+83.882	+93.223
11:32:00	+99.084	+83.760	+92.979
11:32:30	+99.145	+83.821	+93.162
11:33:00	+99.084	+83.760	+93.101
11:33:30	+99.145	+83.821	+93.162
11:34:00	+99.084	+83.760	+93.101
11:34:30	+99.145	+83.882	+93.101
11:35:00	+99.145	+83.821	+93.101
11:35:30	+99.084	+83.760	+93.040
11:36:00	+99.084	+83.699	+93.040
11:36:30	+99.145	+83.760	+93.101
11:37:00	+99.145	+83.943	+93.223
11:37:30	+99.206	+83.882	+93.223
11:38:00	+99.145	+83.760	+93.040
11:38:30	+99.206	+83.882	+93.223
11:39:00	+99.145	+83.760	+93.101
11:39:30	+99.145	+83.821	+93.223
11:40:00	+99.206	+83.821	+93.162
11:40:30	+99.206	+83.821	+93.162
11:41:00	+99.145	+83.760	+93.101
11:41:30	+99.145	+83.821	+93.162
11:42:00	+99.084	+83.699	+93.040
11:42:30	+99.145	+83.699	+93.040
11:43:00	+99.145	+83.821	+93.162
11:43:30	+99.145	+83.638	+93.040
11:44:00	+99.206	+83.943	+93.284
11:44:30	+99.145	+83.760	+93.101
11:45:00	+99.145	+83.760	+93.101
11:45:30	+99.084	+83.638	+93.040
11:46:00	+99.145	+83.699	+93.101
11:46:30	+99.084	+83.638	+92.979
11:47:00	+99.206	+83.882	+93.284
11:47:30	+99.145	+83.760	+93.101
11:48:00	+99.145	+83.699	+93.101
11:48:30	+99.084	+83.577	+92.979
11:49:00	+99.145	+83.760	+93.223
11:49:30	+99.145	+83.760	+93.223
11:50:00	+99.084	+83.516	+92.918
11:50:30	+99.145	+83.577	+93.040
11:51:00	+99.145	+83.638	+93.101
11:51:30	+99.145	+83.638	+93.101
11:52:00	+99.145	+83.577	+93.040
11:52:30	+99.145	+83.638	+93.162
11:53:00	+99.145	+83.577	+93.101
11:53:30	+99.145	+83.577	+93.101
11:54:00	+99.145	+83.638	+93.162
11:54:30	+99.145	+83.638	+93.162
11:55:00	+99.145	+83.638	+93.162
11:55:30	+99.145	+83.638	+93.162
11:56:00	+99.145	+83.577	+93.162
11:56:30	+99.145	+83.577	+93.162
11:57:00	+99.084	+83.577	+93.101
11:57:30	+99.145	+83.577	+93.162
11:58:00	+99.145	+83.455	+93.040
11:58:30	+99.084	+83.577	+93.101
11:59:00	+99.145	+83.638	+93.223
11:59:30	+99.145	+83.577	+93.162
12:00:00	+99.084	+83.394	+92.979
12:00:30	+99.084	+83.516	+93.101
12:01:00	+99.206	+83.699	+93.284
12:01:30	+99.206	+83.699	+93.284
12:02:00	+99.145	+83.577	+93.162
12:02:30	+99.206	+83.638	+93.223
12:03:00	+99.206	+83.638	+93.223
12:03:30	+99.206	+83.699	+93.345
12:04:00	+99.206	+83.699	+93.284
12:04:30	+99.145	+83.455	+93.101
12:05:00	+99.206	+83.699	+93.345
12:05:30	+99.206	+83.699	+93.345
12:06:00	+99.145	+83.638	+93.345
12:06:30	+99.145	+83.638	+93.284
12:07:00	+99.145	+83.516	+93.223
12:07:30	+99.145	+83.638	+93.284
12:08:00	+99.145	+83.577	+93.223
12:08:30	+99.145	+83.455	+93.101
12:09:00	+99.145	+83.577	+93.223
12:09:30	+99.206	+83.699	+93.406
12:10:00	+99.145	+83.638	+93.284
12:10:30	+99.145	+83.577	+93.284
12:11:00	+99.145	+83.516	+93.223
12:11:30	+99.145	+83.577	+93.223
12:12:00	+99.145	+83.516	+93.223
12:12:30	+99.145	+83.516	+93.223
12:13:00	+99.145	+83.577	+93.223
12:13:30	+99.145	+83.577	+93.284
12:14:00	+99.145	+83.516	+93.223
12:14:30	+99.145	+83.577	+93.284
12:15:00	+99.206	+83.699	+93.467
12:15:30	+99.145	+83.577	+93.284
12:16:00	+99.145	+83.577	+93.345
12:16:30	+99.145	+83.577	+93.284
12:17:00	+99.145	+83.455	+93.284
12:17:30	+99.145	+83.577	+93.223
12:18:00	+99.145	+83.455	+93.162
12:18:30	+99.145	+83.699	+93.467
12:19:00	+99.145	+83.394	+93.101
12:19:30	+99.145	+83.394	+93.162
12:20:00	+99.145	+83.516	+93.284
12:20:30	+99.145	+83.516	+93.284
12:21:00	+99.145	+83.516	+93.345
12:21:30	+99.145	+83.455	+93.284
12:22:00	+99.145	+83.394	+93.162
12:22:30	+99.084	+83.211	+93.040

1936:P1-5DAT/1

TRANSDUCER DATA - ZONE P1-6

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 661
Start Time: 12:20:32
Start Date: 09/21
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
12:20:32	+116.54	+112.33	+94.322
12:21:02	+116.60	+112.21	+94.871
12:21:32	+116.60	+112.33	+95.360
12:22:02	+116.54	+112.45	+95.909
12:22:32	+116.54	+112.33	+96.275
12:23:02	+116.54	+112.27	+96.825
12:23:32	+116.54	+112.45	+97.435
12:24:02	+116.54	+112.33	+97.924
12:24:32	+116.54	+112.39	+98.229
12:25:02	+116.54	+112.27	+98.168
12:25:32	+116.54	+112.39	+98.717
12:26:02	+116.54	+112.27	+99.084
12:26:32	+116.48	+112.39	+99.389
12:27:02	+116.54	+112.33	+99.633
12:27:32	+116.48	+112.33	+100.12
12:28:02	+116.54	+112.39	+100.36
12:28:32	+116.54	+112.39	+100.73
12:29:02	+116.54	+112.45	+101.09
12:29:32	+116.54	+112.51	+101.40
12:30:02	+116.54	+112.45	+101.46
12:30:32	+116.48	+112.33	+102.01
12:31:02	+116.54	+112.39	+102.19
12:31:32	+116.48	+112.39	+102.86
12:32:02	+116.54	+112.45	+102.86
12:32:32	+116.54	+112.51	+103.11
12:33:02	+116.48	+112.45	+103.41
12:33:32	+116.48	+112.51	+103.66
12:34:02	+116.48	+112.51	+103.90
12:34:32	+116.54	+112.51	+104.09
12:35:02	+116.48	+112.39	+104.27
12:35:32	+116.48	+112.45	+105.12
12:36:02	+116.48	+112.33	+105.31
12:36:32	+116.48	+112.27	+105.67
12:37:02	+116.48	+112.33	+105.79
12:37:32	+116.48	+112.27	+106.04
12:38:02	+116.48	+112.33	+106.28
12:38:32	+116.48	+112.39	+106.47
12:39:02	+116.48	+112.21	+106.65
12:39:32	+116.48	+112.33	+106.77
12:40:02	+116.48	+112.45	+107.02
12:40:32	+116.48	+112.27	+107.20
12:41:02	+116.48	+112.27	+107.20
12:41:32	+116.42	+112.21	+107.44
12:42:02	+116.42	+112.21	+107.57
12:42:32	+116.42	+112.27	+107.57
12:43:02	+116.42	+112.33	+107.75
12:43:32	+116.42	+112.14	+107.81
12:44:02	+116.42	+112.27	+107.81
12:44:32	+116.42	+112.27	+107.87
12:45:02	+116.42	+112.27	+107.75
12:45:32	+116.42	+112.21	+107.81
12:46:02	+116.42	+112.33	+107.93
12:46:32	+116.42	+112.08	+107.75
12:47:02	+116.42	+112.21	+107.93
12:47:32	+116.42	+112.21	+107.87
12:48:02	+116.42	+112.27	+107.99
12:48:32	+116.42	+112.27	+108.05
12:49:02	+116.42	+112.27	+108.05
12:49:32	+116.42	+112.27	+108.11
12:50:02	+116.42	+112.21	+108.18
12:50:32	+116.42	+112.14	+108.05
12:51:02	+116.23	+111.78	+108.30
12:51:32	+116.30	+112.08	+108.24
12:52:02	+116.17	+111.90	+108.11
12:52:32	+116.11	+111.90	+108.05
12:53:02	+116.05	+111.84	+108.05
12:53:32	+115.93	+111.78	+108.18
12:54:02	+115.87	+111.72	+108.05
12:54:32	+115.81	+111.53	+107.99
12:55:02	+115.75	+111.47	+108.05
12:55:32	+115.68	+111.47	+107.93
12:56:02	+115.68	+111.53	+107.99
12:56:32	+115.62	+111.35	+107.87
12:57:02	+115.56	+111.35	+107.87
12:57:32	+115.56	+111.23	+107.81
12:58:02	+115.50	+111.23	+107.87
12:58:32	+115.50	+111.23	+107.93
12:59:02	+115.44	+111.23	+107.87
12:59:32	+115.38	+111.17	+107.75
13:00:02	+115.38	+111.11	+107.81
13:00:32	+115.38	+111.17	+107.75
13:01:02	+115.32	+111.05	+107.75
13:01:32	+115.26	+111.17	+107.75
13:02:02	+115.26	+111.05	+107.69
13:02:32	+115.26	+110.92	+107.69
13:03:02	+115.20	+110.98	+107.63
13:03:32	+115.20	+110.92	+107.57
13:04:02	+115.20	+110.92	+107.69
13:04:32	+115.14	+110.80	+107.57
13:05:02	+115.20	+110.92	+107.69
13:05:32	+115.32	+111.11	+107.75
13:06:02	+115.38	+111.05	+107.87
13:06:32	+115.44	+111.11	+107.93
13:07:02	+115.50	+111.23	+107.93
13:07:32	+115.56	+111.29	+108.11
13:08:02	+115.62	+111.41	+108.11
13:08:32	+115.62	+111.41	+108.11
13:09:02	+115.68	+111.41	+108.18
13:09:32	+115.68	+111.47	+108.18
13:10:02	+115.75	+111.47	+108.24
13:10:32	+115.75	+111.53	+108.24
13:11:02	+115.81	+111.59	+108.30
13:11:32	+115.81	+111.59	+108.30
13:12:02	+115.87	+111.59	+108.36
13:12:32	+115.87	+111.66	+108.36
13:13:02	+115.87	+111.66	+108.42
13:13:32	+115.87	+111.66	+108.24
13:14:02	+115.87	+111.66	+108.05
13:14:32	+115.93	+111.72	+107.99
13:15:02	+115.93	+111.72	+107.87
13:15:32	+115.93	+111.72	+107.75
13:16:02	+115.93	+111.72	+107.63
13:16:32	+115.93	+111.72	+107.57
13:17:02	+115.93	+111.72	+107.50
13:17:32	+115.99	+111.72	+107.44
13:18:02	+115.99	+111.72	+107.32
13:18:32	+115.99	+111.72	+107.26
13:19:02	+115.99	+111.72	+107.20
13:19:32	+115.99	+111.78	+107.14
13:20:02	+115.99	+111.78	+107.08
13:20:32	+115.99	+111.72	+107.02
13:21:02	+116.11	+111.78	+107.02
13:21:32	+115.99	+111.72	+106.95
13:22:02	+115.99	+111.72	+106.89
13:22:32	+116.05	+111.78	+106.89
13:23:02	+116.05	+111.78	+106.89
13:23:32	+116.05	+111.78	+106.89
13:24:02	+116.05	+111.78	+106.89
13:24:32	+53.540	+111.78	+106.85
13:25:02	+84.798	+111.78	+106.83
13:25:32	+116.05	+111.78	+106.83
13:26:02	+116.05	+111.78	+106.77
13:26:32	+116.05	+111.78	+106.77
13:27:02	+116.05	+111.78	+106.77
13:27:32	+116.05	+111.78	+106.77
13:28:02	+116.05	+111.72	+106.77
13:28:32	+116.11	+111.78	+106.83
13:29:02	+116.05	+111.78	+106.77
13:29:32	+116.05	+111.78	+106.77
13:30:02	+116.11	+111.78	+106.77
13:30:32	+116.05	+111.72	+106.77
13:31:02	+116.11	+111.78	+106.77
13:31:32	+116.11	+111.72	+106.77
13:32:02	+116.11	+111.72	+106.77
13:32:32	+116.11	+111.72	+106.83
13:33:02	+116.11	+111.72	+106.77
13:33:32	+116.11	+111.72	+106.77
13:34:02	+116.11	+111.72	+106.77
13:34:32	+116.11	+111.72	+106.83
13:35:02	+116.11	+111.72	+106.77
13:35:32	+116.11	+111.72	+106.77
13:36:02	+116.11	+111.72	+106.77
13:36:32	+116.11	+111.72	+106.77
13:37:02	+116.11	+111.72	+106.83
13:37:32	+116.11	+111.72	+106.83
13:38:02	+116.11	+111.72	+106.83
13:38:32	+116.11	+111.72	+106.77
13:39:02	+116.11	+111.66	+106.77
13:39:32	+116.11	+111.66	+106.77
13:40:02	+116.11	+111.66	+106.83
13:40:32	+116.11	+111.66	+106.83
13:41:02	+116.11	+111.66	+106.83
13:41:32	+116.11	+111.66	+106.83
13:42:02	+116.11	+111.66	+106.83
13:42:32	+116.11	+111.66	+106.83
13:43:02	+116.11	+111.66	+106.83
13:43:32	+116.11	+111.66	+106.83
13:44:02	+116.11	+111.66	+106.83
13:44:32	+116.11	+111.66	+106.83
13:45:02	+116.11	+111.66	+106.83
13:45:32	+116.11	+111.66	+106.83
13:46:02	+116.17	+111.66	+106.83
13:46:32	+116.11	+111.66	+106.83
13:47:02	+116.11	+111.59	+106.83
13:47:32	+116.11	+111.59	+106.83
13:48:02	+116.11	+111.59	+106.83
13:48:32	+116.11	+111.66	+106.83
13:49:02	+116.11	+111.59	+106.83
13:49:32	+116.11	+111.59	+106.83
13:50:02	+116.11	+111.59	+106.77
13:50:32	+116.11	+111.59	+106.83
13:51:02	+116.11	+111.59	+106.83
13:51:32	+116.11	+111.59	+106.77
13:52:02	+116.11	+111.59	+106.77
13:52:32	+116.11	+111.59	+106.77
13:53:02	+116.11	+111.59	+106.77
13:53:32	+116.17	+111.66	+106.83
13:54:02	+116.11	+111.59	+106.71
13:54:32	+116.11	+111.59	+106.71
13:55:02	+116.11	+111.59	+106.71
13:55:32	+116.11	+111.53	+106.65
13:56:02	+116.11	+111.53	+106.65
13:56:32	+116.11	+111.53	+106.59
13:57:02	+116.11	+111.53	+106.59
13:57:32	+116.11	+111.53	+106.59
13:58:02	+116.11	+111.53	+106.59
13:58:32	+116.11	+111.53	+106.53
13:59:02	+116.11	+111.53	+106.53
13:59:32	+116.11	+111.53	+106.53
14:00:02	+116.11	+111.53	+106.47
14:00:32	+116.11	+111.53	+106.47
14:01:02	+116.17	+111.59	+106.53
14:01:32	+116.11	+111.53	+106.47
14:02:02	+116.11	+111.53	+106.41
14:02:32	+116.11	+111.47	+106.41
14:03:02	+116.11	+111.53	+106.41
14:03:32	+116.11	+111.47	+106.41
14:04:02	+116.11	+111.47	+106.41
14:04:32	+116.11	+111.47	+106.41
14:05:02	+116.17	+111.53	+106.53
14:05:32	+116.11	+111.47	+106.53
14:06:02	+116.11	+111.47	+106.47
14:06:32	+116.17	+111.53	+106.53
14:07:02	+116.17	+111.53	+106.53
14:07:32	+116.11	+111.47	+106.53
14:08:02	+116.11	+111.47	+106.47
14:08:32	+116.11	+111.47	+106.47
14:09:02	+116.11	+111.47	+106.47
14:09:32	+116.11	+111.41	+106.41
14:10:02	+116.11	+111.47	+106.41
14:10:32	+116.11	+111.41	+106.41
14:11:02	+116.17	+111.47	+106.47
14:11:32	+116.17	+111.47	+106.47
14:12:02	+116.11	+111.41	+106.34
14:12:32	+116.17	+111.47	+106.41
14:13:02	+116.17	+111.47	+106.41
14:13:32	+116.17	+111.47	+106.41
14:14:02	+116.17	+111.47	+106.34
14:14:32	+116.17	+111.41	+106.28
14:15:02	+116.11	+111.41	+106.28
14:15:32	+116.11	+111.41	+106.28
14:16:02	+116.17	+111.47	+106.34
14:16:32	+116.17	+111.41	+106.34
14:17:02	+116.17	+111.41	+106.28
14:17:32	+116.11	+111.41	+106.22
14:18:02	+116.11	+111.35	+106.22
14:18:32	+116.11	+111.35	+106.22
14:19:02	+116.17	+111.41	+106.34
14:19:32	+116.17	+111.41	+106.34
14:20:02	+116.17	+111.41	+106.34
14:20:32	+116.17	+111.35	+106.47
14:21:02	+116.17	+111.35	+106.47
14:21:32	+116.17	+111.41	+106.47
14:22:02	+116.17	+111.35	+107.38
14:22:32	+116.23	+111.29	+107.69
14:23:02	+116.23	+111.35	+107.99
14:23:32	+116.23	+111.35	+108.11
14:24:02	+116.30	+111.35	+108.30
14:24:32	+116.30	+111.35	+108.36
14:25:02	+116.30	+111.35	+108.36
14:25:32	+116.30	+111.23	+108.54
14:26:02	+116.30	+111.35	+108.60
14:26:32	+116.30	+111.29	+108.66
14:27:02	+116.30	+111.35	+108.66
14:27:32	+116.23	+111.35	+108.66
14:28:02	+116.30	+111.29	+108.79
14:28:32	+116.30	+111.29	+108.79
14:29:02	+116.30	+111.29	+108.85
14:29:32	+116.30	+111.29	+108.85
14:30:02	+116.30	+111.29	+108.91
14:30:32	+116.30	+111.23	+108.97
14:31:02	+116.30	+111.23	+109.09
14:31:32	+116.30	+111.35	+109.15
14:32:02	+116.30	+111.29	+109.21
14:32:32	+116.30	+111.23	+109.27
14:33:02	+116.30	+111.29	+109.21
14:33:32	+116.30	+111.29	+109.21
14:34:02	+116.30	+111.29	+109.34
14:34:32	+116.30	+111.29	+109.52
14:35:02	+116.30	+111.23	+109.40
14:35:32	+116.30	+111.23	+109.46
14:36:02	+116.30	+111.29	+109.40
14:36:32	+116.30	+111.23	+109.40
14:37:02	+116.36	+111.17	+109.46
14:37:32	+116.23	+111.17	+109.15
14:38:02	+116.23	+111.17	+109.27
14:38:32	+116.23	+111.29	+109.21
14:39:02	+116.23	+111.23	+109.09
14:39:32	+116.30	+111.23	+108.97
14:40:02	+116.23	+111.23	+108.85
14:40:32	+116.23	+111.17	+108.85
14:41:02	+116.23	+111.23	+108.66
14:41:32	+116.30	+111.23	+108.66
14:42:02	+116.23	+111.23	+108.60
14:42:32	+116.23	+111.23	+108.60
14:43:02	+116.23	+111.23	+108.48
14:43:32	+116.23	+111.17	+108.48
14:44:02	+116.23	+111.23	+108.42
14:44:32	+116.23	+111.11	+108.11
14:45:02	+116.17	+111.17	+108.36
14:45:32	+116.23	+111.11	+108.30
14:46:02	+116.23	+111.17	+108.11
14:46:32	+116.23	+111.17	+108.30
14:47:02	+116.23	+111.11	+108.18
14:47:32	+116.30	+111.11	+107.99
14:48:02	+116.23	+111.17	+107.99
14:48:32	+116.23	+111.11	+108.11
14:49:02	+116.23	+111.11	+108.05
14:49:32	+116.23	+111.05	+107.99
14:50:02	+116.17	+110.98	+107.87

14:50:32	+116.23	+111.05	+107.93
14:51:02	+116.23	+111.11	+107.87
14:51:32	+116.23	+111.11	+107.87
14:52:02	+116.17	+111.11	+107.75
14:52:32	+116.23	+111.11	+107.75
14:53:02	+116.23	+111.11	+107.81
14:53:32	+116.23	+111.17	+107.75
14:54:02	+116.23	+111.17	+107.81
14:54:32	+116.17	+111.05	+107.69
14:55:02	+116.23	+111.17	+107.63
14:55:32	+116.23	+110.86	+107.99
14:56:02	+116.23	+111.11	+108.11
14:56:32	+116.23	+111.11	+108.24
14:57:02	+116.23	+111.05	+108.42
14:57:32	+116.23	+111.11	+108.42
14:58:02	+116.23	+111.23	+108.48
14:58:32	+116.23	+111.05	+108.42
14:59:02	+116.23	+111.17	+108.60
14:59:32	+116.30	+111.05	+108.60
15:00:02	+116.30	+110.86	+108.66
15:00:32	+116.23	+110.98	+108.91
15:01:02	+116.30	+111.05	+108.91
15:01:32	+116.30	+111.11	+108.97
15:02:02	+116.30	+111.05	+108.97
15:02:32	+116.30	+111.05	+108.91
15:03:02	+116.30	+110.98	+108.80
15:03:32	+116.30	+111.11	+108.73
15:04:02	+116.30	+111.11	+108.66
15:04:32	+116.23	+111.11	+108.48
15:05:02	+116.30	+110.98	+108.54
15:05:32	+116.23	+111.05	+108.54
15:06:02	+116.23	+110.92	+108.54
15:06:32	+116.23	+110.92	+108.54
15:07:02	+116.23	+110.98	+108.42
15:07:32	+116.23	+110.98	+108.36
15:08:02	+116.23	+110.98	+108.30
15:08:32	+116.23	+110.92	+108.30
15:09:02	+116.23	+110.80	+108.24
15:09:32	+116.23	+110.92	+108.24
15:10:02	+116.23	+110.92	+108.30
15:10:32	+116.23	+111.11	+108.30
15:11:02	+116.23	+111.05	+108.30
15:11:32	+116.23	+110.92	+108.24
15:12:02	+116.30	+110.92	+108.18
15:12:32	+116.23	+110.98	+108.11
15:13:02	+116.23	+110.86	+108.18
15:13:32	+116.23	+110.86	+108.11
15:14:02	+116.23	+110.86	+108.11
15:14:32	+116.17	+110.80	+107.87
15:15:02	+116.23	+110.92	+108.11
15:15:32	+116.23	+110.86	+108.11
15:16:02	+116.23	+110.86	+107.99
15:16:32	+116.23	+110.98	+108.05
15:17:02	+116.17	+110.80	+107.81
15:17:32	+116.23	+110.86	+107.99
15:18:02	+116.23	+110.80	+108.05
15:18:32	+116.23	+110.80	+107.93
15:19:02	+116.23	+110.80	+107.93
15:19:32	+116.23	+110.86	+108.11
15:20:02	+116.23	+110.92	+108.05
15:20:32	+116.23	+110.98	+107.93
15:21:02	+116.23	+110.68	+107.87
15:21:32	+116.23	+110.92	+107.87
15:22:02	+116.30	+110.86	+107.81
15:22:32	+116.23	+110.86	+107.81
15:23:02	+116.17	+110.80	+107.75
15:23:32	+116.23	+110.80	+107.87
15:24:02	+116.30	+110.92	+107.75
15:24:32	+116.23	+110.86	+107.81
15:25:02	+116.17	+110.68	+107.75
15:25:32	+116.23	+110.86	+107.75
15:26:02	+116.23	+110.86	+107.69
15:26:32	+116.23	+110.74	+107.75
15:27:02	+116.23	+110.86	+107.69
15:27:32	+116.17	+110.74	+107.63

15:28:02	+116.23	+110.92	+107.69
15:28:32	+116.17	+110.74	+107.44
15:29:02	+116.17	+110.74	+107.63
15:29:32	+116.17	+110.74	+107.57
15:30:02	+116.23	+110.80	+107.57
15:30:32	+116.23	+110.80	+107.50
15:31:02	+116.23	+110.80	+107.57
15:31:32	+116.23	+110.80	+107.50
15:32:02	+116.23	+110.80	+107.75
15:32:32	+116.23	+110.74	+107.57
15:33:02	+116.23	+110.62	+107.38
15:33:32	+116.23	+110.68	+107.57
15:34:02	+116.23	+110.62	+107.26
15:34:32	+116.23	+110.80	+107.50
15:35:02	+116.23	+110.62	+107.50
15:35:32	+116.30	+110.74	+107.44
15:36:02	+116.17	+110.68	+107.38
15:36:32	+116.23	+110.80	+107.44
15:37:02	+116.23	+110.62	+107.38
15:37:32	+116.30	+110.68	+107.38
15:38:02	+116.23	+110.56	+107.38
15:38:32	+116.23	+110.62	+107.44
15:39:02	+116.23	+110.62	+107.38
15:39:32	+116.23	+110.68	+107.38
15:40:02	+116.17	+110.68	+107.20
15:40:32	+116.17	+110.62	+107.20
15:41:02	+116.23	+110.62	+107.26
15:41:32	+116.23	+110.68	+107.20
15:42:02	+116.23	+110.56	+107.02
15:42:32	+116.23	+110.62	+107.26
15:43:02	+116.23	+110.56	+107.14
15:43:32	+116.23	+110.56	+107.14
15:44:02	+116.23	+110.56	+107.20
15:44:32	+116.23	+110.62	+107.14
15:45:02	+116.23	+110.56	+107.14
15:45:32	+116.30	+110.68	+107.08
15:46:02	+116.30	+110.62	+107.08
15:46:32	+116.23	+110.50	+107.08
15:47:02	+116.23	+110.56	+107.02
15:47:32	+116.23	+110.68	+106.95
15:48:02	+116.23	+110.56	+106.89
15:48:32	+116.23	+110.50	+107.02
15:49:02	+116.23	+110.50	+107.02
15:49:32	+116.23	+110.62	+106.89
15:50:02	+116.17	+110.31	+106.89
15:50:32	+116.23	+110.56	+107.08
15:51:02	+116.30	+110.50	+106.89
15:51:32	+116.23	+110.56	+106.83
15:52:02	+116.17	+110.56	+106.77
15:52:32	+116.23	+110.50	+106.83
15:53:02	+116.23	+110.50	+106.89
15:53:32	+116.23	+110.62	+106.77
15:54:02	+116.23	+110.43	+106.77
15:54:32	+116.30	+110.50	+106.77
15:55:02	+116.23	+110.50	+106.77
15:55:32	+116.23	+110.56	+106.59
15:56:02	+116.23	+110.50	+106.65
15:56:32	+116.23	+110.43	+106.65
15:57:02	+116.23	+110.43	+106.65
15:57:32	+116.23	+110.50	+106.53
15:58:02	+116.23	+110.43	+106.65
15:58:32	+116.23	+110.50	+106.53
15:59:02	+116.17	+110.43	+106.41
15:59:32	+116.17	+110.31	+106.47
16:00:02	+116.23	+110.56	+107.20
16:00:32	+116.30	+110.43	+107.69
16:01:02	+116.30	+110.56	+108.05
16:01:32	+116.30	+110.50	+108.05
16:02:02	+116.30	+110.68	+108.30
16:02:32	+116.30	+110.43	+108.30
16:03:02	+116.23	+110.56	+108.48
16:03:32	+116.30	+110.37	+108.48
16:04:02	+116.23	+110.37	+108.54
16:04:32	+116.23	+110.50	+108.79
16:05:02	+116.30	+110.56	+108.73

16:05:32	+116.36	+110.50	+108.97
16:06:02	+116.30	+110.43	+108.91
16:06:32	+116.30	+110.37	+108.97
16:07:02	+116.30	+110.31	+108.91
16:07:32	+116.30	+110.37	+108.85
16:08:02	+116.30	+110.37	+108.73
16:08:32	+116.30	+110.31	+108.65
16:09:02	+116.30	+110.50	+108.60
16:09:32	+116.30	+110.37	+108.48
16:10:02	+116.30	+110.25	+108.42
16:10:32	+116.36	+110.50	+108.36
16:11:02	+116.30	+110.43	+108.54
16:11:32	+116.30	+110.37	+108.36
16:12:02	+116.30	+110.25	+108.30
16:12:32	+116.30	+110.31	+108.24
16:13:02	+116.23	+110.31	+108.11
16:13:32	+116.23	+110.25	+108.05
16:14:02	+116.30	+110.43	+108.11
16:14:32	+116.36	+110.37	+108.05
16:15:02	+116.23	+110.31	+107.87
16:15:32	+116.30	+110.31	+107.75
16:16:02	+116.30	+110.31	+107.87
16:16:32	+116.30	+110.19	+107.81
16:17:02	+116.23	+110.25	+107.75
16:17:32	+116.30	+110.25	+107.81
16:18:02	+116.30	+110.19	+107.75
16:18:32	+116.30	+110.25	+107.69
16:19:02	+116.23	+110.25	+107.63
16:19:32	+116.30	+110.31	+107.87
16:20:02	+116.36	+110.25	+107.63
16:20:32	+116.23	+110.31	+107.57
16:21:02	+116.30	+110.25	+107.44
16:21:32	+116.30	+110.31	+107.57
16:22:02	+116.30	+110.25	+107.50
16:22:32	+116.30	+110.31	+107.44
16:23:02	+116.30	+110.31	+107.63
16:23:32	+116.23	+110.31	+107.38
16:24:02	+116.23	+110.25	+107.32
16:24:32	+116.23	+110.19	+107.32
16:25:02	+116.23	+110.31	+107.26
16:25:32	+116.23	+110.19	+107.32
16:26:02	+116.30	+110.19	+107.32
16:26:32	+116.23	+110.13	+107.14
16:27:02	+116.23	+110.13	+107.26
16:27:32	+116.23	+110.19	+107.38
16:28:02	+116.23	+110.07	+107.14
16:28:32	+116.23	+110.25	+107.26
16:29:02	+116.23	+110.13	+107.14
16:29:32	+116.23	+110.37	+107.08
16:30:02	+116.23	+110.25	+107.08
16:30:32	+116.23	+110.13	+106.95
16:31:02	+116.23	+110.19	+107.08
16:31:32	+116.23	+110.13	+106.95
16:32:02	+116.23	+110.19	+106.89
16:32:32	+116.30	+110.25	+106.83
16:33:02	+116.17	+110.07	+106.77
16:33:32	+116.30	+110.13	+106.95
16:34:02	+116.23	+110.01	+106.65
16:34:32	+116.30	+110.25	+106.65
16:35:02	+116.30	+110.19	+106.65
16:35:32	+116.23	+110.13	+106.65
16:36:02	+116.23	+110.13	+106.59
16:36:32	+116.23	+110.07	+106.47
16:37:02	+116.23	+110.07	+106.47
16:37:32	+116.23	+110.07	+106.47
16:38:02	+116.23	+110.13	+106.53
16:38:32	+116.36	+110.01	+106.53
16:39:02	+116.23	+110.07	+106.47
16:39:32	+116.23	+110.01	+106.34
16:40:02	+116.23	+110.07	+106.47
16:40:32	+116.23	+110.01	+106.28
16:41:02	+116.23	+110.25	+106.34
16:41:32	+116.23	+110.07	+106.28
16:42:02	+116.23	+110.07	+106.28
16:42:32	+116.23	+109.89	+106.16

16:43:02	+116.23	+109.89	+106.16
16:43:32	+116.30	+110.07	+106.10
16:44:02	+116.23	+109.89	+106.16
16:44:32	+116.30	+110.07	+106.04
16:45:02	+116.23	+109.95	+106.10
16:45:32	+116.23	+110.01	+106.10
16:46:02	+116.30	+110.01	+106.16
16:46:32	+116.30	+110.01	+106.04
16:47:02	+116.30	+110.13	+106.04
16:47:32	+116.23	+109.95	+105.86
16:48:02	+116.30	+109.95	+106.04
16:48:32	+116.23	+109.95	+107.20
16:49:02	+116.30	+110.07	+107.81
16:49:32	+116.30	+109.95	+107.99
16:50:02	+116.30	+109.95	+108.11
16:50:32	+116.23	+109.89	+108.24
16:51:02	+116.30	+110.13	+108.54
16:51:32	+116.36	+109.89	+108.54
16:52:02	+116.36	+109.89	+108.60
16:52:32	+116.36	+110.01	+108.79
16:53:02	+116.30	+109.95	+108.85
16:53:32	+116.36	+109.95	+108.91
16:54:02	+116.30	+109.89	+109.03
16:54:32	+116.36	+110.01	+109.27
16:55:02	+116.36	+110.07	+109.40
16:55:32	+116.30	+109.95	+109.27
16:56:02	+116.36	+110.01	+109.34
16:56:32	+116.36	+109.89	+109.34
16:57:02	+116.30	+109.89	+109.46
16:57:32	+116.30	+109.82	+109.34
16:58:02	+116.30	+109.89	+109.58
16:58:32	+116.36	+109.89	+109.52
16:59:02	+116.30	+109.70	+109.40
16:59:32	+116.36	+109.89	+109.52
17:00:02	+116.36	+109.89	+109.76
17:00:32	+116.36	+109.95	+109.95
17:01:02	+116.42	+109.89	+109.76
17:01:32	+116.36	+109.89	+109.76
17:02:02	+116.30	+109.70	+109.52
17:02:32	+116.23	+109.76	+109.40
17:03:02	+116.30	+109.70	+109.34
17:03:32	+116.30	+109.64	+109.15
17:04:02	+116.36	+109.95	+109.27
17:04:32	+116.30	+109.58	+108.97
17:05:02	+116.36	+109.82	+109.15
17:05:32	+116.30	+109.89	+109.09
17:06:02	+116.23	+109.82	+108.97
17:06:32	+116.30	+109.76	+108.85
17:07:02	+116.30	+109.76	+108.79
17:07:32	+116.30	+109.70	+108.66
17:08:02	+116.23	+109.70	+108.60
17:08:32	+116.23	+109.82	+108.66
17:09:02	+116.23	+109.64	+108.36
17:09:32	+116.23	+109.76	+108.42
17:10:02	+116.30	+109.76	+108.42
17:10:32	+116.23	+109.64	+108.30
17:11:02	+116.30	+109.58	+108.18
17:11:32	+116.23	+109.70	+108.24
17:12:02	+116.23	+109.82	+108.30
17:12:32	+116.30	+109.70	+108.18
17:13:02	+116.23	+109.64	+108.11
17:13:32	+116.23	+109.64	+108.05
17:14:02	+116.30	+109.89	+108.18
17:14:32	+116.23	+109.70	+108.05
17:15:02	+116.30	+109.70	+107.99
17:15:32	+116.30	+109.58	+107.87
17:16:02	+116.30	+109.58	+107.81
17:16:32	+116.30	+109.70	+107.93
17:17:02	+116.23	+109.58	+107.69
17:17:32	+116.23	+109.64	+107.75
17:18:02	+116.30	+109.76	+107.81
17:18:32	+116.30	+109.82	+107.81
17:19:02	+116.30	+109.52	+107.57
17:19:32	+116.30	+109.82	+107.69
17:20:02	+116.23	+109.58	+107.57

17:20:32	+116.30	+109.64	+107.57
17:21:02	+116.30	+109.58	+107.50
17:21:32	+116.30	+109.70	+107.57
17:22:02	+116.36	+109.70	+107.57
17:22:32	+116.23	+109.58	+107.38
17:23:02	+116.30	+109.64	+107.44
17:23:32	+116.30	+109.52	+107.32
17:24:02	+116.30	+109.64	+107.38
17:24:32	+116.30	+109.70	+107.44
17:25:02	+116.30	+109.76	+107.38
17:25:32	+116.30	+109.52	+107.26
17:26:02	+116.30	+109.70	+107.26
17:26:32	+116.23	+109.52	+107.08
17:27:02	+116.36	+109.58	+107.20
17:27:32	+116.30	+109.58	+107.14
17:28:02	+116.30	+109.52	+107.08
17:28:32	+116.30	+109.52	+107.02
17:29:02	+116.30	+109.52	+107.02
17:29:32	+116.30	+109.58	+107.08
17:30:02	+116.30	+109.46	+106.95
17:30:32	+116.30	+109.58	+107.02
17:31:02	+116.30	+109.52	+106.95
17:31:32	+116.30	+109.52	+106.83
17:32:02	+116.30	+109.46	+106.77
17:32:32	+116.30	+109.52	+106.77
17:33:02	+116.30	+109.46	+106.77
17:33:32	+116.30	+109.46	+106.77
17:34:02	+116.30	+109.70	+106.95
17:34:32	+116.23	+109.40	+106.65
17:35:02	+116.30	+109.40	+106.65
17:35:32	+116.30	+109.76	+106.89
17:36:02	+116.30	+109.70	+106.83
17:36:32	+116.30	+109.52	+106.65
17:37:02	+116.30	+109.52	+107.50
17:37:32	+116.30	+109.46	+106.11
17:38:02	+116.30	+109.46	+106.42
17:38:32	+116.30	+109.52	+106.60
17:39:02	+116.36	+109.46	+106.79
17:39:32	+116.30	+109.40	+106.85
17:40:02	+116.30	+109.40	+106.97
17:40:32	+116.36	+109.46	+109.21
17:41:02	+116.30	+109.58	+109.34
17:41:32	+116.36	+109.34	+109.21
17:42:02	+116.36	+109.52	+109.52
17:42:32	+116.36	+109.46	+109.46
17:43:02	+116.36	+109.46	+109.52
17:43:32	+116.36	+109.27	+109.40
17:44:02	+116.36	+109.46	+109.64
17:44:32	+116.30	+109.52	+109.76
17:45:02	+116.42	+109.34	+109.64
17:45:32	+116.30	+109.40	+109.76
17:46:02	+116.36	+109.27	+109.70
17:46:32	+116.30	+109.46	+109.89
17:47:02	+116.36	+109.46	+109.95
17:47:32	+116.36	+109.40	+109.95
17:48:02	+116.36	+109.34	+109.95
17:48:32	+116.42	+109.64	+110.25
17:49:02	+116.30	+109.27	+109.89
17:49:32	+116.36	+109.40	+110.07
17:50:02	+116.36	+109.34	+110.01
17:50:32	+116.42	+109.40	+110.13
17:53:00	+116.36	+109.27	+110.01
17:53:30	+116.36	+109.15	+109.95
17:54:00	+116.30	+109.27	+110.07
17:54:30	+116.36	+109.27	+110.07
17:55:00	+116.36	+109.52	+110.37
17:55:30	+116.36	+109.34	+110.19
17:56:00	+116.36	+109.40	+110.31
17:56:30	+116.36	+109.34	+110.19
17:57:00	+116.36	+109.15	+110.13
17:57:30	+116.36	+109.21	+110.13
17:58:00	+116.36	+109.34	+110.25
17:58:30	+116.36	+109.21	+110.13
17:59:00	+116.36	+109.40	+110.31
17:59:30	+116.36	+109.15	+110.01

18:00:00	+116.36	+109.27	+110.07
18:00:30	+116.30	+109.34	+110.07
18:01:00	+116.36	+109.27	+109.95
18:01:30	+116.36	+109.27	+109.89
18:02:00	+116.36	+109.27	+109.82
18:02:30	+116.36	+109.27	+109.76
18:03:00	+116.36	+109.21	+109.64
18:03:30	+116.36	+109.21	+109.58
18:04:00	+116.36	+109.15	+109.52
18:04:30	+116.30	+109.09	+109.40
18:05:00	+116.36	+109.21	+109.46
18:05:30	+116.30	+109.09	+109.34
18:06:00	+116.30	+109.15	+109.34
18:06:30	+116.30	+109.15	+109.27
18:07:00	+116.36	+109.27	+109.34
18:07:30	+116.30	+109.27	+109.34
18:08:00	+116.30	+109.09	+109.21
18:08:30	+116.30	+109.21	+109.27
18:09:00	+116.30	+108.97	+108.97
18:09:30	+116.30	+108.91	+108.97
18:10:00	+116.30	+109.15	+109.09
18:10:30	+116.36	+109.03	+108.91
18:11:00	+116.30	+109.15	+109.03
18:11:30	+116.30	+109.09	+108.91
18:12:00	+116.36	+109.15	+108.97
18:12:30	+116.36	+109.15	+108.97
18:13:00	+116.30	+109.15	+108.97
18:13:30	+116.30	+108.91	+108.66
18:14:00	+116.36	+109.15	+108.91
18:14:30	+116.30	+108.03	+108.73
18:15:00	+116.30	+109.09	+108.66
18:15:30	+116.36	+109.15	+108.73
18:16:00	+116.36	+109.21	+108.73
18:16:30	+116.30	+109.21	+108.73
18:17:00	+116.30	+109.15	+108.66
18:17:30	+116.30	+108.97	+108.48
18:18:00	+116.36	+109.09	+108.54
18:18:30	+116.36	+109.09	+108.60
18:19:00	+116.36	+109.21	+108.66
18:19:30	+116.36	+109.15	+108.48
18:20:00	+116.36	+109.27	+109.21
18:20:30	+116.30	+109.03	+109.21
18:21:00	+116.36	+109.03	+109.40
18:21:30	+116.36	+109.09	+109.58
18:22:00	+116.36	+109.03	+109.70
18:22:30	+116.36	+109.09	+109.82
18:23:00	+116.36	+109.09	+109.95
18:23:30	+116.36	+109.09	+110.01
18:24:00	+116.36	+109.09	+110.07
18:24:30	+116.36	+109.03	+110.13
18:25:00	+116.36	+109.09	+110.19
18:25:30	+116.30	+108.91	+109.89
18:26:00	+116.42	+108.97	+109.95
18:26:30	+116.36	+108.97	+109.76
18:27:00	+116.36	+109.09	+109.82
18:27:30	+116.36	+109.09	+109.76
18:28:00	+116.36	+109.03	+109.58
18:28:30	+116.36	+108.97	+109.46
18:29:00	+116.36	+109.03	+109.46
18:29:30	+116.36	+108.79	+109.21
18:30:00	+116.36	+109.03	+109.40
18:30:30	+116.36	+109.03	+109.27
18:31:00	+116.36	+109.09	+109.34
18:31:30	+116.30	+108.85	+108.97
18:32:00	+116.36	+109.09	+109.21
18:32:30	+116.36	+108.85	+108.97
18:33:00	+116.36	+108.97	+109.03
18:33:30	+116.36	+108.85	+108.97
18:34:00	+116.30	+108.85	+108.79
18:34:30	+116.36	+109.15	+109.09
18:35:00	+116.36	+108.91	+108.79
18:35:30	+116.36	+108.85	+108.79
18:36:00	+116.36	+108.97	+108.85
18:36:30	+116.36	+109.09	+108.79
18:37:00	+116.36	+108.79	+108.54

18:37:30	+116.36	+109.09	+108.85
18:38:00	+116.36	+108.79	+108.48
18:38:30	+116.36	+108.85	+108.54
18:39:00	+116.36	+108.85	+108.48
18:39:30	+116.36	+108.85	+108.48
18:40:00	+116.36	+108.91	+108.48
18:40:30	+116.36	+108.91	+108.42
18:41:00	+116.36	+108.85	+108.30
18:41:30	+116.36	+108.85	+108.36
18:42:00	+116.36	+108.91	+108.42
18:42:30	+116.36	+108.85	+108.30
18:43:00	+116.36	+108.73	+108.11
18:43:30	+116.36	+108.91	+108.24
18:44:00	+116.36	+108.85	+108.18
18:44:30	+116.36	+108.91	+108.18
18:45:00	+116.36	+108.85	+108.11
18:45:30	+116.36	+108.79	+108.05
18:46:00	+116.42	+108.85	+109.15
18:46:30	+116.36	+108.73	+109.27
18:47:00	+116.36	+108.79	+109.40
18:47:30	+116.36	+108.66	+109.46
18:48:00	+116.36	+108.85	+109.58
18:48:30	+116.36	+108.79	+109.70
18:49:00	+116.36	+108.79	+109.76
18:49:30	+116.36	+108.85	+109.89
18:50:00	+116.36	+108.85	+110.01
18:50:30	+116.36	+108.73	+109.95
18:51:00	+116.42	+108.85	+110.13
18:51:30	+116.36	+108.79	+110.13
18:52:00	+116.42	+108.79	+110.19
18:52:30	+116.36	+108.73	+110.19
18:53:00	+116.42	+108.73	+110.25
18:53:30	+116.42	+108.79	+110.31
18:54:00	+116.42	+108.79	+110.43
18:54:30	+116.42	+108.85	+110.37
18:55:00	+116.42	+108.73	+110.37
18:55:30	+116.42	+108.85	+110.50
18:56:00	+116.42	+108.66	+110.37
18:56:30	+116.42	+108.79	+110.43
18:57:00	+610.43	-610.43	+58.119
18:57:30	-132.60	+108.73	+110.43
18:58:00	+116.36	+108.73	+110.50
18:58:30	+116.42	+108.79	+110.56
18:59:00	+116.42	+108.85	+110.62
18:59:30	+116.42	+108.54	+110.37
19:00:00	+116.42	+108.85	+110.68
19:00:30	+116.42	+108.66	+110.56
19:01:00	+116.42	+108.85	+110.68
19:01:30	+116.42	+108.73	+110.62
19:02:00	+116.42	+108.66	+110.56
19:02:30	+116.42	+108.66	+110.62
19:03:00	+116.42	+108.79	+109.64
19:03:30	+116.42	+108.66	+109.15
19:04:00	+116.42	+108.91	+108.97
19:04:30	+116.42	+108.54	+108.42
19:05:00	+116.42	+108.79	+108.54
19:05:30	+116.42	+108.85	+108.73
19:06:00	+116.42	+108.66	+108.60
19:06:30	+116.42	+108.79	+108.85
19:07:00	+116.42	+108.79	+108.97
19:07:30	+116.36	+108.54	+108.85
19:08:00	+116.42	+108.66	+108.85
19:08:30	+116.36	+108.79	+108.79
19:09:00	+116.36	+108.66	+108.66
19:09:30	+116.42	+108.66	+108.66
19:10:00	+116.36	+108.73	+108.66
19:10:30	+116.36	+108.54	+108.54
19:11:00	+116.42	+108.66	+108.54
19:11:30	+116.36	+108.60	+108.42
19:12:00	+116.42	+108.60	+108.42
19:12:30	+116.36	+108.54	+108.36
19:13:00	+116.36	+108.73	+108.48
19:13:30	+116.36	+108.73	+108.54
19:14:00	+116.36	+108.48	+108.24
19:14:30	+116.36	+108.54	+108.30

19:15:00	+116.36	+108.54	+108.30
19:15:30	+116.36	+108.36	+108.11
19:16:00	+116.36	+108.48	+108.18
19:16:30	+116.36	+108.48	+108.24
19:17:00	+116.36	+108.66	+108.42
19:17:30	+116.36	+108.42	+108.18
19:18:00	+116.36	+108.48	+108.18
19:18:30	+116.36	+108.54	+108.30
19:19:00	+116.42	+108.73	+108.48
19:19:30	+116.42	+108.54	+108.30
19:20:00	+116.30	+108.42	+108.11
19:20:30	+116.42	+108.54	+108.24
19:21:00	+116.36	+108.24	+108.30
19:21:30	+116.36	+108.48	+108.66
19:22:00	+116.36	+108.48	+108.85
19:22:30	+116.36	+108.60	+109.03
19:23:00	+116.42	+108.42	+109.03
19:23:30	+116.36	+108.60	+109.21
19:24:00	+116.36	+108.54	+109.27
19:24:30	+116.42	+108.48	+109.27
19:25:00	+116.42	+108.66	+109.52
19:25:30	+116.42	+108.42	+109.27
19:26:00	+116.42	+108.36	+109.27
19:26:30	+116.42	+108.48	+109.46
19:27:00	+116.42	+108.54	+109.52
19:27:30	+116.42	+108.48	+109.52
19:28:00	+116.36	+108.42	+109.52
19:28:30	+116.36	+108.42	+109.52
19:29:00	+116.36	+108.24	+109.27
19:29:30	+116.36	+108.42	+109.46
19:30:00	+116.36	+108.42	+109.46
19:30:30	+116.36	+108.30	+109.34
19:31:00	+116.36	+108.36	+109.34
19:31:30	+116.36	+108.48	+109.46
19:32:00	+116.36	+108.24	+109.15
19:32:30	+116.36	+108.42	+109.27
19:33:00	+116.36	+108.36	+109.15
19:33:30	+116.36	+108.24	+109.09
19:34:00	+116.42	+108.36	+109.15
19:34:30	+116.42	+108.54	+109.27
19:35:00	+116.36	+108.24	+108.97
19:35:30	+116.36	+108.24	+108.91
19:36:00	+116.36	+108.24	+109.15
19:36:30	+116.36	+108.54	+109.40
19:37:00	+116.36	+108.30	+109.15
19:37:30	+116.42	+108.54	+109.34
19:38:00	+116.36	+108.18	+108.97
19:38:30	+116.42	+108.30	+109.03
19:39:00	+116.36	+108.36	+109.09
19:39:30	+116.36	+108.11	+108.91
19:40:00	+116.30	+108.05	+108.79
19:40:30	+116.36	+108.36	+109.09
19:41:00	+116.36	+108.30	+109.03
19:41:30	+116.36	+108.30	+109.03
19:42:00	+116.36	+108.36	+109.15
19:42:30	+116.36	+108.18	+108.91
19:43:00	+116.30	+108.18	+108.91
19:43:30	+116.36	+108.24	+108.91
19:44:00	+116.30	+107.99	+108.73
19:44:30	+116.42	+108.30	+109.03
19:45:00	+116.42	+108.11	+108.91
19:45:30	+116.42	+108.24	+108.97
19:46:00	+116.36	+108.24	+108.97
19:46:30	+116.36	+108.18	+108.91
19:47:00	+116.30	+108.18	+108.85
19:47:30	+116.36	+108.18	+108.85
19:48:00	+116.42	+108.11	+108.91
19:48:30	+116.36	+108.30	+108.97
19:49:00	+116.36	+108.18	+108.91
19:49:30	+116.36	+107.93	+108.73
19:50:00	+116.36	+108.11	+108.79
19:50:30	+116.36	+108.18	+108.91
19:51:00	+116.30	+108.11	+108.73
19:51:30	+116.36	+108.24	+108.97
19:52:00	+116.36	+108.18	+108.85

19:52:30	+116.30	+108.18	+108.91
19:53:00	+116.36	+108.18	+108.91
19:53:30	+116.36	+108.30	+109.09
19:54:00	+116.36	+107.93	+108.85
19:54:30	+116.36	+108.18	+109.09
19:55:00	+116.36	+108.05	+109.15
19:55:30	+116.36	+108.18	+109.34
19:56:00	+116.36	+108.11	+109.40
19:56:30	+116.36	+108.24	+109.52
19:57:00	+116.42	+107.99	+109.27
19:57:30	+116.42	+108.11	+109.40
19:58:00	+116.42	+108.05	+109.40
19:58:30	+116.42	+108.18	+109.52
19:59:00	+116.42	+108.11	+109.46
19:59:30	+116.42	+108.18	+109.52
20:00:00	+116.42	+108.30	+109.70
20:00:30	+116.42	+107.99	+109.46
20:01:00	+116.42	+108.24	+109.64
20:01:30	+116.42	+108.05	+109.58
20:02:00	+116.42	+108.05	+109.58
20:02:30	+116.42	+108.05	+109.52
20:03:00	+116.42	+108.18	+109.70
20:03:30	+116.42	+108.18	+109.70
20:04:00	+116.42	+108.18	+109.70
20:04:30	+116.36	+107.93	+109.52
20:05:00	+116.42	+108.11	+109.64
20:05:30	+116.36	+108.05	+109.52
20:06:00	+116.36	+107.99	+109.52
20:06:30	+116.42	+107.99	+109.58
20:07:00	+116.42	+108.18	+109.70
20:07:30	+116.42	+108.05	+109.64
20:08:00	+116.42	+107.99	+109.52
20:08:30	+116.48	+108.11	+109.64
20:09:00	+116.42	+108.05	+109.64
20:09:30	+116.36	+107.99	+109.58
20:10:00	+116.36	+107.81	+109.34
20:10:30	+116.36	+107.99	+109.52
20:11:00	+116.36	+108.05	+109.58
20:11:30	+116.36	+107.87	+109.46
20:12:00	+116.36	+107.93	+109.52
20:12:30	+116.48	+107.87	+109.40
20:13:00	+116.36	+107.99	+109.52
20:13:30	+116.36	+107.87	+109.46
20:14:00	+116.36	+107.75	+109.34
20:14:30	+116.36	+107.87	+109.46
20:15:00	+116.36	+107.93	+109.46
20:15:30	+116.36	+107.81	+109.40
20:16:00	+116.30	+107.81	+109.40
20:16:30	+116.36	+107.87	+109.46
20:17:00	+116.36	+107.87	+109.40
20:17:30	+116.36	+107.93	+109.46
20:18:00	+116.36	+107.93	+109.46
20:18:30	+116.36	+107.75	+109.27
20:19:00	+116.36	+107.87	+109.46
20:19:30	+116.36	+107.87	+109.46
20:20:00	+116.36	+107.93	+109.46
20:20:30	+116.36	+107.93	+109.46
20:21:00	+116.36	+107.87	+109.40
20:21:30	+116.42	+107.87	+109.52
20:22:00	+116.36	+107.75	+109.46
20:22:30	+116.36	+107.93	+109.58
20:23:00	+116.42	+107.93	+109.58
20:23:30	+116.42	+107.87	+109.52
20:24:00	+116.36	+107.87	+109.58
20:24:30	+116.36	+107.81	+109.52
20:25:00	+116.42	+108.05	+109.76
20:25:30	+116.42	+107.63	+109.46
20:26:00	+116.42	+107.87	+109.64
20:26:30	+116.42	+107.87	+109.58
20:27:00	+116.42	+108.05	+109.76
20:27:30	+116.42	+107.81	+109.52
20:28:00	+116.42	+107.93	+109.64
20:28:30	+116.42	+107.87	+109.64
20:29:00	+116.42	+107.93	+109.76
20:29:30	+116.42	+107.87	+109.58
20:30:00	+116.42	+107.99	+109.70

20:30:30	+116.42	+107.81	+109.58
20:31:00	+116.42	+107.75	+109.58
20:31:30	+116.42	+107.75	+109.52
20:32:00	+116.42	+107.87	+109.64
20:32:30	+116.48	+107.87	+109.70
20:33:00	+116.42	+107.69	+109.58
20:33:30	+116.42	+107.87	+109.70
20:34:00	+116.42	+107.81	+109.64
20:34:30	+116.48	+107.81	+109.70
20:35:00	+116.36	+107.75	+109.58
20:35:30	+116.36	+107.75	+109.[illegible]
20:36:00	+116.42	+107.69	+109.64
20:36:30	+116.36	+107.63	+109.58
20:37:00	+116.36	+107.50	+109.52
20:37:30	+116.36	+107.69	+109.58
20:38:00	+116.36	+107.75	+109.64
20:38:30	+116.42	+107.87	+109.70
20:39:00	+116.42	+107.69	+109.70
20:39:30	+116.36	+107.63	+109.58
20:40:00	+116.36	+107.75	+109.70
20:40:30	+116.36	+107.75	+109.70
20:41:00	+116.36	+107.81	+109.70
20:41:30	+116.42	+107.81	+109.76
20:42:00	+116.42	+107.75	+109.70
20:42:30	+116.42	+107.57	+109.52
20:43:00	+116.36	+107.69	+109.64
20:43:30	+116.42	+107.57	+109.58
20:44:00	+116.36	+107.63	+109.64
20:44:30	+116.42	+107.69	+109.70
20:45:00	+116.42	+107.63	+109.64
20:45:30	+116.42	+107.81	+109.82
20:46:00	+116.42	+107.81	+109.89
20:46:30	+116.42	+107.69	+109.70
20:47:00	+116.42	+107.57	+109.64
20:47:30	+116.36	+107.50	+109.52
20:48:00	+116.42	+107.69	+109.76
20:48:30	+116.36	+107.69	+109.76
20:49:00	+116.42	+107.50	+109.58
20:49:30	+116.42	+107.63	+109.76
20:50:00	+116.42	+107.69	+109.76
20:50:30	+116.42	+107.81	+109.89
20:51:00	+116.42	+107.57	+109.70
20:51:30	+116.36	+107.50	+109.64
20:52:00	+116.36	+107.63	+109.70
20:52:30	+116.36	+107.50	+109.64
20:53:00	+116.42	+107.69	+109.89
20:53:30	+116.42	+107.63	+109.76
20:54:00	+116.36	+107.50	+109.70
20:54:30	+116.42	+107.44	+109.64
20:55:00	+116.42	+107.69	+109.89
20:55:30	+116.42	+107.50	+109.70
20:56:00	+116.42	+107.75	+109.95
20:56:30	+116.42	+107.57	+109.76
20:57:00	+116.42	+107.57	+109.76
20:57:30	+116.36	+107.50	+109.70
20:58:00	+116.42	+107.44	+109.64
20:58:30	+116.42	+107.44	+109.70
20:59:00	+116.42	+107.57	+109.82
20:59:30	+116.36	+107.44	+109.70
21:00:00	+116.36	+107.50	+109.76
21:00:30	+116.42	+107.57	+109.82
21:01:00	+116.36	+107.38	+109.70
21:01:30	+116.42	+107.57	+109.82
21:02:00	+116.36	+107.50	+109.76
21:02:30	+116.42	+107.44	+109.76
21:03:00	+116.42	+107.44	+109.70
21:03:30	+116.42	+107.44	+109.76
21:04:00	+116.42	+107.44	+109.76
21:04:30	+116.42	+107.50	+109.82
21:05:00	+116.36	+107.57	+109.89
21:05:30	+116.36	+107.44	+109.70
21:06:00	+116.48	+107.44	+109.70
21:06:30	+116.42	+107.44	+109.[illegible]
21:07:00	+116.36	+107.38	+109.76
21:07:30	+116.42	+107.50	+109.76
21:08:00	+116.42	+107.44	+109.76

21:08:30	+116.36	+107.50	+109.82
21:09:00	+116.42	+107.44	+109.76
21:09:30	+116.42	+107.44	+109.76
21:10:00	+116.36	+107.26	+109.58
21:10:30	+116.36	+107.32	+109.64
21:11:00	+116.36	+107.44	+109.70
21:11:30	+116.36	+107.50	+109.82
21:12:00	+116.42	+107.50	+109.76
21:12:30	+116.42	+107.26	+109.58
21:13:00	+116.36	+107.32	+109.64
21:13:30	+116.42	+107.38	+109.70
21:14:00	+116.42	+107.38	+109.70
21:14:30	+116.36	+107.32	+109.58
21:15:00	+116.36	+107.44	+109.70
21:15:30	+116.42	+107.26	+109.58
21:16:00	+116.42	+107.26	+109.58
21:16:30	+116.42	+107.20	+109.58
21:17:00	+116.36	+107.26	+109.58
21:17:30	+116.42	+107.57	+109.89
21:18:00	+116.36	+107.26	+109.58
21:18:30	+116.42	+107.32	+109.70
21:19:00	+116.42	+107.32	+109.70
21:19:30	+116.36	+107.14	+109.46
21:20:00	+116.42	+107.38	+109.76
21:20:30	+116.42	+107.38	+109.76
21:21:00	+116.42	+107.26	+109.70
21:21:30	+116.42	+107.20	+109.64
21:22:00	+116.42	+107.32	+109.76
21:22:30	+116.36	+107.26	+109.70
21:23:00	+116.42	+107.32	+109.76
21:23:30	+116.36	+107.26	+109.70
21:24:00	+116.42	+107.32	+109.76
21:24:30	+116.42	+107.32	+109.76
21:25:00	+116.42	+107.32	+109.82
21:25:30	+116.42	+107.26	+109.70
21:26:00	+116.36	+107.02	+109.52
21:26:30	+116.42	+107.26	+109.76
21:27:00	+116.36	+107.26	+109.76
21:27:30	+116.42	+107.26	+109.70
21:28:00	+116.42	+107.26	+109.76
21:28:30	+116.42	+107.20	+109.76
21:29:00	+116.42	+107.38	+109.89
21:29:30	+116.42	+107.26	+109.76
21:30:00	+116.48	+107.08	+109.64
21:30:30	+116.36	+107.20	+109.70
21:31:00	+116.42	+107.26	+109.76
21:31:30	+116.42	+107.32	+109.82
21:32:00	+116.42	+107.38	+109.89
21:32:30	+116.42	+107.26	+109.76
21:33:00	+116.42	+107.38	+109.89
21:33:30	+116.42	+107.14	+109.64
21:34:00	+116.36	+107.08	+109.70
21:34:30	+116.42	+107.20	+109.82
21:35:00	+116.42	+107.26	+109.82
21:35:30	+116.36	+107.14	+109.76
21:36:00	+116.42	+107.20	+109.82
21:36:30	+116.42	+107.08	+109.76
21:37:00	+116.36	+107.20	+109.76
21:37:30	+116.42	+107.20	+109.82
21:38:00	+116.42	+107.20	+109.76
21:38:30	+116.48	+107.20	+109.82
21:39:00	+116.42	+107.20	+109.89
21:39:30	+116.42	+107.08	+109.76
21:40:00	+116.42	+107.14	+109.76
21:40:30	+116.42	+107.26	+110.01
21:41:00	+116.42	+107.08	+109.76
21:41:30	+116.36	+107.14	+109.82
21:42:00	+116.36	+107.08	+109.70
21:42:30	+116.36	+107.08	+109.76
21:43:00	+116.42	+107.26	+109.89
21:43:30	+116.42	+107.02	+109.76
21:44:00	+116.42	+107.14	+109.82
21:44:30	+116.42	+107.02	+109.70
21:45:00	+116.48	+107.02	+109.70
21:45:30	+116.42	+106.95	+109.70
21:46:00	+116.42	+106.95	+109.70

21:46:30	+116.36	+107.08	+109.76
21:47:00	+116.42	+107.08	+109.82
21:47:30	+116.42	+107.08	+109.76
21:48:00	+116.42	+107.20	+109.95
21:48:30	+116.36	+107.02	+109.76
21:49:00	+116.42	+107.08	+109.82
21:49:30	+116.42	+107.08	+109.82
21:50:00	+116.36	+107.02	+109.76
21:50:30	+116.42	+107.02	+109.82
21:51:00	+116.48	+107.08	+109.82
21:51:30	+116.42	+107.08	+109.89
21:52:00	+116.42	+106.95	+109.70
21:52:30	+116.42	+107.02	+109.76
21:53:00	+116.42	+107.02	+109.82
21:53:30	+116.42	+107.02	+109.82
21:54:00	+116.42	+106.89	+109.64
21:54:30	+116.42	+106.95	+109.76
21:55:00	+116.42	+106.95	+109.76
21:55:30	+116.42	+107.02	+109.82
21:56:00	+116.42	+106.95	+109.76
21:56:30	+116.42	+106.95	+109.82
21:57:00	+116.42	+106.89	+109.76
21:57:30	+116.42	+107.02	+109.89
21:58:00	+116.42	+107.14	+109.95
21:58:30	+116.42	+107.20	+110.01
21:59:00	+116.42	+106.89	+109.76
21:59:30	+116.42	+106.95	+109.82
22:00:00	+116.42	+107.02	+109.89
22:00:30	+116.42	+107.02	+109.89
22:01:00	+116.42	+106.89	+109.82
22:01:30	+116.42	+106.95	+109.82
22:02:00	+116.48	+107.02	+109.89
22:02:30	+116.42	+106.89	+109.82
22:03:00	+116.48	+106.95	+109.89
22:03:30	+116.48	+106.95	+109.82
22:04:00	+116.42	+106.89	+109.82
22:04:30	+116.42	+106.95	+109.89
22:05:00	+116.48	+106.89	+109.89
22:05:30	+116.42	+107.02	+110.01
22:06:00	+116.48	+106.95	+109.95
22:06:30	+116.48	+106.95	+109.95
22:07:00	+116.42	+106.89	+109.89
22:07:30	+116.48	+107.02	+110.01
22:08:00	+116.42	+106.89	+109.89
22:08:30	+116.42	+106.83	+109.82
22:09:00	+116.48	+107.02	+110.07
22:09:30	+116.42	+106.83	+109.89
22:10:00	+116.48	+106.95	+109.95
22:10:30	+116.48	+106.89	+109.95
22:11:00	+116.48	+106.83	+109.89
22:11:30	+116.48	+106.95	+109.95
22:12:00	+116.42	+106.83	+109.89
22:12:30	+116.48	+106.71	+109.82
22:13:00	+116.48	+106.77	+109.89
22:13:30	+116.42	+106.89	+109.95
22:14:00	+116.36	+106.53	+109.64
22:14:30	+116.48	+106.83	+110.01
22:15:00	+116.42	+106.83	+109.95
22:15:30	+116.42	+106.83	+110.01
22:16:00	+116.42	+106.89	+110.01
22:16:30	+116.42	+106.77	+109.89
22:17:00	+116.42	+106.83	+109.95
22:17:30	+116.48	+106.77	+109.95
22:18:00	+116.42	+106.77	+109.95
22:18:30	+116.42	+106.59	+109.76
22:19:00	+116.42	+106.71	+109.89
22:19:30	+116.42	+106.89	+110.01
22:20:00	+116.42	+106.77	+109.89
22:20:30	+116.36	+106.65	+109.82
22:21:00	+116.36	+106.65	+109.89
22:21:30	+116.36	+106.65	+109.89
22:22:00	+116.36	+106.65	+109.89
22:22:30	+116.48	+106.71	+109.89
22:23:00	+116.42	+106.65	+109.89
22:23:30	+116.42	+106.59	+109.82
22:24:00	+116.42	+106.71	+109.95

22:24:30	+116.36	+106.53	+109.70
22:25:00	+116.42	+106.65	+109.89
22:25:30	+116.42	+106.77	+110.01
22:26:00	+116.42	+106.53	+109.76
22:26:30	+116.42	+106.71	+109.95
22:27:00	+116.48	+106.71	+109.95
22:27:30	+116.36	+106.71	+109.89
22:28:00	+116.42	+106.71	+109.89
22:28:30	+116.42	+106.77	+110.07
22:29:00	+116.42	+106.65	+109.95
22:29:30	+116.42	+106.65	+109.89
22:30:00	+116.42	+106.47	+109.76
22:30:30	+116.36	+106.59	+109.82
22:31:00	+116.42	+106.59	+109.82
22:31:30	+116.42	+106.59	+109.82
22:32:00	+116.42	+106.65	+109.95
22:32:30	+116.42	+106.65	+109.89
22:33:00	+116.36	+106.65	+109.89
22:33:30	+116.36	+106.65	+109.89
22:34:00	+116.42	+106.71	+109.95
22:34:30	+116.42	+106.47	+109.64
22:35:00	+116.42	+106.53	+109.76
22:35:30	+116.42	+106.59	+109.82
22:36:00	+116.36	+106.65	+109.82
22:36:30	+116.42	+106.47	+109.70
22:37:00	+116.36	+106.53	+109.76
22:37:30	+116.36	+106.53	+109.76
22:38:00	+116.42	+106.65	+109.89
22:38:30	+116.42	+106.53	+109.82
22:39:00	+116.42	+106.47	+109.76
22:39:30	+116.42	+106.53	+109.82
22:40:00	+116.36	+106.53	+109.70
22:40:30	+116.42	+106.34	+109.58
22:41:00	+116.42	+106.71	+109.95
22:41:30	+116.42	+106.47	+109.70
22:42:00	+116.42	+106.53	+109.70
22:42:30	+116.42	+106.65	+109.89
22:43:00	+116.42	+106.47	+109.70
22:43:30	+116.36	+106.41	+109.70
22:44:00	+116.42	+106.53	+109.76
22:44:30	+116.36	+106.47	+109.70
22:45:00	+116.42	+106.41	+109.64
22:45:30	+116.42	+106.53	+109.76
22:46:00	+116.42	+106.59	+109.82
22:46:30	+116.42	+106.47	+109.64
22:47:00	+116.42	+106.47	+109.70
22:47:30	+116.42	+106.53	+109.70
22:48:00	+116.36	+106.34	+109.52
22:48:30	+116.36	+106.41	+109.64
22:49:00	+116.42	+106.41	+109.64
22:49:30	+116.36	+106.34	+109.46
22:50:00	+116.42	+106.34	+109.58
22:50:30	+116.36	+106.41	+109.58
22:51:00	+116.42	+106.41	+109.58
22:51:30	+116.42	+106.47	+109.64
22:52:00	+116.42	+106.41	+109.64
22:52:30	+116.42	+106.47	+109.64
22:53:00	+116.42	+106.47	+109.64
22:53:30	+116.36	+106.47	+109.64
22:54:00	+116.42	+106.41	+109.58
22:54:30	+116.42	+106.47	+109.58
22:55:00	+116.42	+106.53	+109.70
22:55:30	+116.36	+106.34	+109.52
22:56:00	+116.42	+106.28	+109.46
22:56:30	+116.42	+106.34	+109.52
22:57:00	+116.42	+106.41	+109.58
22:57:30	+116.36	+106.34	+109.52
22:58:00	+116.42	+106.41	+109.52
22:58:30	+116.42	+106.34	+109.52
22:59:00	+116.42	+106.41	+109.52
22:59:30	+116.36	+106.10	+109.27
23:00:00	+116.42	+106.28	+109.46
23:00:30	+116.42	+106.28	+109.46
23:01:00	+116.42	+106.28	+109.40
23:01:30	+116.42	+106.22	+109.46
23:02:00	+116.42	+106.41	+109.52

23:02:30	+116.36	+106.28	+109.40
23:03:00	+116.42	+106.16	+109.34
23:03:30	+116.42	+106.41	+109.52
23:04:00	+116.36	+106.16	+109.21
23:04:30	+116.42	+106.22	+109.40
23:05:00	+116.42	+106.34	+109.46
23:05:30	+116.42	+106.34	+109.46
23:06:00	+116.42	+106.22	+109.40
23:06:30	+116.42	+106.16	+109.27
23:07:00	+116.42	+106.41	+109.52
23:07:30	+116.42	+106.34	+109.46
23:08:00	+116.42	+106.28	+109.40
23:08:30	+116.36	+106.22	+109.34
23:09:00	+116.42	+106.41	+109.52
23:09:30	+116.42	+106.28	+109.40
23:10:00	+116.42	+106.22	+109.34
23:10:30	+116.36	+106.28	+109.40
23:11:00	+116.42	+106.34	+109.40
23:11:30	+116.42	+106.16	+109.27
23:12:00	+116.42	+106.41	+109.40
23:12:30	+116.42	+106.28	+109.27
23:13:00	+116.36	+106.16	+109.27
23:13:30	+116.36	+106.10	+109.09
23:14:00	+116.42	+106.16	+109.34
23:14:30	+116.42	+106.22	+109.34
23:15:00	+116.42	+106.22	+109.34
23:15:30	+116.42	+106.16	+109.21
23:16:00	+116.42	+106.22	+109.34
23:16:30	+116.42	+106.34	+109.40
23:17:00	+116.42	+106.34	+109.40
23:17:30	+116.42	+106.10	+109.15
23:18:00	+116.42	+106.28	+109.46
23:18:30	+116.42	+106.22	+109.34
23:19:00	+116.42	+105.92	+108.97
23:19:30	+116.42	+106.22	+109.27
23:20:00	+116.36	+106.16	+109.21
23:20:30	+116.42	+106.34	+109.46
23:21:00	+116.42	+106.16	+109.21
23:21:30	+116.42	+106.10	+109.15
23:22:00	+116.42	+106.22	+109.27
23:22:30	+116.36	+106.04	+109.03
23:23:00	+116.42	+106.10	+109.15
23:23:30	+116.42	+106.04	+109.15
23:24:00	+116.42	+106.10	+109.15
23:24:30	+116.42	+106.22	+109.27
23:25:00	+116.42	+106.22	+109.21
23:25:30	+116.48	+106.22	+109.34
23:26:00	+116.42	+106.10	+109.15
23:26:30	+116.42	+105.86	+108.97
23:27:00	+116.42	+106.16	+109.21
23:27:30	+116.42	+106.16	+109.21
23:28:00	+116.42	+106.22	+109.21
23:28:30	+116.42	+106.16	+109.21
23:29:00	+116.42	+106.16	+109.21
23:29:30	+116.42	+106.16	+109.21
23:30:00	+116.48	+106.10	+109.09
23:30:30	+116.42	+106.16	+109.15
23:31:00	+116.42	+105.98	+109.03
23:31:30	+116.42	+106.16	+109.15
23:32:00	+116.42	+106.10	+109.09
23:32:30	+116.36	+106.04	+109.03
23:33:00	+116.42	+106.10	+109.15
23:33:30	+116.42	+106.04	+109.03
23:34:00	+116.42	+106.04	+109.09
23:34:30	+116.36	+106.10	+109.09
23:35:00	+116.42	+106.10	+109.15
23:35:30	+116.42	+106.10	+109.09
23:36:00	+116.42	+106.16	+109.15
23:36:30	+116.42	+105.98	+109.03
23:37:00	+116.42	+106.10	+109.15
23:37:30	+116.42	+105.92	+109.03
23:38:00	+116.42	+105.98	+108.97
23:38:30	+116.42	+105.92	+108.91
23:39:00	+116.42	+106.04	+109.03
23:39:30	+116.42	+105.92	+108.97
23:40:00	+116.42	+105.92	+108.97

23:40:30	+116.42	+105.98	+108.97
23:41:00	+116.42	+105.86	+108.91
23:41:30	+116.48	+106.04	+109.03
23:42:00	+116.42	+105.98	+108.97
23:42:30	+116.42	+106.04	+108.91
23:43:00	+116.42	+106.04	+109.03
23:43:30	+116.42	+105.92	+108.91
23:44:00	+116.42	+105.86	+108.85
23:44:30	+116.42	+105.92	+108.91
23:45:00	+116.42	+106.10	+109.09
23:45:30	+116.42	+105.98	+108.97
23:46:00	+116.42	+105.92	+108.97
23:46:30	+116.42	+105.98	+108.97
23:47:00	+116.42	+105.86	+108.85
23:47:30	+116.42	+106.10	+109.09
23:48:00	+116.42	+105.92	+108.97
23:48:30	+116.48	+105.92	+108.91
23:49:00	+116.48	+105.98	+108.97
23:49:30	+116.48	+105.92	+108.91
23:50:00	+116.42	+105.98	+108.97
23:50:30	+116.48	+105.98	+108.97
23:51:00	+116.48	+106.10	+109.03
23:51:30	+116.48	+105.98	+108.97
23:52:00	+116.48	+105.98	+108.97
23:52:30	+116.42	+106.10	+109.03
23:53:00	+116.42	+105.92	+108.91
23:53:30	+116.54	+105.98	+108.97
23:54:00	+116.48	+105.92	+108.91
23:54:30	+116.48	+106.16	+109.15
23:55:00	+116.42	+105.92	+108.91
23:55:30	+116.48	+105.92	+108.85
23:56:00	+116.48	+105.98	+108.97
23:56:30	+116.48	+106.04	+108.97
23:57:00	+116.48	+105.86	+108.79
23:57:30	+116.48	+105.86	+108.79
23:58:00	+116.48	+105.86	+108.85
23:58:30	+116.54	+105.86	+108.85
23:59:00	+116.42	+105.73	+108.66
23:59:30	+116.54	+105.92	+108.91
00:00:00	+116.42	+105.67	+108.60
00:00:30	+116.48	+105.86	+108.85
00:01:00	+116.54	+105.92	+108.91
00:01:30	+116.48	+105.79	+108.73
00:02:00	+116.54	+105.86	+108.79
00:02:30	+116.48	+105.86	+108.79
00:03:00	+116.54	+106.04	+108.91
00:03:30	+116.54	+105.86	+108.79
00:04:00	+116.54	+105.98	+108.91
00:04:30	+116.54	+106.04	+108.97
00:05:00	+116.54	+105.98	+108.85
00:05:30	+116.48	+105.86	+108.79
00:06:00	+116.54	+105.98	+108.97
00:06:30	+116.54	+105.79	+108.79
00:07:00	+116.54	+105.92	+108.85
00:07:30	+116.48	+105.79	+108.73
00:08:00	+116.60	+105.98	+108.91
00:08:30	+116.54	+105.92	+108.79
00:09:00	+116.54	+105.92	+108.91
00:09:30	+116.54	+105.79	+108.79
00:10:00	+116.54	+105.86	+108.85
00:10:30	+116.54	+105.79	+108.73
00:11:00	+116.48	+105.73	+108.66
00:11:30	+116.54	+105.92	+108.85
00:12:00	+116.54	+105.79	+108.73
00:12:30	+116.48	+105.73	+108.66
00:13:00	+116.54	+105.86	+108.73
00:13:30	+116.54	+105.79	+108.73
00:14:00	+116.54	+105.98	+108.85
00:14:30	+116.54	+105.73	+108.66
00:15:00	+116.54	+105.79	+108.66
00:15:30	+116.60	+106.04	+108.97
00:16:00	+116.54	+105.86	+108.66
00:16:30	+116.48	+105.61	+108.60
00:17:00	+116.54	+105.67	+108.60
00:17:30	+116.54	+105.73	+108.60
00:18:00	+116.54	+105.73	+108.66

00:18:30	+116.54	+105.67	+108.66
00:19:00	+116.48	+105.61	+108.48
00:19:30	+116.54	+105.86	+108.73
00:20:00	+116.54	+105.73	+108.66
00:20:30	+116.54	+105.86	+108.79
00:21:00	+116.54	+105.67	+108.60
00:21:30	+116.48	+105.67	+108.60
00:22:00	+116.54	+105.67	+108.60
00:22:30	+116.60	+105.61	+108.54
00:23:00	+116.48	+105.67	+108.60
00:23:30	+116.48	+105.61	+108.54
00:24:00	+116.60	+105.73	+108.73
00:24:30	+116.60	+105.73	+108.73
00:25:00	+116.54	+105.49	+108.48
00:25:30	+116.54	+105.73	+108.66
00:26:00	+116.54	+105.67	+108.66
00:26:30	+116.54	+105.86	+108.79
00:27:00	+116.54	+105.86	+108.73
00:27:30	+116.54	+105.55	+108.54
00:28:00	+116.60	+105.61	+108.54
00:28:30	+116.54	+105.67	+108.60
00:29:00	+116.54	+105.61	+108.54
00:29:30	+116.54	+105.73	+108.66
00:30:00	+116.54	+105.61	+108.54
00:30:30	+116.60	+105.92	+108.85
00:31:00	+116.54	+105.49	+108.42
00:31:30	+116.54	+105.79	+108.73
00:32:00	+116.60	+105.61	+108.54
00:32:30	+116.60	+105.73	+108.73
00:33:00	+116.54	+105.61	+108.60
00:33:30	+116.48	+105.67	+108.60
00:34:00	+116.54	+105.61	+108.60
00:34:30	+116.60	+105.55	+108.48
00:35:00	+116.48	+105.55	+108.54
00:35:30	+116.54	+105.49	+108.48
00:36:00	+116.54	+105.67	+108.60
00:36:30	+116.54	+105.55	+108.54
00:37:00	+116.60	+105.61	+108.60
00:37:30	+116.54	+105.61	+108.60
00:38:00	+116.54	+105.67	+108.60
00:38:30	+116.60	+105.61	+108.60
00:39:00	+116.54	+105.55	+108.48
00:39:30	+116.60	+105.49	+108.48
00:40:00	+116.54	+105.49	+108.48
00:40:30	+116.60	+105.55	+108.48
00:41:00	+116.66	+105.67	+108.60
00:41:30	+116.54	+105.61	+108.54
00:42:00	+116.48	+105.37	+108.42
00:42:30	+116.54	+105.55	+108.48
00:43:00	+116.54	+105.49	+108.66
00:43:30	+116.54	+105.67	+108.79
00:44:00	+116.54	+105.61	+108.79
00:44:30	+116.54	+105.67	+108.79
00:45:00	+116.54	+105.55	+108.73
00:45:30	+116.60	+105.55	+108.73
00:46:00	+116.54	+105.43	+108.66
00:46:30	+116.54	+105.49	+108.60
00:47:00	+116.48	+105.37	+108.54
00:47:30	+116.54	+105.43	+108.66
00:48:00	+116.54	+105.43	+108.66
00:48:30	+116.60	+105.49	+108.66
00:49:00	+116.48	+105.55	+108.66
00:49:30	+116.54	+105.43	+108.54
00:50:00	+116.54	+105.55	+108.66
00:50:30	+116.54	+105.55	+108.66
00:51:00	+116.54	+105.55	+108.66
00:51:30	+116.60	+105.61	+108.73
00:52:00	+116.54	+105.49	+108.66
00:52:30	+116.60	+105.61	+108.73
00:53:00	+116.54	+105.55	+108.66
00:53:30	+116.54	+105.43	+108.54
00:54:00	+116.54	+105.31	+108.54
00:54:30	+116.54	+105.49	+108.54
00:55:00	+116.48	+105.31	+108.48
00:55:30	+116.48	+105.37	+108.48
00:56:00	+116.54	+105.55	+108.66

00:56:30	+116.60	+105.31	+108.48
00:57:00	+116.60	+105.49	+108.66
00:57:30	+116.54	+105.37	+108.48
00:58:00	+116.54	+105.25	+108.36
00:58:30	+116.54	+105.37	+108.48
00:59:00	+116.48	+105.31	+108.48
00:59:30	+116.48	+105.49	+108.60
01:00:00	+116.48	+105.25	+108.42
01:00:30	+116.54	+105.43	+108.60
01:01:00	+116.54	+105.31	+108.48
01:01:30	+116.54	+105.12	+108.36
01:02:00	+116.54	+105.31	+108.42
01:02:30	+116.54	+105.49	+108.54
01:03:00	+116.54	+105.25	+108.42
01:03:30	+116.54	+105.31	+108.42
01:04:00	+116.60	+105.37	+108.54
01:04:30	+116.54	+105.43	+108.54
01:05:00	+116.48	+105.31	+108.48
01:05:30	+116.48	+105.37	+108.48
01:06:00	+116.60	+105.37	+108.54
01:06:30	+116.54	+105.31	+108.48
01:07:00	+116.54	+105.37	+108.54
01:07:30	+116.54	+105.43	+108.48
01:08:00	+116.54	+105.18	+108.42
01:08:30	+116.54	+105.43	+108.54
01:09:00	+116.54	+105.43	+108.54
01:09:30	+116.54	+105.37	+108.48
01:10:00	+116.48	+105.37	+108.48
01:10:30	+116.54	+105.37	+108.48
01:11:00	+116.54	+105.31	+108.48
01:11:30	+116.54	+105.37	+108.48
01:12:00	+116.48	+105.18	+108.30
01:12:30	+116.48	+105.25	+108.36
01:13:00	+116.54	+105.37	+108.60
01:13:30	+116.48	+105.49	+108.66
01:14:00	+116.48	+105.12	+108.24
01:14:30	+116.54	+105.37	+108.48
01:15:00	+116.54	+105.18	+108.36
01:15:30	+116.54	+105.31	+108.48
01:16:00	+116.48	+105.12	+108.24
01:16:30	+116.48	+105.37	+108.36
01:17:00	+116.54	+105.25	+108.42
01:17:30	+116.54	+105.31	+108.48
01:18:00	+116.54	+105.55	+108.66
01:18:30	+116.54	+105.12	+108.24
01:19:00	+116.54	+105.12	+108.30
01:19:30	+116.54	+105.31	+108.42
01:20:00	+116.54	+105.00	+108.11
01:20:30	+116.54	+105.37	+108.48
01:21:00	+116.54	+105.12	+108.24
01:21:30	+116.54	+105.25	+108.42
01:22:00	+116.48	+105.25	+108.36
01:22:30	+116.42	+105.00	+108.11
01:23:00	+116.54	+105.25	+108.42
01:23:30	+116.54	+105.18	+108.36
01:24:00	+116.54	+105.06	+108.18
01:24:30	+116.60	+105.12	+108.30
01:25:00	+116.54	+105.12	+108.24
01:25:30	+116.48	+105.12	+108.24
01:26:00	+116.54	+105.25	+108.36
01:26:30	+116.54	+105.00	+108.18
01:27:00	+116.48	+105.18	+108.30
01:27:30	+116.48	+105.00	+108.18
01:28:00	+116.54	+105.06	+108.24
01:28:30	+116.54	+105.12	+108.30
01:29:00	+116.54	+105.12	+108.36
01:29:30	+116.54	+105.18	+108.30
01:30:00	+116.48	+105.18	+108.30
01:30:30	+116.48	+105.00	+108.18
01:31:00	+116.54	+105.25	+108.30
01:31:30	+116.54	+105.18	+108.36
01:32:00	+116.48	+105.00	+108.18
01:32:30	+116.54	+105.12	+108.36
01:33:00	+116.48	+105.06	+108.24
01:33:30	+116.54	+105.12	+108.30
01:34:00	+116.42	+104.94	+108.11

01:34:30	+116.48	+105.25	+108.48
01:35:00	+116.54	+105.00	+108.18
01:35:30	+116.48	+105.00	+108.11
01:36:00	+116.54	+105.18	+108.30
01:36:30	+116.48	+105.12	+108.24
01:37:00	+116.54	+105.18	+108.30
01:37:30	+116.42	+104.88	+108.05
01:38:00	+116.54	+104.82	+108.05
01:38:30	+116.48	+105.12	+108.30
01:39:00	+116.42	+105.06	+108.24
01:39:30	+116.60	+105.12	+108.36
01:40:00	+116.48	+105.06	+108.18
01:40:30	+116.48	+105.06	+108.30
01:41:00	+116.54	+104.94	+108.18
01:41:30	+116.48	+104.94	+108.11
01:42:00	+116.48	+104.94	+108.11
01:42:30	+116.54	+105.18	+108.30
01:43:00	+116.48	+104.82	+108.05
01:43:30	+116.54	+105.00	+108.18
01:44:00	+116.48	+105.00	+108.18
01:44:30	+116.54	+104.94	+108.11
01:45:00	+116.48	+104.88	+108.05
01:45:30	+116.42	+104.76	+107.99
01:46:00	+116.42	+104.82	+108.05
01:46:30	+116.48	+104.88	+108.11
01:47:00	+116.48	+104.76	+107.93
01:47:30	+116.48	+105.00	+108.24
01:48:00	+116.48	+104.88	+108.11
01:48:30	+116.48	+104.94	+108.24
01:49:00	+116.48	+104.82	+108.05
01:49:30	+116.60	+104.94	+108.18
01:50:00	+116.48	+104.76	+108.05
01:50:30	+116.48	+104.82	+108.11
01:51:00	+116.54	+105.00	+108.30
01:51:30	+116.48	+104.88	+108.11
01:52:00	+116.48	+104.82	+108.11
01:52:30	+116.54	+104.94	+108.24
01:53:00	+116.48	+104.88	+108.18
01:53:30	+116.48	+104.82	+108.05
01:54:00	+116.42	+104.82	+108.05
01:54:30	+116.48	+104.76	+108.05
01:55:00	+116.54	+104.82	+108.05
01:55:30	+116.54	+104.88	+108.18
01:56:00	+116.48	+104.76	+108.05
01:56:30	+116.48	+104.88	+108.18
01:57:00	+116.48	+104.94	+108.11
01:57:30	+116.48	+104.94	+108.18
01:58:00	+116.48	+104.70	+108.05
01:58:30	+116.54	+104.82	+108.11
01:59:00	+116.54	+104.76	+108.05
01:59:30	+116.42	+104.70	+107.93
02:00:00	+116.48	+104.82	+108.18
02:00:30	+116.48	+105.12	+108.30
02:01:00	+116.48	+104.76	+107.99
02:01:30	+116.42	+104.82	+108.11
02:02:00	+116.42	+104.70	+107.93
02:02:30	+116.48	+104.70	+107.99
02:03:00	+116.54	+104.76	+108.05
02:03:30	+116.48	+105.06	+108.36
02:04:00	+116.48	+104.82	+108.11
02:04:30	+116.48	+104.70	+108.05
02:05:00	+116.54	+104.70	+108.05
02:05:30	+116.48	+104.51	+107.87
02:06:00	+116.48	+104.51	+107.81
02:06:30	+116.42	+104.76	+108.05
02:07:00	+116.42	+104.63	+107.93
02:07:30	+116.48	+104.70	+107.99
02:08:00	+116.54	+104.82	+108.11
02:08:30	+116.48	+104.82	+108.05
02:09:00	+116.54	+104.82	+108.11
02:09:30	+116.42	+104.45	+107.69
02:10:00	+116.48	+104.76	+108.11
02:10:30	+116.54	+104.70	+107.99
02:11:00	+116.42	+104.57	+107.93
02:11:30	+116.48	+104.82	+108.11
02:12:00	+116.54	+104.63	+107.99

02:12:30	+116.48	+105.00	+108.30
02:13:00	+116.48	+104.57	+107.93
02:13:30	+116.48	+104.70	+107.99
02:14:00	+116.48	+104.76	+108.05
02:14:30	+116.54	+104.76	+108.11
02:15:00	+116.48	+104.70	+107.99
02:15:30	+116.48	+104.76	+108.05
02:16:00	+116.48	+104.57	+107.93
02:16:30	+116.54	+104.57	+107.99
02:17:00	+116.48	+104.76	+108.11
02:17:30	+116.42	+104.57	+107.93
02:18:00	+116.48	+104.82	+108.05
02:18:30	+116.48	+104.57	+107.93
02:19:00	+116.54	+104.76	+108.18
02:19:30	+116.48	+104.70	+107.99
02:20:00	+116.48	+104.76	+108.05
02:20:30	+116.48	+104.88	+108.18
02:21:00	+116.48	+104.57	+107.99
02:21:30	+116.48	+104.57	+107.93
02:22:00	+116.48	+104.63	+107.99
02:22:30	+116.54	+104.76	+108.05
02:23:00	+116.48	+104.70	+107.99
02:23:30	+116.48	+104.57	+107.99
02:24:00	+116.48	+104.57	+107.93
02:24:30	+116.48	+104.45	+107.81
02:25:00	+116.42	+104.51	+107.87
02:25:30	+116.48	+104.70	+108.05
02:26:00	+116.48	+104.82	+108.11
02:26:30	+116.48	+104.63	+108.05
02:27:00	+116.42	+104.45	+107.87
02:27:30	+116.48	+104.45	+107.87
02:28:00	+116.42	+104.51	+107.87
02:28:30	+116.42	+104.39	+107.81
02:29:00	+116.48	+104.82	+108.24
02:29:30	+116.48	+104.51	+107.87
02:30:00	+116.48	+104.51	+107.99
02:30:30	+116.48	+104.63	+107.99
02:31:00	+116.48	+104.45	+107.87
02:31:30	+116.48	+104.45	+107.87
02:32:00	+116.48	+104.51	+107.87
02:32:30	+116.48	+104.57	+107.99
02:33:00	+116.48	+104.45	+107.87
02:33:30	+116.48	+104.45	+107.93
02:34:00	+116.48	+104.51	+107.99
02:34:30	+116.48	+104.33	+107.87
02:35:00	+116.42	+104.45	+107.87
02:35:30	+116.48	+104.39	+107.87
02:36:00	+116.42	+104.39	+107.87
02:36:30	+116.48	+104.51	+108.05
02:37:00	+116.42	+104.33	+107.81
02:37:30	+116.48	+104.33	+107.87
02:38:00	+116.42	+104.51	+107.93
02:38:30	+116.48	+104.15	+107.63
02:39:00	+116.48	+104.39	+107.93
02:39:30	+116.42	+104.39	+107.75
02:40:00	+116.42	+104.51	+107.99
02:40:30	+116.48	+104.45	+107.93
02:41:00	+116.42	+104.33	+107.81
02:41:30	+116.48	+104.57	+108.11
02:42:00	+116.48	+104.39	+107.87
02:42:30	+116.48	+104.51	+107.99
02:43:00	+116.54	+104.51	+108.05
02:43:30	+116.48	+104.33	+107.81
02:44:00	+116.42	+104.39	+107.87
02:44:30	+116.48	+104.39	+107.87
02:45:00	+116.48	+104.39	+107.93
02:45:30	+116.54	+104.33	+107.93
02:46:00	+116.48	+104.33	+107.81
02:46:30	+116.48	+104.51	+107.99
02:47:00	+116.42	+104.33	+107.81
02:47:30	+116.48	+104.39	+107.93
02:48:00	+116.48	+104.45	+107.99
02:48:30	+116.48	+104.09	+107.63
02:49:00	+116.48	+104.39	+107.93
02:49:30	+116.48	+104.39	+107.99
02:50:00	+116.48	+104.27	+107.87

02:50:30	+116.48	+104.39	+107.93
02:51:00	+116.48	+104.33	+108.18
02:51:30	+116.42	+104.09	+107.93
02:52:00	+116.42	+104.21	+108.18
02:52:30	+116.48	+104.33	+108.36
02:53:00	+116.48	+104.15	+108.42
02:53:30	+116.48	+104.27	+108.48
02:54:00	+116.48	+104.51	+108.85
02:54:30	+116.48	+104.27	+108.66
02:55:00	+116.42	+104.39	+108.73
02:55:30	+116.48	+104.39	+108.73
02:56:00	+116.42	+104.21	+108.73
02:56:30	+116.42	+104.15	+108.66
02:57:00	+116.48	+104.27	+108.79
02:57:30	+116.48	+104.15	+108.73

TRANSDUCER DATA - ZONE P2-1

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 1031
Start Time: 16:35:55
Start Date: 09/24
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:10

Time	Chnl 1	Chnl 2	Chnl 3
16:35:55	+25.152	-27.594	+26.862
16:36:05	+25.091	-27.472	+26.923
16:36:15	+25.030	-27.289	+26.862
16:36:25	+24.969	-26.984	+26.800
16:36:35	+24.908	-26.556	+26.984
16:36:45	+24.847	-26.373	+26.862
16:36:55	+24.847	-26.007	+26.739
16:37:05	+24.786	-25.702	+26.862
16:37:15	+24.786	-25.579	+26.800
16:37:25	+24.725	-25.152	+26.862
16:37:35	+24.725	-24.969	+26.862
16:37:45	+24.664	-24.847	+26.862
16:37:55	+24.664	-24.664	+26.862
16:38:05	+24.603	-24.481	+26.984
16:38:15	+24.603	-24.297	+26.923
16:38:25	+24.542	-24.053	+26.862
16:38:35	+24.542	-23.931	+26.923
16:38:45	+24.481	-23.931	+26.862
16:38:55	+24.481	-23.626	+26.800
16:39:05	+24.481	-23.504	+26.923
16:39:15	+24.420	-23.443	+26.862
16:39:25	+24.420	-23.199	+26.862
16:39:35	+24.420	-23.015	+26.923
16:39:45	+24.358	-22.832	+27.045
16:39:55	+24.358	-22.832	+26.923
16:40:05	+24.358	-22.832	+26.862
16:40:15	+24.358	-22.588	+26.862
16:40:25	+24.358	-22.405	+26.862
16:40:35	+24.297	-22.283	+26.800
16:40:45	+24.297	-22.283	+26.862
16:40:55	+24.236	-22.161	+26.862
16:41:05	+24.236	-22.222	+26.862
16:41:15	+24.236	-22.100	+26.862
16:41:25	+24.236	-22.100	+26.862
16:41:35	+24.175	-21.855	+26.862
16:41:45	+24.175	-21.672	+26.923
16:41:55	+24.175	-21.733	+26.923
16:42:05	+24.175	-21.672	+26.984
16:42:15	+24.114	-21.550	+26.923
16:42:25	+24.114	-21.428	+26.984
16:42:35	+24.114	-21.245	+26.862
16:42:45	+24.114	-21.306	+26.800
16:42:55	+24.053	-21.428	+26.923
16:43:05	+24.053	-21.306	+26.862
16:43:15	+24.053	-21.184	+26.862
16:43:25	+23.992	-21.062	+26.862
16:43:35	+23.992	-21.062	+26.862
16:43:45	+23.992	-21.062	+26.739
16:43:55	+23.870	-21.001	+26.923
16:44:05	+23.809	-20.818	+26.923
16:44:15	+23.748	-20.695	+26.862
16:44:25	+23.748	-20.512	+27.045
16:44:35	+23.748	-20.451	+26.862
16:44:45	+23.687	-20.207	+26.862
16:44:55	+23.687	-20.146	+26.862
16:45:05	+23.687	-20.146	+26.923
16:45:15	+23.626	-19.902	+26.923
16:45:25	+23.626	-19.841	+26.923
16:45:35	+23.565	-19.658	+26.800
16:45:45	+23.565	-19.597	+26.862
16:45:55	+23.504	-19.352	+26.862
16:46:05	+23.443	-19.230	+26.862
16:46:15	+23.382	-18.986	+26.923
16:46:25	+23.321	-18.864	+26.923
16:46:35	+23.260	-18.681	+26.923
16:46:45	+23.199	-18.498	+26.862
16:46:55	+23.137	-18.437	+26.800
16:47:05	+23.137	-18.192	+26.923
16:47:15	+23.076	-18.070	+26.862
16:47:25	+23.015	-17.948	+26.862
16:47:35	+22.954	-17.765	+26.800
16:47:45	+22.893	-17.643	+26.862
16:47:55	+22.832	-17.582	+26.923
16:48:05	+22.771	-17.399	+26.862
16:48:15	+22.710	-17.338	+26.800
16:48:25	+22.710	-17.094	+26.862
16:48:35	+22.588	-17.032	+26.800
16:48:45	+22.527	-16.910	+26.862
16:48:55	+22.466	-16.788	+26.862
16:49:05	+22.405	-16.605	+26.862
16:49:15	+22.344	-16.544	+26.800
16:49:25	+22.283	-16.422	+26.862
16:49:35	+22.222	-16.300	+26.923
16:49:45	+22.161	-16.178	+26.923
16:49:55	+22.100	-16.117	+26.862
16:50:05	+22.100	-15.995	+26.862
16:50:15	+22.039	-15.811	+26.862
16:50:25	+21.978	-15.750	+26.923
16:50:35	+21.916	-15.628	+26.739
16:50:45	+21.916	-15.506	+26.984
16:50:55	+21.855	-15.323	+26.923
16:51:05	+21.855	-15.323	+26.923
16:51:15	+21.794	-15.201	+26.984
16:51:25	+21.794	-15.018	+26.923
16:51:35	+21.794	-14.835	+26.862
16:51:45	+21.733	-14.774	+26.923
16:51:55	+21.733	-14.529	+26.923
16:52:05	+21.733	-14.529	+27.045
16:52:15	+21.733	-14.346	+26.984
16:52:25	+21.672	-14.163	+26.862
16:52:35	+21.672	-14.163	+26.862
16:52:45	+21.672	-14.041	+26.862
16:52:55	+21.611	-13.858	+26.923
16:53:05	+21.611	-13.736	+26.862
16:53:15	+21.611	-13.675	+26.800
16:53:25	+21.672	-13.431	+26.923
16:53:35	+21.672	-13.308	+26.984
16:53:45	+21.672	-13.247	+27.045
16:53:55	+21.672	-13.003	+26.984
16:54:05	+21.611	-13.003	+26.800
16:54:15	+21.611	-12.820	+26.800
16:54:25	+21.672	-12.515	+26.984
16:54:35	+21.672	-12.515	+26.800
16:54:45	+21.672	-12.454	+26.984
16:54:55	+21.672	-12.332	+26.984
16:55:05	+21.611	-12.332	+26.862
16:55:15	+21.611	-12.148	+26.984
16:55:25	+21.672	-12.026	+26.923
16:55:35	+21.672	-11.904	+26.923
16:55:45	+21.672	-11.843	+26.923
16:55:55	+21.672	-11.782	+26.923
16:56:05	+21.672	-11.660	+26.923
16:56:15	+21.672	-11.660	+26.923
16:56:25	+21.672	-11.477	+26.923
16:56:35	+21.672	-11.416	+26.923
16:56:45	+21.733	-11.355	+26.923
16:56:55	+21.733	-11.233	+26.923
16:57:05	+21.733	-11.233	+26.923
16:57:15	+52.991	-11.172	+26.862
16:57:25	+22.222	-11.111	+26.923
16:57:35	+21.733	-11.111	+26.923
16:57:45	+21.733	-11.111	+26.923
16:57:55	+21.794	-10.927	+26.923
16:58:05	+21.794	-10.805	+26.923
16:58:15	+21.733	-10.866	+26.800
16:58:25	+21.794	-10.683	+26.984
16:58:35	+21.855	-10.744	+26.862
16:58:45	+21.794	-10.622	+26.984
16:58:55	+21.855	-10.683	+26.800
16:59:05	+21.855	-10.622	+26.923
16:59:15	+21.855	-10.561	+26.984
16:59:25	+21.794	-10.561	+26.923
16:59:35	+21.855	-10.439	+26.984
16:59:45	+21.916	-10.439	+26.984
16:59:55	+21.916	-10.439	+26.862
17:00:05	+21.916	-10.439	+26.923
17:00:15	+21.916	-11.721	+26.984
17:00:25	+21.916	-14.652	+26.862
17:00:35	+22.039	-16.544	+26.984
17:00:45	+21.978	-17.887	+26.923
17:00:55	+21.978	-18.620	+26.862
17:01:05	+21.978	-18.376	+27.045
17:01:15	+21.978	-18.253	+26.862
17:01:25	+22.039	-18.131	+26.984
17:01:35	+21.978	-18.131	+26.800
17:01:45	+22.039	-17.887	+26.923
17:01:55	+22.039	-17.887	+26.923
17:02:05	+22.039	-17.643	+26.923
17:02:15	+22.039	-17.582	+27.045
17:02:25	+22.039	-17.521	+26.923
17:02:35	+22.039	-17.460	+26.923
17:02:45	+22.100	-17.216	+26.984
17:02:55	+22.039	-17.277	+26.923
17:03:05	+22.039	-17.094	+26.739
17:03:15	+22.100	-16.971	+26.923
17:03:25	+22.100	-16.910	+26.862
17:03:35	+22.161	-16.666	+26.984
17:03:45	+22.161	-16.666	+27.045
17:03:55	+22.161	-16.544	+26.923
17:04:05	+22.161	-16.483	+26.923
17:04:15	+22.161	-16.300	+26.862
17:04:25	+22.161	-16.239	+27.045
17:04:35	+22.222	-16,117	+26.800
17:04:45	+22.222	-15.995	+26.923
17:04:55	+22.222	-15.934	+26.923
17:05:05	+22.222	-15.811	+26.923
17:05:15	+22.161	-15.750	+26.923
17:05:25	+22.283	-15.567	+26.862
17:05:35	+22.283	-15.445	+26.923
17:05:45	+22.283	-15.384	+26.923
17:05:55	+22.283	-15.140	+26.923
17:06:05	+22.283	-15.079	+26.984
17:06:15	+22.283	-15.018	+26.923
17:06:25	+22.283	-14.896	+26.923
17:06:35	+22.344	-14.713	+26.984
17:06:45	+22.344	-14.590	+26.923
17:06:55	+22.344	-14.529	+26.923
17:07:05	+22.344	-14.407	+26.862
17:07:15	+22.344	-14.224	+26.923
17:07:25	+22.405	-14.163	+26.923
17:07:35	+22.405	-13.980	+26.800
17:07:45	+22.405	-13.858	+26.923
17:07:55	+22.405	-13.736	+26.862
17:08:05	+22.405	-13.553	+26.984
17:08:15	+22.466	-13.492	+27.045
17:08:25	+22.466	-13.308	+26.923
17:08:35	+22.466	-13.186	+26.984
17:08:45	+22.466	-13.064	+26.984
17:08:55	+22.466	-12.942	+26.984
17:09:05	+22.527	-12.881	+26.923
17:09:15	+22.527	-12.637	+26.923
17:09:25	+22.527	-12.698	+26.923
17:09:35	+22.527	-12.454	+26.923
17:09:45	+22.466	-12.454	+26.800
17:09:55	+22.527	-12.393	+26.862
17:10:05	+22.527	-12.271	+26.862
17:10:15	+22.649	-12.087	+26.923
17:10:25	+22.588	-12.026	+26.923
17:10:35	+22.588	-11.904	+26.923
17:10:45	+22.649	-11.843	+26.923
17:10:55	+22.649	-11.904	+26.923
17:11:05	+22.649	-11.721	+26.862
17:11:15	+22.649	-11.660	+26.923
17:11:25	+22.588	-11.721	+26.800
17:11:35	+22.649	-11.599	+26.862
17:11:45	+22.710	-11.477	+26.923
17:11:55	+22.649	-11.477	+26.862
17:12:05	+22.710	-11.294	+26.923
17:12:15	+22.649	-11.355	+26.923
17:12:25	+22.649	-11.294	+26.862
17:12:35	+22.710	-11.172	+26.862
17:12:45	+22.710	-11.111	+26.923
17:12:55	+22.710	-11.111	+26.800
17:13:05	+22.710	-11.050	+26.923
17:13:15	+22.710	-11.050	+26.862
17:13:25	+22.710	-10.927	+26.862
17:13:35	+22.710	-10.989	+26.862
17:13:45	+22.771	-10.866	+26.923
17:13:55	+22.771	-10.927	+26.800
17:14:05	+22.771	-10.805	+26.923
17:14:15	+22.771	-10.866	+26.923
17:14:25	+22.771	-10.805	+26.923
17:14:35	+22.771	-10.866	+26.800
17:14:45	+22.771	-10.744	+26.862
17:14:55	+22.832	-10.744	+26.923
17:15:05	+22.832	-10.683	+26.984
17:15:15	+22.832	-10.805	+26.800
17:15:25	+22.832	-10.683	+26.923
17:15:35	+22.832	-10.622	+26.923
17:15:45	+22.832	-12.820	+26.862
17:15:55	+22.832	-10.622	+26.800
17:16:05	+22.832	-10.561	+26.862
17:16:15	+22.832	-10.561	+26.923
17:16:25	+22.893	-10.622	+26.862
17:16:35	+22.893	-10.561	+26.862
17:16:45	+22.893	-10.439	+26.862
17:16:55	+22.893	-10.500	+26.923
17:17:05	+22.893	-10.561	+26.800
17:17:15	+22.893	-10.561	+26.862
17:17:25	+22.893	-10.500	+26.862
17:17:35	+22.893	-10.439	+26.923
17:17:45	+22.893	-10.561	+26.862
17:17:55	+22.893	-10.500	+26.862
17:18:05	+22.954	-10.500	+26.800
17:18:15	+22.954	-10.500	+26.923
17:18:25	+22.954	-10.500	+26.862
17:18:35	+22.954	-10.500	+26.862
17:18:45	+22.954	-10.500	+26.862
17:18:55	+22.954	-10.561	+26.800
17:19:05	+23.015	-10.439	+26.862
17:19:15	+23.015	-10.439	+26.862
17:19:25	+23.015	-10.317	+26.923
17:19:35	+22.954	-10.439	+26.984
17:19:45	+23.015	-10.256	+26.923
17:19:55	+23.015	-10.378	+26.923
17:20:05	+23.015	-10.439	+26.862
17:20:15	+23.015	-10.500	+26.800
17:20:25	+23.015	-10.439	+26.862
17:20:35	+23.015	-10.439	+26.800
17:20:45	+23.015	-13.858	+26.923
17:20:55	+23.015	-16.300	+26.923
17:21:05	+23.015	-18.131	+26.862
17:21:15	+23.015	-19.536	+26.984
17:21:25	+23.015	-20.329	+26.862
17:21:35	+23.015	-20.207	+26.862
17:21:45	+23.076	-20.024	+26.984
17:21:55	+23.076	-19.963	+26.862
17:22:05	+23.076	-19.780	+26.923
17:22:15	+23.015	-19.780	+26.800
17:22:25	+23.076	-19.597	+26.923
17:22:35	+23.076	-19.352	+26.984
17:22:45	+23.076	-19.352	+26.923
17:22:55	+23.076	-19.169	+26.862
17:23:05	+23.076	-19.047	+26.923
17:23:15	+23.137	-18.864	+26.862
17:23:25	+23.076	-18.864	+26.862
17:23:35	+23.076	-18.681	+26.923
17:23:45	+23.076	-18.559	+26.862
17:23:55	+23.076	-18.620	+26.862
17:24:05	+23.076	-18.376	+26.862
17:24:15	+23.076	-18.253	+26.800
17:24:25	+23.076	-18.131	+26.862
17:24:35	+23.076	-18.009	+26.923
17:24:45	+23.076	-17.826	+26.923
17:24:55	+23.076	-17.887	+26.862
17:25:05	+23.076	-17.765	+26.800
17:25:15	+23.076	-17.582	+26.862
17:25:25	+23.137	-17.460	+26.923
17:25:35	+23.137	-17.338	+26.923
17:25:45	+23.076	-17.399	+26.862

17:25:55	+23.137	-17.277	+26.800
17:26:05	+23.137	-17.094	+26.800
17:26:15	+23.137	-16.971	+26.923
17:26:25	+23.137	-17.032	+26.923
17:26:35	+23.137	-16.849	+26.862
17:26:45	+23.137	-16.666	+26.800
17:26:55	+23.137	-16.544	+26.923
17:27:05	+23.137	-16.483	+26.923
17:27:15	+23.137	-16.239	+26.923
17:27:25	+23.137	-16.300	+26.862
17:27:35	+23.137	-16.178	+26.800
17:27:45	+23.137	-15.995	+26.800
17:27:55	+23.137	-15.873	+26.800
17:28:05	+23.137	-15.811	+26.862
17:28:15	+23.137	-15.689	+26.923
17:28:25	+23.137	-15.506	+26.923
17:28:35	+23.137	-15.506	+26.862
17:28:45	+23.137	-15.384	+26.800
17:28:55	+23.199	-15.201	+26.862
17:29:05	+23.137	-15.140	+26.800
17:29:15	+23.199	-15.018	+26.800
17:29:25	+23.199	-14.835	+26.984
17:29:35	+23.199	-14.774	+26.923
17:29:45	+23.199	-14.590	+26.862
17:29:55	+23.199	-14.529	+26.923
17:30:05	+23.199	-14.285	+26.923
17:30:15	+23.199	-14.163	+26.923
17:30:25	+23.199	-14.041	+26.984
17:30:35	+23.199	-13.919	+26.923
17:30:45	+23.199	-13.797	+26.800
17:30:55	+23.199	-13.675	+26.862
17:31:05	+23.199	-13.553	+26.862
17:31:15	+23.199	-13.492	+26.923
17:31:25	+23.199	-13.369	+26.862
17:31:35	+23.199	-13.186	+26.800
17:31:45	+23.199	-13.064	+26.800
17:31:55	+23.199	-13.003	+26.862
17:32:05	+23.260	-12.759	+26.923
17:32:15	+23.260	-12.698	+26.800
17:32:25	+23.260	-12.576	+26.862
17:32:35	+23.260	-12.454	+26.923
17:32:45	+23.260	-12.393	+26.923
17:32:55	+23.260	-12.332	+26.862
17:33:05	+23.260	-12.210	+26.923
17:33:15	+23.382	-12.148	+26.862
17:33:25	+23.382	-12.026	+26.862
17:33:35	+23.382	-11.782	+26.984
17:33:45	+23.260	-11.660	+26.923
17:33:55	+23.260	-11.599	+26.923
17:34:05	+23.260	-11.599	+26.862
17:34:15	+23.260	-11.477	+26.923
17:34:25	+23.260	-11.538	+26.800
17:34:35	+23.321	-11.355	+26.800
17:34:45	+23.260	-11.294	+26.923
17:34:55	+23.260	-14.102	+26.862
17:35:05	+23.260	-16.239	+26.862
17:35:15	+23.260	-17.826	+26.862
17:35:25	+23.321	-18.498	+26.923
17:35:35	+23.321	-18.315	+26.923
17:35:45	+23.321	-18.315	+26.800
17:35:55	+23.321	-18.192	+26.862
17:36:05	+23.321	-18.192	+26.800
17:36:15	+23.321	-17.948	+26.862
17:36:25	+23.321	-17.887	+26.862
17:36:35	+23.321	-17.765	+26.800
17:36:45	+23.321	-17.643	+26.862
17:36:55	+23.321	-17.582	+26.923
17:37:05	+23.321	-17.399	+26.800
17:37:15	+23.321	-17.338	+26.862
17:37:25	+23.321	-17.216	+26.800
17:37:35	+23.321	-17.094	+26.862
17:37:45	+23.321	-16.910	+26.862
17:37:55	+23.321	-16.849	+26.862
17:38:05	+23.321	-16.727	+26.923
17:38:15	+23.321	-16.666	+26.800
17:38:25	+23.321	-16.483	+26.862
17:38:35	+23.321	-16.422	+26.923
17:38:45	+23.321	-16.239	+26.800
17:38:55	+23.321	-16.117	+26.862
17:39:05	+23.321	-16.056	+26.862
17:39:15	+23.321	-15.934	+26.862
17:39:25	+23.321	-15.811	+26.862
17:39:35	+23.382	-15.567	+26.923
17:39:45	+23.321	-15.628	+26.800
17:39:55	+23.321	-15.506	+26.862
17:40:05	+23.382	-15.445	+26.800
17:40:15	+23.382	-15.201	+26.862
17:40:25	+23.382	-15.079	+26.923
17:40:35	+23.382	-14.896	+26.862
17:40:45	+23.382	-14.896	+26.862
17:40:55	+23.382	-14.774	+26.862

17:41:05	+23.382	-14.652	+26.862
17:41:15	+23.382	-14.529	+26.923
17:41:25	+23.382	-14.346	+26.800
17:41:35	+23.382	-14.346	+26.862
17:41:45	+23.382	-14.102	+26.800
17:41:55	+23.382	-13.919	+26.862
17:42:05	+23.443	-13.736	+26.923
17:42:15	+23.382	-13.736	+26.923
17:42:25	+23.382	-13.553	+26.923
17:42:35	+23.382	-13.369	+26.800
17:42:45	+23.382	-13.308	+26.800
17:42:55	+23.382	-13.125	+26.923
17:43:05	+23.382	-12.942	+26.862
17:43:15	+23.382	-13.003	+26.800
17:43:25	+23.382	-12.820	+26.800
17:43:35	+23.382	-12.759	+26.739
17:43:45	+23.382	-12.637	+26.800
17:43:55	+23.382	-12.515	+26.800
17:44:05	+23.382	-12.148	+26.923
17:44:15	+23.382	-10.195	+26.862
17:44:25	+23.382	-7.6312	+26.862
17:44:35	+23.382	-7.4481	+26.923
17:44:45	+23.443	-7.6312	+26.862
17:44:55	+23.443	-5.5555	+26.800
17:45:05	+23.382	-2.5030	+26.862
17:45:15	+23.443	-1.0989	+26.862
17:45:25	+23.443	-1.7704	+26.984
17:45:35	+23.443	-0.5494	+26.923
17:45:45	+23.443	+2.2588	+26.800
17:45:55	+23.443	+4.7619	+26.862
17:46:05	+23.443	+3.7851	+26.862
17:46:15	+23.443	+4.0903	+26.800
17:46:25	+23.443	+6.7155	+26.923
17:46:35	+23.443	+9.7680	+26.800
17:46:45	+23.443	+6.7301	+26.800
17:46:55	+23.443	+6.1807	+26.923
17:47:05	+23.443	+10.256	+26.862
17:47:15	+23.504	+13.736	+26.862
17:47:25	+23.504	+13.125	+26.862
17:47:35	+23.504	+11.965	+26.862
17:47:45	+23.504	+13.431	+26.862
17:47:55	+23.504	+16.361	+26.800
17:48:05	+23.504	+16.971	+26.800
17:48:15	+23.504	+15.628	+26.862
17:48:25	+23.504	+15.934	+26.800
17:48:35	+23.504	+18.376	+26.923
17:48:45	+23.504	+19.413	+26.800
17:48:55	+23.504	+17.216	+26.923
17:49:05	+23.504	+16.117	+26.862
17:49:15	+23.504	+17.643	+26.862
17:49:25	+23.504	+19.658	+26.923
17:49:35	+23.504	+17.521	+26.800
17:49:45	+23.565	+16.483	+26.862
17:49:55	+23.565	+18.070	+26.862
17:50:05	+23.565	+20.085	+26.862
17:50:15	+23.565	+19.230	+26.862
17:50:25	+23.565	+17.826	+26.862
17:50:35	+23.565	+18.559	+26.862
17:50:45	+23.565	+20.329	+26.923
17:50:55	+23.565	+20.512	+26.862
17:51:05	+23.565	+18.437	+26.862
17:51:15	+23.565	+17.399	+26.739
17:51:25	+23.565	+16.605	+26.800
17:51:35	+23.504	+13.675	+26.923
17:51:45	+23.565	+4.3345	+26.923
17:51:55	+23.565	-2.9914	+26.984
17:52:05	+23.504	-7.0818	+26.862
17:52:15	+23.504	-8.9133	+26.862
17:52:25	+23.504	-11.111	+26.800
17:52:35	+23.565	-12.942	+26.862
17:52:45	+23.565	-13.064	+26.862
17:52:55	+23.565	-12.210	+26.678
17:53:05	+23.504	-12.454	+26.862
17:53:15	+23.565	-13.431	+26.984
17:53:25	+23.504	-13.308	+26.800
17:53:35	+23.504	-12.026	+26.739
17:53:45	+23.565	-10.989	+26.923
17:53:55	+23.504	-11.904	+26.800
17:54:05	+23.565	-12.210	+26.800
17:54:15	+23.565	-11.111	+26.923
17:54:25	+23.504	-9.2796	+26.862
17:54:35	+23.504	-9.7069	+26.984
17:54:45	+23.504	-10.500	+26.800
17:54:55	+23.504	-10.500	+26.800
17:55:05	+23.504	-10.622	+26.739
17:55:15	+23.504	-10.683	+26.800
17:55:25	+23.504	-10.683	+26.862
17:55:35	+23.504	-10.622	+26.862
17:55:45	+23.504	-10.622	+26.800
17:55:55	+23.504	-10.561	+26.678
17:56:05	+23.504	-10.378	+26.862

17:56:15	+23.504	-10.317	+26.739
17:56:25	+23.443	-10.195	+26.923
17:56:35	+23.504	-10.256	+26.800
17:56:45	+23.443	-10.073	+26.862
17:56:55	+23.443	-10.073	+26.800
17:57:05	+23.504	-9.9511	+26.739
17:57:15	+23.504	-9.7680	+26.862
17:57:25	+23.504	-9.7680	+26.739
17:57:35	+23.504	-9.6459	+26.862
17:57:45	+23.504	-9.6459	+26.862
17:57:55	+23.504	-9.4627	+26.862
17:58:05	+23.504	-9.4627	+26.678
17:58:15	+23.504	-9.4627	+26.800
17:58:25	+23.504	-9.2796	+26.862
17:58:35	+23.504	-9.2185	+26.739
17:58:45	+23.504	-9.0964	+26.862
17:58:55	+23.504	-9.0354	+26.800
17:59:05	+23.504	-8.9133	+26.923
17:59:15	+23.504	-8.7912	+26.862
17:59:25	+23.504	-8.8522	+26.862
17:59:35	+23.504	-8.6691	+26.739
17:59:45	+23.504	-8.6080	+26.739
17:59:55	+23.504	-8.4859	+26.739
18:00:05	+23.504	-8.4249	+26.800
18:00:15	+23.504	-8.3028	+26.739
18:00:25	+23.504	-8.2417	+26.800
18:00:35	+23.504	-8.1196	+26.923
18:00:45	+23.504	-8.0586	+26.862
18:00:55	+23.504	-7.9365	+26.800
18:01:05	+23.504	-7.8144	+26.862
18:01:15	+23.504	-7.7533	+26.862
18:01:25	+23.504	-7.6923	+26.862
18:01:35	+23.504	-7.6312	+26.800
18:01:45	+23.504	-7.5702	+26.800
18:01:55	+23.504	-7.5091	+26.862
18:02:05	+23.504	-7.4481	+26.800
18:02:15	+23.504	-7.3260	+26.800
18:02:25	+23.504	-7.1428	+26.862
18:02:35	+23.504	-7.1428	+26.862
18:02:45	+23.504	-7.1428	+26.800
18:02:55	+23.504	-7.0207	+26.862
18:03:05	+23.504	-7.0207	+26.739
18:03:15	+23.504	-6.8376	+26.862
18:03:25	+23.504	-6.8376	+26.800
18:03:35	+23.504	-6.7155	+26.739
18:03:45	+23.504	-6.5323	+26.862
18:03:55	+23.504	-6.5323	+26.923
18:04:05	+23.504	-6.4713	+26.800
18:04:15	+23.504	-6.4102	+26.800
18:04:25	+23.504	-6.2881	+26.678
18:04:35	+23.504	-6.1680	+26.800
18:04:45	+23.504	-6.1660	+26.862
18:04:55	+23.504	-6.0439	+26.739
18:05:05	+23.504	-5.9829	+26.800
18:05:15	+23.504	-4.8229	+26.862
18:05:25	+23.504	-2.1978	+26.862
18:05:35	+23.504	-0.7326	+26.800
18:05:45	+23.504	-1.3431	+26.984
18:05:55	+23.504	-0.8105	+26.800
18:06:05	+23.504	+1.7704	+26.862
18:06:15	+23.504	+4.2735	+26.800
18:06:25	+23.504	+3.4188	+26.800
18:06:35	+23.504	+3.2356	+26.862
18:06:45	+23.565	+5.3724	+26.678
18:06:55	+23.565	+6.2417	+26.862
18:07:05	+23.565	+7.5702	+26.800
18:07:15	+23.565	+6.8376	+26.923
18:07:25	+23.565	+8.4859	+26.862
18:07:35	+23.565	+11.050	+26.862
18:07:45	+23.565	+11.538	+26.984
18:07:55	+23.565	+10.317	+26.800
18:08:05	+23.565	+11.111	+26.862
18:08:15	+23.565	+13.369	+26.862
18:08:25	+23.565	+14.835	+26.800
18:08:35	+23.565	+13.553	+26.862
18:08:45	+23.565	+13.186	+26.862
18:08:55	+23.565	+15.079	+26.862
18:09:05	+23.565	+17.460	+26.923
18:09:15	+23.565	+16.117	+26.862
18:09:25	+23.565	+15.140	+26.800
18:09:35	+23.565	+16.666	+26.923
18:09:45	+23.626	+18.986	+26.739
18:09:55	+23.626	+18.070	+26.800
18:10:05	+23.626	+16.849	+26.862
18:10:15	+23.626	+17.582	+26.862
18:10:25	+23.626	+19.291	+26.800
18:10:35	+23.626	+19.474	+26.923
18:10:45	+23.626	+17.643	+26.739
18:10:55	+23.626	+17.399	+26.862
18:11:05	+23.626	+18.742	+26.800
18:11:15	+23.626	+19.352	+26.800

18:11:25	+23.626	+15.201	+26.923
18:11:35	+23.626	+10.500	+26.800
18:11:45	+23.565	+4.7619	+26.739
18:11:55	+23.565	-0.6105	+26.800
18:12:05	+23.565	-6.5934	+26.923
18:12:15	+23.565	-10.683	+26.800
18:12:25	+23.565	-11.599	+26.800
18:12:35	+23.565	-11.416	+26.862
18:12:45	+23.565	-11.965	+26.800
18:12:55	+23.565	-13.369	+26.739
18:13:05	+23.565	-13.736	+26.800
18:13:15	+23.565	-13.492	+26.739
18:13:25	+23.565	-13.858	+26.984
18:13:35	+23.565	-14.346	+26.800
18:13:45	+23.565	-14.407	+26.800
18:13:55	+23.565	-14.285	+26.800
18:14:05	+23.565	-14.407	+26.862
18:14:15	+23.565	-14.346	+26.862
18:14:25	+23.565	-14.346	+26.862
18:14:35	+23.565	-14.224	+26.800
18:14:45	+23.565	-14.346	+26.800
18:14:55	+23.565	-14.285	+26.862
18:15:05	+23.565	-14.224	+26.800
18:15:15	+23.565	-14.285	+26.800
18:15:25	+23.565	-14.102	+26.862
18:15:35	+23.565	-14.102	+26.800
18:15:45	+23.565	-14.163	+26.800
18:15:55	+23.565	-14.102	+26.800
18:16:05	+23.565	-13.980	+26.800
18:16:15	+23.565	-13.919	+26.923
18:16:25	+23.565	-13.919	+26.862
18:16:35	+23.565	-13.858	+26.800
18:16:45	+23.565	-13.797	+26.800
18:16:55	+23.565	-13.797	+26.862
18:17:05	+23.565	-13.675	+26.862
18:17:15	+23.565	-13.614	+26.862
18:17:25	+23.565	-13.553	+26.862
18:17:35	+23.565	-13.431	+26.800
18:17:45	+23.565	-13.369	+26.862
18:17:55	+23.565	-13.247	+26.862
18:18:05	+23.565	-13.186	+26.862
18:18:15	+23.565	-13.125	+26.862
18:18:25	+23.565	-13.064	+26.923
18:18:35	+23.565	-13.003	+26.862
18:18:45	+23.565	-12.942	+26.800
18:18:55	+23.565	-12.881	+26.862
18:19:05	+23.565	-12.698	+26.923
18:19:15	+23.565	-12.759	+26.862
18:19:25	+23.565	-12.637	+26.800
18:19:35	+23.565	-12.515	+26.923
18:19:45	+23.565	-12.515	+26.739
18:19:55	+23.565	-12.454	+26.862
18:20:05	+23.565	-12.393	+26.862
18:20:15	+23.565	-12.332	+26.923
18:20:25	+23.565	-12.332	+26.739
18:20:35	+23.565	-12.148	+26.862
18:20:45	+23.565	-12.148	+26.800
18:20:55	+23.565	-12.087	+26.678
18:21:05	+23.565	-11.965	+26.923
18:21:15	+23.565	-11.904	+26.800
18:21:25	+23.565	-11.965	+26.800
18:21.35	+23.565	-11.904	+26.739
18:21:45	+23.565	-11.843	+26.739
18:21:55	+23.565	-11.904	+26.862
18:22:05	+23.565	-11.721	+26.923
18:22:15	+23.565	-11.721	+26.923
18:22:25	+23.565	-11.660	+26.923
18:22:35	+23.565	-11.599	+26.862
18:22:45	+23.565	-11.599	+26.800
18:22:55	+23.565	-11.477	+26.923
18:23:05	+23.565	-11.538	+26.862
18:23:15	+23.565	-11.538	+26.800
18:23:25	+23.565	-11.538	+26.800
18:23:35	+23.565	-11.477	+26.862
18:23:45	+23.565	-11.416	+26.862
18:23:55	+23.565	-11.233	+26.862
18:24:05	+23.565	-11.355	+26.739
18:24:15	+23.565	-11.294	+26.800
18:24:25	+23.565	-11.294	+26.862
18:24:35	+23.565	-11.233	+26.862
18:24:45	+23.565	-11.233	+26.800
18:24:55	+23.565	-11.172	+26.800
18:25:05	+23.565	-11.111	+26.678
18:25:15	+23.565	-11.050	+26.800
18:25:25	+23.565	-11.050	+26.800
18:25:35	+23.565	-10.927	+26.800
18:25:45	+23.565	-10.866	+26.739
18:25:55	+23.565	-10.805	+26.923
18:26:05	+23.565	-10.805	+26.862
18:26:15	+23.565	-10.805	+26.739
18:26:25	+23.565	-10.622	+26.739

18:26:35	+23.565	-10.500	+26.862
18:26:45	+23.565	-10.622	+26.739
18:26:55	+23.565	-10.439	+26.862
18:27:05	+23.626	-10.439	+26.923
18:27:15	+23.626	-10.378	+26.739
18:27:25	+23.626	-10.317	+26.862
18:27:35	+23.626	-10.256	+26.862
18:27:45	+23.626	-10.317	+26.800
18:27:55	+23.626	-10.195	+26.800
18:28:05	+23.626	-9.3406	+26.862
18:28:15	+23.626	-5.7997	+26.800
18:28:25	+23.626	-1.3431	+26.800
18:28:35	+23.626	-1.4041	+26.800
18:28:45	+23.626	-1.4652	+26.800
18:28:55	+23.626	+1.7704	+26.800
18:29:05	+23.626	+6.2271	+26.800
18:29:15	+23.626	+6.6544	+26.800
18:29:25	+23.626	+6.0439	+26.800
18:29:35	+23.626	+8.2417	+26.862
18:29:45	+23.626	+10.500	+26.800
18:29:55	+23.626	+10.012	+26.678
18:30:05	+23.626	+8.9133	+26.800
18:30:15	+23.626	+10.012	+26.739
18:30:25	+23.626	+10.378	+26.862
18:30:35	+23.687	+10.317	+26.800
18:30:45	+23.687	+9.3406	+26.739
18:30:55	+23.626	+9.4017	+26.739
18:31:05	+23.626	+10.134	+26.617
18:31:15	+23.687	+10.134	+26.678
18:31:25	+23.626	+9.4017	+26.617
18:31:35	+23.626	+9.0964	+26.739
18:31:45	+23.626	+9.9511	+26.556
18:31:55	+23.626	+10.012	+26.556
18:32:05	+23.626	+9.5238	+26.556
18:32:15	+23.626	+9.2796	+26.556
18:32:25	+23.687	+9.2796	+26.617
18:32:35	+23.687	+9.4627	+26.617
18:32:45	+23.626	+9.4627	+26.617
18:32:55	+23.626	+9.7069	+26.556
18:33:05	+23.626	+9.8290	+26.556
18:35:05	+23.626	+10.012	+26.190
18:35:15	+23.626	+10.073	+26.495
18:35:25	+23.626	+10.195	+26.556
18:35:35	+23.626	+10.012	+26.495
18:35:45	+23.626	+9.8901	+26.312
18:35:55	+23.626	+10.073	+26.434
18:36:05	+23.626	+10.195	+26.312
18:36:15	+23.626	+10.561	+26.312
18:36:25	+23.626	+10.927	+26.312
18:36:35	+23.626	+10.989	+26.434
18:36:45	+23.687	+11.050	+26.373
18:36:55	+23.687	+11.111	+26.617
18:37:05	+23.626	+11.111	+26.495
18:37:15	+23.687	+10.989	+26.495
18:37:25	+23.687	+11.172	+26.617
18:37:35	+23.687	+10.989	+26.556
18:37:45	+23.687	+11.111	+26.556
18:37:55	+23.687	+11.233	+26.678
18:38:05	+23.687	+11.172	+26.617
18:38:15	+23.687	+11.233	+26.617
18:38:25	+23.687	+11.172	+26.800
18:38:35	+23.687	+11.111	+26.434
18:38:45	+23.687	+11.172	+26.678
18:38:55	+23.687	+11.172	+26.617
18:39:05	+23.687	+11.172	+26.678
18:39:15	+23.687	+11.172	+26.678
18:39:25	+23.687	+11.172	+26.617
18:39:35	+23.687	+11.111	+26.617
18:39:45	+23.687	+11.294	+26.678
18:39:55	+23.687	+10.989	+26.678
18:40:05	+23.687	+11.050	+26.739
18:40:15	+23.687	+11.172	+26.617
18:40:25	+23.687	+11.050	+26.617
18:40:35	+23.687	+10.866	+26.678
18:40:45	+23.687	+10.927	+26.617
18:40:55	+23.687	+11.050	+26.495
18:41:05	+23.687	+10.989	+26.495
18:41:15	+23.687	+10.927	+26.556
18:41:25	+23.687	+10.805	+26.434
18:41:35	+23.687	+10.927	+26.434
18:41:45	+23.687	+11.050	+26.495
18:41:55	+23.687	+10.744	+26.434
18:42:05	+23.687	+10.805	+26.495
18:42:15	+23.687	+10.866	+26.434
18:42:25	+23.687	+10.927	+26.434
18:42:35	+23.687	+10.927	+26.556
18:42:45	+23.687	+10.866	+26.434
18:42:55	+23.687	+10.866	+26.434
18:43:05	+23.687	+10.927	+26.495
18:43:15	+23.687	+10.927	+26.434
18:43:25	+23.687	+10.744	+26.251
18:43:35	+23.687	+10.927	+26.373
18:43:45	+23.687	+10.866	+26.434
18:43:55	+23.687	+10.866	+26.373
18:44:05	+23.687	+10.683	+26.373
18:44:15	+23.687	+10.744	+26.312
18:44:25	+23.687	+10.927	+26.373
18:44:35	+23.687	+10.866	+26.495
18:44:45	+23.687	+10.622	+26.312
18:44:55	+23.687	+10.744	+26.434
18:45:05	+23.687	+10.866	+26.312
18:45:15	+23.687	+10.927	+26.373
18:45:25	+23.748	+10.683	+26.373
18:45:35	+23.748	+10.805	+26.312
18:45:45	+23.687	+10.805	+26.312
18:45:55	+23.687	+10.744	+26.312
18:46:05	+23.687	+10.744	+26.434
18:46:15	+23.748	+10.744	+26.373
18:46:25	+23.687	+10.805	+26.312
18:46:35	+23.687	+10.622	+26.312
18:46:45	+23.687	+10.744	+26.312
18:46:55	+23.748	+10.744	+26.373
18:47:05	+23.687	+10.744	+26.312
18:47:15	+23.748	+10.744	+26.251
18:47:25	+23.748	+10.805	+26.312
18:47:35	+23.748	+10.622	+26.434
18:47:45	+23.687	+10.561	+26.312
18:47:55	+23.748	+10.683	+26.251
18:48:05	+23.748	+10.866	+26.312
18:48:15	+23.748	+10.622	+26.190
18:48:25	+23.748	+10.744	+26.251
18:48:35	+23.748	+10.744	+26.190
18:48:45	+23.748	+10.805	+26.251
18:48:55	+23.748	+10.805	+26.373
18:49:05	+23.748	+10.561	+26.373
18:49:15	+23.748	+10.622	+26.251
18:49:25	+23.748	+10.744	+26.190
18:49:35	+23.748	+10.622	+26.251
18:49:45	+23.748	+10.622	+26.251
18:49:55	+23.748	+10.683	+26.190
18:50:15	+23.748	+10.622	+26.190
18:50:25	+23.748	+10.683	+26.129
18:50:35	+23.748	+10.622	+26.312
18:50:45	+23.748	+10.744	+26.251
18:50:55	+23.748	+10.805	+26.312
18:51:05	+23.748	+10.439	+26.312
18:51:15	+23.748	+10.561	+26.251
18:51:25	+23.748	+10.683	+26.312
18:51:35	+23.748	+10.805	+26.251
18:51:45	+23.748	+10.744	+26.434
18:51:55	+23.748	+10.683	+26.373
18:52:05	+23.748	+10.744	+26.251
18:52:15	+23.748	+10.683	+26.129
18:52:25	+23.748	+10.683	+26.312
18:52:35	+23.748	+10.683	+26.251
18:52:45	+23.748	+10.683	+26.251
18:52:55	+23.748	+10.561	+26.190
18:53:05	+23.748	+10.683	+26.251
18:53:15	+23.748	+10.683	+26.312
18:53:25	+23.748	+10.622	+26.312
18:53:35	+23.748	+10.744	+26.251
18:53:45	+23.748	+10.744	+26.251
18:53:55	+23.748	+10.622	+26.373
18:54:05	+23.748	+10.500	+26.190
18:54:15	+23.748	+10.622	+26.190
18:54:25	+23.748	+10.744	+26.312
18:54:35	+23.748	+10.683	+26.373
18:54:45	+23.748	+10.561	+26.312
18:54:55	+23.748	+10.683	+26.251
18:55:05	+23.748	+10.683	+26.190
18:55:15	+23.748	+10.683	+26.373
18:55:25	+23.748	+10.622	+26.373
18:55:35	+23.748	+10.683	+26.251
18:55:45	+23.748	+10.744	+26.190
18:55:55	+23.748	+10.744	+26.251
18:56:05	+23.748	+10.683	+26.251
18:56:15	+23.748	+10.622	+26.190
18:56:25	+23.748	+10.683	+26.251
18:56:35	+23.748	+10.683	+26.129
18:56:45	+23.748	+10.561	+26.251
18:56:55	+23.748	+10.683	+26.434
18:57:05	+23.748	+10.683	+26.190
18:57:15	+23.748	+10.683	+26.251
18:57:25	+23.748	+10.622	+26.373
18:57:35	+23.748	+10.500	+26.251
18:57:45	+23.748	+10.622	+26.312
18:57:55	+23.748	+10.744	+26.312
18:58:05	+23.748	+10.683	+26.312
18:58:15	+23.748	+10.622	+26.251
18:58:25	+23.748	+10.683	+26.251
18:58:35	+23.748	+10.683	+26.129
18:58:45	+23.748	+10.683	+26.190
18:58:55	+23.748	+10.622	+26.373
18:59:05	+23.748	+10.744	+26.312
18:59:15	+23.748	+10.683	+26.251
18:59:25	+23.748	+10.683	+26.190
18:59:35	+23.748	+10.622	+26.251
18:59:45	+23.748	+10.622	+26.312
18:59:55	+23.748	+10.744	+26.312
19:00:05	+23.748	+10.744	+26.251
19:00:15	+23.748	+10.622	+26.312
19:00:25	+23.748	+10.622	+26.190
19:00:35	+23.748	+10.622	+26.251
19:00:45	+23.748	+10.683	+26.251
19:00:55	+23.748	+10.561	+26.251
19:01:05	+23.748	+10.683	+26.312
19:01:15	+23.748	+10.683	+26.190
19:01:25	+23.748	+10.622	+26.251
19:01:35	+23.748	+10.683	+26.190
19:01:45	+23.748	+10.683	+26.251
19:01:55	+23.748	+10.744	+26.312
19:02:05	+23.748	+10.500	+26.190
19:02:15	+23.748	+10.622	+26.251
19:02:25	+23.748	+10.683	+26.373
19:02:35	+23.748	+10.683	+26.312
19:02:45	+23.748	+10.683	+26.129
19:02:55	+23.748	+10.622	+26.312
19:03:05	+23.748	+10.683	+26.312
19:03:15	+23.748	+10.622	+26.190
19:03:25	+23.748	+10.500	+26.251
19:03:35	+23.748	+10.683	+26.251
19:03:45	+23.748	+10.683	+26.251
19:03:55	+23.748	+10.622	+26.251
19:04:05	+23.748	+10.744	+26.434
19:04:15	+23.748	+10.744	+26.312
19:04:25	+23.748	+10.622	+26.251
19:04:35	+23.748	+10.744	+26.373
19:04:45	+23.809	+10.744	+26.312
19:04:55	+23.809	+10.744	+26.434
19:05:05	+23.809	+10.744	+26.251
19:05:15	+23.809	+10.622	+26.251
19:05:25	+23.748	+10.561	+26.251
19:05:35	+23.809	+10.622	+26.251
19:05:45	+23.809	+10.561	+26.251
19:05:55	+23.809	+10.683	+26.373
19:06:05	+23.809	+10.622	+26.434
19:06:15	+23.748	+10.622	+26.312
19:06:25	+23.748	+10.561	+26.251
19:06:35	+23.748	+10.683	+26.251
19:06:45	+23.748	+10.561	+26.251
19:07:05	+23.748	+10.683	+26.251
19:07:15	+23.809	+10.744	+26.251
19:07:25	+23.748	+10.561	+26.251
19:07:35	+23.748	+10.683	+26.312
19:07:45	+23.748	+10.622	+26.251
19:07:55	+23.809	+10.683	+26.251
19:08:05	+23.748	+10.500	+26.251
19:08:15	+23.809	+10.744	+26.312
19:08:25	+23.748	+10.622	+26.129
19:08:35	+23.748	+10.622	+26.312
19:08:45	+23.748	+10.561	+26.251
19:08:55	+23.748	+10.561	+26.312
19:09:05	+23.748	+11.111	+26.129
19:09:15	+23.748	+11.233	+26.312
19:09:25	+23.748	+19.352	+26.312
19:09:35	+23.870	+22.710	+26.190
19:09:45	+23.870	+11.599	+26.312
19:09:55	+23.809	+10.989	+26.373
19:10:05	+23.809	+15.628	+26.373
19:10:15	+23.809	+22.771	+26.373
19:10:25	+23.931	+14.774	+26.251
19:10:35	+23.870	+14.041	+26.617
19:10:45	+23.809	+14.835	+26.434
19:10:55	+23.870	+20.940	+26.434
19:11:05	+23.931	+16.849	+26.556
19:11:15	+23.870	+15.384	+26.434
19:11:25	+23.870	+15.262	+26.434
19:11:35	+23.870	+19.536	+26.556
19:11:45	+23.931	+19.474	+26.495
19:11:55	+23.931	+15.811	+26.495
19:12:05	+23.870	+15.811	+26.617
19:12:15	+23.870	+18.070	+26.617
19:12:25	+23.931	+20.695	+26.556
19:12:35	+23.931	+16.239	+26.495
19:12:45	+23.870	+15.506	+26.556
19:12:55	+23.870	+16.544	+26.617
19:13:05	+23.870	+19.841	+26.495
19:13:15	+23.931	+16.544	+26.556
19:13:25	+23.931	+15.628	+26.617
19:13:35	+23.870	+15.934	+26.556
19:13:45	+23.870	+18.681	+26.617
19:13:55	+23.931	+17.032	+26.556
19:14:05	+23.931	+15.689	+26.617
19:14:15	+23.870	+15.811	+26.617
19:14:25	+23.870	+17.460	+26.556
19:14:35	+23.931	+18.253	+26.617
19:14:45	+23.931	+15.873	+26.495
19:14:55	+23.870	+15.567	+26.617
19:15:05	+23.870	+16.788	+26.739
19:15:15	+23.931	+18.681	+26.556
19:15:25	+23.931	+16.117	+26.678
19:15:35	+23.931	+15.323	+26.678
19:15:45	+23.931	+16.483	+26.556
19:15:55	+23.931	+18.986	+26.617
19:16:05	+23.931	+16.483	+26.495
19:16:15	+23.931	+15.384	+26.617
19:16:25	+23.931	+16.239	+26.495
19:16:35	+23.931	+18.559	+26.495
19:16:45	+23.931	+16.971	+26.800
19:16:55	+23.931	+15.384	+26.556
19:17:05	+23.931	+16.056	+26.617
19:17:15	+23.931	+18.253	+26.556
19:17:25	+23.931	+17.643	+26.617
19:17:35	+23.931	+15.811	+26.617
19:17:45	+23.992	+16.056	+26.617
19:17:55	+23.931	+17.765	+26.617
19:18:05	+23.931	+18.437	+26.617
19:18:15	+23.931	+16.117	+26.556
19:18:25	+23.931	+15.689	+26.617
19:18:35	+23.931	+17.399	+26.617
19:18:45	+23.931	+19.047	+26.678
19:18:55	+23.931	+16.605	+26.556
19:19:05	+23.992	+15.567	+26.556
19:19:15	+23.931	+16.971	+26.556
19:19:25	+23.931	+19.108	+26.617
19:19:35	+23.931	+16.971	+26.617
19:19:45	+23.931	+15.750	+26.556
19:19:55	+23.931	+16.849	+26.556
19:20:05	+23.931	+18.681	+26.617
19:20:15	+23.931	+17.521	+26.556
19:20:25	+23.931	+15.995	+26.556
19:20:35	+23.931	+16.605	+26.556
19:20:45	+23.931	+18.315	+26.495
19:20:55	+23.931	+18.070	+26.617
19:21:05	+23.931	+16.422	+26.739
19:21:15	+23.931	+16.239	+26.556
19:21:25	+23.931	+17.948	+26.678
19:21:35	+23.931	+18.742	+26.617
19:21:45	+23.931	+16.788	+26.617
19:21:55	+23.931	+16.300	+26.617
19:22:05	+23.931	+17.704	+26.678
19:22:15	+23.931	+18.986	+26.617
19:22:25	+23.992	+17.155	+26.617
19:22:35	+23.992	+16.178	+26.617
19:22:45	+23.931	+17.399	+26.678
19:22:55	+23.992	+19.047	+26.617
19:23:05	+23.992	+17.460	+26.617
19:23:15	+23.992	+16.300	+26.617
19:23:25	+23.931	+16.910	+26.617
19:23:35	+23.931	+18.498	+26.617
19:23:45	+23.992	+17.032	+26.617
19:23:55	+23.931	+14.713	+26.617
19:24:05	+23.931	+10.866	+26.617
19:24:15	+23.870	+5.7997	+26.678
19:24:25	+23.809	-0.8547	+26.556
19:24:35	+23.748	-6.4713	+26.617
19:24:45	+23.748	-10.134	+26.678
19:24:55	+23.748	-12.332	+26.556
19:25:05	+23.748	-13.675	+26.617
19:25:15	+23.504	-14.468	+26.495
19:25:25	+22.649	-14.041	+26.556
19:25:35	+20.146	-10.622	+26.312
19:25:45	+29.731	+9.6459	+25.641
19:25:55	+29.304	+9.3406	+24.969
19:26:05	+29.304	+9.4627	+25.213
19:26:15	+29.426	+9.5848	+25.274
19:26:25	+29.548	+9.5848	+25.335
19:26:35	+29.670	+9.7680	+25.335
19:26:45	+29.792	+9.8901	+25.641
19:26:55	+29.853	+10.073	+25.763
19:27:05	+29.975	+10.073	+25.824
19:27:15	+30.097	+10.195	+26.007
19:27:25	+30.219	+10.256	+26.007
19:27:35	+30.280	+10.256	+26.068

1936:P2-1DAT/3

TRANSDUCER DATA - ZONE P2-2

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 426
Start Time: 08:01:43
Start Date: 09/24
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
08:01:43	+52.380	+30.158	+48.656
08:02:13	+52.319	+30.158	+48.656
08:02:43	+52.380	+30.158	+48.656
08:03:13	+52.380	+30.158	+48.656
08:03:43	+52.442	+30.219	+48.717
08:04:13	+52.380	+30.219	+48.717
08:04:43	+52.380	+30.158	+48.717
08:05:13	+50.610	+30.097	+48.717
08:05:43	+45.909	+30.219	+48.778
08:06:13	+43.467	+30.158	+48.778
08:06:43	+42.307	+30.280	+48.717
08:07:13	+40.964	-30.647	+48.595
08:07:43	+40.415	-26.876	+48.595
08:08:13	+40.048	-26.739	+48.595
08:08:43	+39.804	-24.969	+48.595
08:09:13	+39.621	-25.091	+48.595
08:09:43	+39.438	-24.786	+48.656
08:10:13	+39.255	-24.664	+48.656
08:10:43	+39.133	-24.664	+48.656
08:11:13	+39.010	-25.213	+48.656
08:11:43	+38.888	-26.190	+48.656
08:12:13	+38.766	-26.617	+48.656
08:12:43	+38.705	-26.800	+48.656
08:13:13	+38.583	-27.106	+48.656
08:13:43	+38.522	-26.800	+48.656
08:14:13	+38.461	-26.495	+48.717
08:14:43	+38.400	-26.068	+48.717
08:15:13	+38.644	-25.702	+48.717
08:15:43	+38.705	-25.518	+48.717
08:16:13	+38.400	-25.274	+48.717
08:16:43	+38.278	-25.152	+48.717
08:17:13	+38.156	-24.969	+48.656
08:17:43	+38.095	-24.725	+48.717
08:18:13	+38.034	-24.542	+48.717
08:18:43	+38.034	-24.358	+48.717
08:19:13	+37.973	-24.236	+48.717
08:19:43	+37.851	-24.053	+48.717
08:20:13	+37.789	-23.992	+48.717
08:20:43	+37.728	-23.870	+48.656
08:21:13	+37.728	-23.687	+48.717
08:21:43	+37.667	-23.626	+48.717
08:22:13	+37.606	-23.565	+48.717
08:22:43	+37.545	-23.504	+48.717
08:23:13	+37.545	-23.321	+48.717
08:23:43	+37.484	-23.199	+48.717
08:24:13	+37.423	-22.832	+48.656
08:24:43	+37.362	-22.588	+48.656
08:25:13	+37.301	-22.344	+48.717
08:25:43	+37.240	-21.978	+48.717
08:26:13	+37.301	-21.550	+48.778
08:26:43	+37.240	-21.123	+48.778
08:27:13	+37.240	-20.757	+48.778
08:27:43	+37.179	-20.451	+48.717
08:28:13	+37.179	-20.085	+48.778
08:28:43	+37.118	-19.780	+48.778
08:29:13	+37.057	-19.352	+48.778
08:29:43	+37.057	-18.986	+48.717
08:30:13	+36.996	-18.620	+48.717
08:30:43	+36.935	-18.070	+48.717
08:31:13	+36.874	-17.643	+48.656
08:31:43	+36.935	-17.094	+48.717
08:32:13	+36.874	-16.483	+48.717
08:32:43	+36.874	-15.934	+48.717
08:33:13	+36.874	-15.262	+48.717
08:33:43	+36.813	-14.713	+48.717
08:34:13	+36.813	-14.041	+48.717
08:34:43	+36.813	-13.369	+48.717
08:35:13	+36.813	-12.759	+48.717
08:35:43	+36.813	-12.087	+48.717
08:36:13	+36.752	-11.416	+48.717
08:36:43	+36.752	-10.744	+48.717
08:37:13	+36.752	-10.012	+48.656
08:37:43	+36.813	-9.5848	+48.656
08:38:13	+36.996	-9.5848	+48.717
08:38:43	+36.874	-9.8901	+48.717
08:39:13	+36.874	-10.134	+48.717
08:39:43	+36.874	-10.439	+48.717
08:40:13	+36.874	-10.622	+48.717
08:40:43	+36.935	-10.805	+48.717
08:41:13	+36.935	-10.927	+48.717
08:41:43	+36.996	-11.111	+48.717
08:42:13	+36.996	-11.172	+48.778
08:42:43	+36.996	-11.294	+48.717
08:43:13	+37.057	-11.416	+48.778
08:43:43	+37.057	-11.416	+48.717
08:44:13	+37.057	-10.317	+48.717
08:44:43	+37.118	-9.1575	+48.717
08:45:13	+37.118	-7.8754	+48.717
08:45:43	+37.118	-6.4102	+48.717
08:46:13	+37.179	-4.9450	+48.717
08:46:43	+37.179	-3.2967	+48.717
08:47:13	+37.179	-1.5873	+48.717
08:47:43	+37.240	+0.1831	+48.717
08:48:13	+37.240	+2.0757	+48.717
08:48:43	+37.240	+4.1514	+48.717
08:49:13	+37.179	+6.3492	+48.717
08:49:43	+37.179	+8.7301	+48.717
08:50:13	+37.179	+11.111	+48.717
08:50:43	+37.240	+13.736	+48.717
08:51:13	+37.179	+16.361	+48.717
08:51:43	+37.179	+18.681	+48.717
08:52:13	+37.179	+20.512	+48.717
08:52:43	+37.179	+22.283	+48.717
08:53:13	+37.240	+23.076	+48.717
08:53:43	+37.240	+22.893	+48.717
08:54:13	+37.240	+22.893	+48.778
08:54:43	+37.240	+22.771	+48.778
08:55:13	+37.240	+22.771	+48.717
08:55:43	+37.240	+22.771	+48.778
08:56:13	+37.240	+22.710	+48.778
08:56:43	+37.179	-11.538	+48.778
08:57:13	+37.240	-19.780	+48.778
08:57:43	+37.240	-23.260	+48.778
08:58:13	+37.240	-24.114	+48.717
08:58:43	+37.240	-23.870	+48.778
08:59:13	+37.179	-23.565	+48.717
08:59:43	+37.179	-23.199	+48.778
09:00:13	+37.179	-22.832	+48.778
09:00:43	+37.179	-22.466	+48.778
09:01:13	+37.179	-22.161	+48.778
09:01:43	+37.179	-21.733	+48.778
09:02:13	+37.179	-21.428	+48.778
09:02:43	+37.118	-21.123	+48.778
09:03:13	+37.118	-20.818	+48.778
09:03:43	+37.118	-20.451	+48.778
09:04:13	+37.118	-20.207	+48.778
09:04:43	+37.118	-19.902	+48.778
09:05:13	+37.118	-19.658	+48.778
09:05:43	+37.057	-19.291	+48.778
09:06:13	+37.057	-18.986	+48.778
09:06:43	+36.996	-18.742	+48.778
09:07:13	+37.179	-18.437	+48.778
09:07:43	+37.118	-18.009	+48.778
09:08:13	+37.057	-17.643	+48.778
09:08:43	+36.996	-17.338	+48.778
09:09:13	+36.996	-16.971	+48.778
09:09:43	+36.996	-16.544	+48.778
09:10:13	+36.996	-16.239	+48.778
09:10:43	+36.996	-15.811	+48.778
09:11:13	+36.935	-15.506	+48.778
09:11:43	+36.935	-15.262	+48.778
09:12:13	+36.935	-14.896	+48.778
09:12:43	+36.935	-14.713	+48.778
09:13:13	+36.935	-14.468	+48.778
09:13:43	+36.935	-14.285	+48.778
09:14:13	+36.935	-14.041	+48.778
09:14:43	+36.935	-13.858	+48.778
09:15:13	+36.935	-13.736	+48.778
09:15:43	+36.874	-13.553	+48.717
09:16:13	+36.813	-13.431	+48.778
09:16:43	+36.874	-13.308	+48.717
09:17:13	+36.874	-13.186	+48.778
09:17:43	+36.874	-13.125	+48.778
09:18:13	+36.874	-13.064	+48.778
09:18:43	+36.874	-13.003	+48.778
09:19:13	+36.813	-12.881	+48.778
09:19:43	+36.813	-12.820	+48.778
09:20:13	+36.813	-12.820	+48.778
09:20:43	+36.813	-12.881	+48.778
09:21:13	+36.813	-12.820	+48.778
09:21:43	+36.813	-12.942	+48.778
09:22:13	+36.752	-12.759	+48.778
09:22:43	+36.752	-12.698	+48.778
09:23:13	+36.752	-12.637	+48.717
09:23:43	+36.752	-12.637	+48.778
09:24:13	+36.752	-12.637	+48.778
09:24:43	+36.752	-12.637	+48.778
09:25:13	+36.752	-12.576	+48.778
09:25:43	+36.691	-12.515	+48.778
09:26:13	+36.691	-12.454	+48.778
09:26:43	+36.691	-12.210	+48.717
09:27:13	+36.691	-12.026	+48.717
09:27:43	+36.691	-11.782	+48.717
09:28:13	+36.691	-11.599	+48.717
09:28:43	+36.691	-11.233	+48.717
09:29:13	+36.630	-10.866	+48.717
09:29:43	+36.691	-9.9511	+48.717
09:30:13	+36.630	-8.0586	+48.717
09:30:43	+36.691	-6.4713	+48.717
09:31:13	+36.630	-5.1282	+48.778
09:31:43	+36.630	-3.7851	+48.717
09:32:13	+36.630	-2.5641	+48.717
09:32:43	+36.691	-1.2210	+48.840
09:33:13	+36.630	+0.0610	+48.778
09:33:43	+36.630	+1.4652	+48.840
09:34:13	+36.568	+2.6862	+48.717
09:34:43	+36.630	+4.0293	+48.778
09:35:13	+36.630	+5.3724	+48.778
09:35:43	+36.568	+6.6544	+48.717
09:36:13	+36.568	+7.9975	+48.717
09:36:43	+36.568	+9.2185	+48.717
09:37:13	+36.630	+10.622	+48.778
09:37:43	+36.568	+11.721	+48.778
09:38:13	+36.568	+12.942	+48.778
09:38:43	+36.568	+13.980	+48.778
09:39:13	+36.568	+15.018	+48.778
09:39:43	+36.568	+15.934	+48.778
09:40:13	+36.568	+16.727	+48.778
09:40:43	+36.507	+17.399	+48.778
09:41:13	+36.507	+18.131	+48.778
09:41:43	+36.507	+18.681	+48.778
09:42:13	+36.507	+19.169	+48.778
09:42:43	+36.507	+19.474	+48.778
09:43:13	+36.507	+19.780	+48.840
09:43:43	+36.507	+20.024	+48.778
09:44:13	+36.507	+20.329	+48.778
09:44:43	+36.507	+20.573	+48.778
09:45:13	+36.507	+20.818	+48.778
09:45:43	+36.507	+21.062	+48.778
09:46:13	+36.507	+21.245	+48.778
09:46:43	+36.446	+21.367	+48.778
09:47:13	+36.446	+21.611	+48.778
09:47:43	+36.446	+21.794	+48.778
09:48:13	+36.446	+22.039	+48.778
09:48:43	+36.446	+22.283	+48.778
09:49:13	+36.446	+22.527	+48.778
09:49:43	+36.385	+22.893	+48.778
09:50:13	+36.385	+23.076	+48.778
09:50:43	+36.385	+23.443	+48.778
09:51:13	+36.385	+23.931	+48.778
09:51:43	+36.385	+24.542	+48.778
09:52:13	+36.385	+25.274	+48.778
09:52:43	+36.385	+26.007	+48.778
09:53:13	+36.385	+26.678	+48.778
09:53:43	+36.385	+27.289	+48.778
09:54:13	+36.385	+27.899	+48.778
09:54:43	+36.324	+28.449	+48.778
09:55:13	+36.324	+28.815	+48.778
09:55:43	+36.385	+29.059	+48.778
09:56:13	+36.324	+29.059	+48.778
09:56:43	+36.324	+29.242	+48.778
09:57:13	+36.324	+29.242	+48.778
09:57:43	+36.324	+29.426	+48.778
09:58:13	+36.324	+29.426	+48.778
09:58:43	+36.324	+29.548	+48.778
09:59:13	+36.385	+29.670	+48.840
09:59:43	+36.324	+29.548	+48.840
10:00:13	+36.324	+29.731	+48.840
10:00:43	+36.324	+29.670	+48.840
10:01:13	+36.324	+29.731	+48.840
10:01:43	+36.324	+29.670	+48.840
10:02:13	+36.385	-4.0293	+48.840
10:02:43	+36.385	-15.018	+48.840
10:03:13	+36.324	-19.780	+48.840
10:03:43	+36.324	-21.184	+48.840
10:04:13	+36.324	-20.818	+48.840
10:04:43	+36.507	-20.573	+48.840
10:05:13	+36.385	-20.329	+48.840
10:05:43	+36.080	-19.902	+48.840
10:06:13	+36.019	-19.719	+48.840
10:06:43	+35.958	-19.352	+48.840
10:07:13	+35.958	-19.108	+48.840
10:07:43	+35.958	-18.803	+48.840
10:08:13	+35.897	-18.437	+48.840
10:08:43	+35.897	-18.131	+48.840
10:09:13	+35.897	-17.826	+48.840
10:09:43	+35.897	-17.521	+48.840
10:10:13	+35.836	-17.216	+48.840
10:10:43	+35.836	-16.849	+48.840
10:11:13	+35.836	-16.483	+48.840
10:11:43	+35.836	-16.117	+48.840
10:12:13	+35.836	-15.811	+48.840
10:12:43	+35.836	-15.506	+48.840
10:13:13	+35.836	-15.262	+48.840
10:13:43	+35.836	-15.018	+48.840
10:14:13	+35.836	-14.713	+48.840
10:14:43	+35.836	-14.590	+48.840
10:15:13	+35.775	-14.346	+48.840
10:15:43	+35.836	-14.163	+48.840
10:16:13	+35.836	-13.980	+48.840
10:16:43	+35.836	-13.797	+48.840
10:17:13	+35.836	-13.675	+48.840
10:17:43	+35.775	-13.553	+48.840
10:18:13	+35.775	-13.431	+48.840
10:18:43	+35.775	-13.186	+48.840
10:19:13	+35.775	-12.271	+48.840
10:19:43	+35.836	-8.4859	+48.840
10:20:13	+35.836	-1.9536	+48.840
10:20:43	+35.775	+0.4273	+48.840
10:21:13	+35.775	+3.2356	+48.840
10:21:43	+35.836	+9.6459	+48.840
10:22:13	+35.836	+13.675	+48.840
10:22:43	+35.836	+14.590	+48.840
10:23:13	+35.836	+18.925	+48.778
10:23:43	+35.897	+24.664	+48.778
10:24:13	+35.836	+23.992	+48.840
10:24:43	+35.836	+24.786	+48.778
10:25:13	+35.836	+28.754	+48.840
10:25:43	+35.836	+30.158	+48.840
10:26:13	+35.836	+27.045	+48.778
10:26:43	+35.836	+27.838	+48.778
10:27:13	+35.897	+30.158	+48.778
10:27:43	+35.897	+28.388	+48.717
10:28:13	+36.080	+27.167	+48.717
10:28:43	+36.019	+31.013	+48.717
10:29:13	+36.019	+30.402	+48.778
10:29:43	+36.019	+28.205	+48.778
10:30:13	+36.019	+30.280	+48.840
10:30:43	+36.019	+32.112	+48.840
10:31:13	+36.019	+29.487	+48.840

10:31:43	+36.019	+29.304	+48.840
10:32:13	+36.019	+32.051	+48.840
10:32:43	+36.019	+30.402	+48.778
10:33:13	+36.019	+28.388	+48.778
10:33:43	+36.019	+30.341	+48.778
10:34:13	+36.019	+31.257	+48.778
10:34:43	+35.897	+28.876	+48.778
10:35:13	+36.019	+29.365	+48.778
10:35:43	+36.080	+31.929	+48.778
10:36:13	+36.080	+29.670	+48.778
10:36:43	+36.080	+28.632	+48.778
10:37:13	+36.080	+30.341	+48.778
10:37:43	+36.080	+30.525	+48.778
10:38:13	+36.080	+28.266	+48.778
10:38:43	+36.080	+29.304	+48.778
10:39:13	+35.897	+31.257	+48.778
10:39:43	+35.836	+29.120	+48.778
10:40:13	+35.775	+28.632	+48.778
10:40:43	+35.714	+30.525	+48.778
10:41:13	+35.714	+29.731	+48.717
10:41:43	+35.653	+27.899	+48.778
10:42:13	+35.592	+29.242	+48.717
10:42:43	+35.592	+30.402	+48.778
10:43:13	+35.592	+28.449	+48.717
10:43:43	+35.531	+28.571	+48.778
10:44:13	+35.531	+30.525	+48.717
10:44:43	+35.531	+28.998	+48.717
10:45:13	+35.470	+27.045	+48.717
10:45:43	+35.470	+26.800	+48.717
10:46:13	+35.409	+23.687	+48.717
10:46:43	+35.347	+13.675	+48.717
10:47:13	+35.470	+4.5787	+48.778
10:47:43	+35.714	-2.3809	+48.778
10:48:13	+35.714	-3.4188	+48.778
10:48:43	+35.775	-4.3956	+48.717
10:49:13	+35.775	-4.9450	+48.778
10:49:43	+35.836	-5.7997	+48.778
10:50:13	+35.836	-6.4713	+48.778
10:50:43	+35.897	-7.1428	+48.778
10:51:13	+35.836	-7.5091	+48.778
10:51:43	+35.836	-7.9365	+48.778
10:52:13	+35.836	-8.1196	+48.778
10:52:43	+35.836	-8.5470	+48.778
10:53:13	+35.836	-8.6691	+48.778
10:53:43	+35.836	-8.7301	+48.778
10:54:13	+35.836	-8.7912	+48.717
10:54:43	+35.836	-8.7912	+48.778
10:55:13	+35.836	-8.8522	+48.717
10:55:43	+35.836	-8.7912	+48.717
10:56:13	+35.836	-8.6080	+48.717
10:56:43	+35.775	-8.4859	+48.717
10:57:13	+35.775	-8.3638	+48.717
10:57:43	+35.775	-8.0586	+48.717
10:58:13	+35.775	-7.6923	+48.717
10:58:43	+35.775	-7.2039	+48.717
10:59:13	+35.714	-6.5934	+48.717
10:59:43	+35.714	-5.6776	+48.717
11:00:13	+35.714	-4.3345	+48.656
11:00:43	+35.714	-1.6483	+48.656
11:01:13	+35.714	+3.7240	+48.717
11:01:43	+35.775	+10.317	+48.717
11:02:13	+35.714	+17.826	+48.717
11:02:43	+35.775	+29.609	+48.717
11:03:13	+35.714	+29.670	+48.778
11:03:43	+35.714	+29.242	+48.717
11:04:13	+35.653	+28.021	+48.717
11:04:43	+35.653	+29.426	+48.717
11:05:13	+35.653	+29.304	+48.656
11:05:43	+35.653	+28.815	+48.656
11:06:13	+35.592	+29.304	+48.656
11:06:43	+35.592	+29.181	+48.595
11:07:13	+35.592	+29.181	+48.595
11:07:43	+35.531	+29.120	+48.595
11:08:13	+35.531	+29.059	+48.595
11:08:43	+35.531	+29.120	+48.534
11:09:13	+35.531	+28.754	+48.534
11:09:43	+35.531	+29.120	+48.534
11:10:13	+35.531	+28.998	+48.473
11:10:43	+35.531	+29.059	+48.473
11:11:13	+35.531	+29.120	+48.473
11:11:43	+35.470	+28.998	+48.412
11:12:13	+35.470	+29.120	+48.412
11:12:43	+35.470	+28.937	+48.351
11:13:13	+35.470	+28.937	+48.290
11:13:43	+35.470	+28.998	+48.229
11:14:13	+35.470	+29.181	+48.168
11:14:43	+35.470	+29.548	+48.168
11:15:13	+35.470	+29.609	+48.168
11:15:43	+35.470	+29.670	+48.229
11:16:13	+35.470	+29.670	+48.351
11:16:43	+35.470	+29.792	+48.351
11:17:13	+35.531	+29.914	+48.412
11:17:43	+35.653	+27.899	+48.473
11:18:13	+35.592	+29.853	+48.534
11:18:43	+35.409	+29.365	+48.534
11:19:13	+35.347	+26.800	+48.534
11:19:43	+35.286	+29.975	+48.534
11:20:13	+35.286	+29.487	+48.534
11:20:43	+35.286	+28.632	+48.534
11:21:13	+35.286	+29.670	+48.534
11:21:43	+35.286	+29.487	+48.473
11:22:13	+35.225	+29.304	+48.473
11:22:43	+35.225	+28.083	+48.473
11:23:13	+35.225	+29.426	+48.473
11:23:43	+35.225	+29.365	+48.473
11:24:13	+35.225	+28.266	+48.473
11:24:43	+35.225	+29.487	+48.473
11:25:13	+35.225	+29.365	+48.473
11:25:43	+35.225	+29.242	+48.473
11:26:13	+35.286	+29.548	+48.534
11:26:43	+35.286	+29.242	+48.534
11:27:13	+35.164	+29.242	+48.473
11:27:43	+35.164	+28.388	+48.473
11:28:13	+35.164	+29.365	+48.473
11:28:43	+35.164	+29.304	+48.473
11:29:13	+35.164	+29.120	+48.473
11:29:43	+35.164	+29.304	+48.473
11:30:13	+35.225	+29.304	+48.534
11:30:43	+35.225	+29.365	+48.534
11:31:13	+35.225	+29.365	+48.534
11:31:43	+35.225	+29.426	+48.534
11:32:13	+35.225	+29.304	+48.534
11:32:43	+35.225	+28.998	+48.473
11:33:13	+35.225	+29.304	+48.473
11:33:43	+52.258	+29.609	+48.290
11:34:13	+52.197	+29.487	+48.107

TRANSDUCER DATA - ZONE P2-3

S/N SDEE-03A-SN-3091 Block 1

Program INTERVAL
Readings: 228
Start Time: 15:09:51
Start Date: 09/23
Range: 0250 0250 0250 PSI
Channels 3
Units: PSI

Interval. 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
15:09:51	+70.818	+51.282	+67.887
15:10:21	+70.085	+51.159	+67.887
15:10:51	+69.413	+51.221	+67.887
15:11:21	+68.864	+51.098	+67.887
15:11:51	+68.620	+51.343	+68.009
15:12:21	+68.498	+51.343	+68.009
15:12:51	+68.559	+51.343	+68.009
15:13:21	+68.742	+51.343	+68.009
15:13:51	+68.681	+51.159	+67.948
15:14:21	+68.681	+51.221	+67.948
15:14:51	+68.803	+51.282	+67.948
15:15:21	+68.803	+51.465	+67.948
15:15:51	+68.620	+51.221	+67.948
15:16:21	+68.925	+51.343	+67.948
15:16:51	+69.169	+51.343	+67.948
15:17:21	+69.352	+51.159	+67.948
15:17:51	+69.352	+51.343	+68.009
15:18:21	+50.854	+32.661	+67.887
15:18:51	+54.700	+36.507	+67.826
15:19:21	+60.927	+42.796	+67.887
15:19:51	+63.431	+45.177	+67.948
15:20:21	+64.774	+46.275	+68.009
15:20:51	+29.670	+11.355	+68.009
15:21:21	+23.687	-25.091	+67.948
15:21:51	+43.711	+29.304	+67.948
15:22:21	+60.500	+44.871	+67.948
15:22:51	+61.538	+50.427	+67.948
15:23:21	+57.936	+51.098	+68.009
15:23:51	+55.494	-25.824	+68.070
15:24:21	+55.372	-23.870	+68.009
15:24:51	+55.311	-22.283	+68.070
15:25:21	+55.128	-21.245	+68.009
15:25:51	+55.006	-20.390	+68.009
15:26:21	+55.006	-19.780	+68.009
15:26:51	+55.006	-19.474	+68.009
15:27:21	+54.945	-19.169	+68.009
15:27:51	+54.945	-19.291	+68.009
15:28:21	+54.884	-19.230	+68.009
15:28:51	+54.884	-19.352	+68.009
15:29:21	+54.945	-19.169	+68.009
15:29:51	+54.945	-19.108	+68.009
15:30:21	+55.006	-19.230	+68.009
15:30:51	+54.945	-19.047	+68.009
15:31:21	+54.945	-19.169	+68.009
15:31:51	+54.945	-19.047	+68.009
15:32:21	+54.945	-18.925	+68.009
15:32:51	+54.945	-18.986	+68.009
15:33:21	+54.884	-18.925	+68.009
15:33:51	+54.884	-18.986	+68.009
15:34:21	+54.884	-19.047	+68.009
15:34:51	+54.822	-19.169	+68.009
15:35:21	+54.822	-19.230	+68.009
15:35:51	+54.822	-19.291	+68.009
15:36:21	+54.761	-19.230	+68.009
15:36:51	+54.639	-19.536	+67.948
15:37:21	+54.700	-19.352	+68.009
15:37:51	+54.639	-19.536	+68.009
15:38:21	+54.578	-19.352	+68.009
15:38:51	+54.578	-19.352	+67.948
15:39:21	+54.517	-19.536	+67.948
15:39:51	+54.456	-19.597	+68.009
15:40:21	+54.395	-19.658	+68.009
15:40:51	+54.273	-19.902	+67.948
15:41:21	+54.212	-19.902	+67.948
15:41:51	+54.212	-19.902	+67.948
15:42:21	+54.090	-19.780	+67.948
15:42:51	+54.029	-19.841	+67.887
15:43:21	+53.968	-19.902	+67.948
15:43:51	+53.907	-19.780	+67.948
15:44:21	+53.846	-19.658	+67.948
15:44:51	+53.785	-19.719	+67.948
15:45:21	+53.724	-19.719	+67.948
15:45:51	+53.663	-19.719	+67.948
15:46:21	+53.663	-19.780	+67.948
15:46:51	+53.601	-19.841	+67.948
15:47:21	+53.540	-19.902	+67.948
15:47:51	+53.479	-20.024	+67.948
15:48:21	+53.418	-20.207	+68.009
15:48:51	+53.357	-20.512	+68.009
15:49:21	+53.296	-20.451	+67.948
15:49:51	+53.296	-20.329	+67.948
15:50:21	+53.235	-20.085	+68.009
15:50:51	+53.174	-19.902	+67.948
15:51:21	+53.174	-19.719	+68.009
15:51:51	+53.113	-19.536	+68.009
15:52:21	+53.113	-19.352	+68.009
15:52:51	+53.052	-19.047	+67.948
15:53:21	+53.052	-18.925	+68.009
15:53:51	+52.930	-18.803	+68.070
15:54:21	+52.869	-18.681	+67.948
15:54:51	+52.869	-18.498	+68.009
15:55:21	+52.808	-18.131	+68.009
15:55:51	+52.808	-18.131	+68.009
15:56:21	+52.686	-18.009	+68.070
15:56:51	+52.686	-17.826	+68.070
15:57:21	+52.686	-17.704	+68.009
15:57:51	+52.625	-17.521	+68.009
15:58:21	+52.564	-17.277	+68.070
15:58:51	+52.564	-17.094	+68.070
15:59:21	+52.503	-16.849	+68.070
15:59:51	+52.442	-16.727	+68.070
16:00:21	+52.442	-16.422	+68.070
16:00:51	+52.380	-16.300	+68.070
16:01:21	+52.319	-16.056	+68.070
16:01:51	+52.258	-15.873	+68.070
16:02:21	+52.197	-15.628	+68.070
16:02:51	+52.136	-15.384	+68.070
16:03:21	+52.136	-15.140	+68.131
16:03:51	+52.014	-14.224	+68.009
16:04:21	+51.953	-12.454	+67.948
16:04:51	+51.892	-10.683	+67.887
16:05:21	+51.892	-8.1807	+67.948
16:05:51	+51.037	-5.4945	+67.948
16:06:21	+50.732	-2.1367	+67.887
16:06:51	+50.549	+2.1367	+67.948
16:07:21	+50.427	+7.2039	+67.887
16:07:51	+50.427	+17.460	+67.887
16:08:21	+52.197	+38.461	+67.826
16:08:51	+68.192	+51.648	+67.704
16:09:21	+69.413	+51.709	+67.643
16:09:51	+69.719	+51.648	+67.704
16:10:21	+69.902	+51.526	+67.643
16:10:51	+69.719	+51.282	+67.399
16:11:21	+69.413	+50.793	+67.155
16:11:51	+69.291	+50.732	+66.971
16:12:21	+69.413	+50.610	+66.910
16:12:51	+69.902	+51.037	+67.277
16:13:21	+70.268	+51.221	+67.460
16:13:51	+70.451	+51.343	+67.643
16:14:21	+70.695	+51.404	+67.704
16:14:51	+70.757	+51.465	+67.765
16:15:21	+70.818	+51.465	+67.765
16:15:51	+70.818	+51.404	+67.765
16:16:21	+70.879	+51.587	+67.765
16:16:51	+70.879	+51.404	+67.704
16:17:21	+70.879	+51.404	+67.765
16:17:51	+70.940	+51.343	+67.704
16:18:21	+71.062	+51.404	+67.704
16:18:51	+71.001	+51.404	+67.704
16:19:21	+71.062	+51.343	+67.765
16:19:51	+71.123	+51.404	+67.704
16:20:21	+71.123	+51.587	+67.704
16:20:51	+71.123	+51.282	+67.704
16:21:21	+71.184	+51.343	+67.704
16:21:51	+71.184	+51.221	+67.704
16:22:21	+71.184	+51.282	+67.765
16:22:51	+71.245	+51.282	+67.704
16:23:21	+71.245	+51.221	+67.704
16:23:51	+71.184	+51.221	+67.704
16:24:21	+71.306	+51.282	+67.704
16:24:51	+71.306	+51.221	+67.704
16:25:21	+71.306	+51.221	+67.704
16:25:51	+71.306	+51.343	+67.765
16:26:21	+71.367	+51.221	+67.704
16:26:51	+71.367	+51.221	+67.704
16:27:21	+71.367	+51.221	+67.704
16:27:51	+71.428	+51.159	+67.704
16:28:21	+71.428	+51.098	+67.704
16:28:51	+71.367	+51.159	+67.704
16:29:21	+71.428	+51.221	+67.704
16:29:51	+71.489	+51.098	+67.704
16:30:21	+71.489	+51.159	+67.704
16:30:51	+71.489	+51.098	+67.765
16:31:21	+71.489	+51.221	+67.704
16:31:51	+71.489	+51.221	+67.704
16:32:21	+71.489	+51.037	+67.704
16:32:51	+71.550	+51.159	+67.704
16:33:21	+71.550	+51.221	+67.704
16:33:51	+71.550	+51.159	+67.704
16:34:21	+71.611	+51.159	+67.704
16:34:51	+71.611	+51.221	+67.704
16:35:21	+71.611	+51.221	+67.704
16:35:51	+71.611	+51.159	+67.704
16:36:21	+71.672	+51.159	+67.765
16:36:51	+71.672	+51.098	+67.704
16:37:21	+71.733	+51.037	+67.765
16:37:51	+71.733	+51.159	+67.704
16:38:21	+71.733	+51.037	+67.704
16:38:51	+71.733	+51.282	+67.704
16:39:21	+71.733	+51.037	+67.704
16:39:51	+71.733	+51.098	+67.643
16:40:21	+71.733	+51.098	+67.704
16:40:51	+71.794	+51.037	+67.704
16:41:21	+71.794	+51.098	+67.704
16:41:51	+71.794	+50.915	+67.643
16:42:21	+71.794	+51.098	+67.704
16:42:51	+71.855	+50.915	+67.704
16:43:21	+71.855	+51.037	+67.704
16:43:51	+71.855	+50.915	+67.704
16:44:21	+71.855	+51.037	+67.704
16:44:51	+71.978	+51.159	+67.704
16:45:21	+71.855	+50.915	+67.704
16:45:51	+71.916	+51.037	+67.704
16:46:21	+71.916	+50.976	+67.643
16:46:51	+71.916	+51.098	+67.704
16:47:21	+71.916	+50.915	+67.704
16:47:51	+71.978	+50.976	+67.643
16:48:21	+71.978	+50.915	+67.704
16:48:51	+71.978	+50.976	+67.704
16:49:21	+71.978	+50.915	+67.704
16:49:51	+71.978	+50.976	+67.643
16:50:21	+71.978	+51.098	+67.643
16:50:51	+71.978	+50.915	+67.704
16:51:21	+71.978	+50.854	+67.704
16:51:51	+72.039	+51.037	+67.643
16:52:21	+71.978	+50.732	+67.643
16:52:51	+72.039	+51.037	+67.704
16:53:21	+72.039	+51.098	+67.643
16:53:51	+72.100	+50.976	+67.643
16:54:21	+72.100	+51.159	+67.704
16:54:51	+72.100	+50.976	+67.643
16:55:21	+72.100	+50.976	+67.704
16:55:51	+72.100	+50.854	+67.704
16:56:21	+72.100	+50.915	+67.704
16:56:51	+72.100	+50.976	+67.704
16:57:21	+72.100	+50.915	+67.704
16:57:51	+72.161	+50.976	+67.704
16:58:21	+72.161	+50.976	+67.704
16:58:51	+72.161	+50.976	+67.704
16:59:21	+72.222	+50.915	+67.704
16:59:51	+72.222	+51.159	+67.704
17:00:21	+72.283	+51.037	+67.765
17:00:51	+72.283	+51.098	+67.765
17:01:21	+72.344	+50.976	+67.765
17:01:51	+72.344	+50.976	+67.765
17:02:21	+72.344	+51.037	+67.765

TRANSDUCER DATA - ZONE P2-4

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 122
Start Time: 12:26:04
Start Date: 09/23
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
12:26:04	+85.592	+64.774	+81.135
12:26:34	+85.409	+64.590	+81.013
12:27:04	+85.286	+64.529	+80.891
12:27:34	+85.225	+64.407	+80.830
12:28:04	+85.164	+64.285	+80.769
12:28:34	+85.103	+64.285	+80.769
12:29:04	+85.042	+64.285	+80.708
12:29:34	+85.042	+64.346	+80.708
12:30:04	+84.981	+64.163	+80.647
12:30:34	+84.920	+64.102	+80.647
12:31:04	+84.920	+64.224	+80.647
12:31:34	+84.981	+64.102	+80.647
12:32:04	+84.859	+63.919	+80.647
12:32:34	+84.859	+64.041	+80.586
12:33:04	+84.859	+64.041	+80.586
12:33:34	+84.798	+64.102	+80.586
12:34:04	+84.798	+63.980	+80.586
12:34:34	+84.737	+63.858	+80.525
12:35:04	+84.737	+63.980	+80.586
12:35:34	+84.737	+63.797	+80.525
12:36:04	+84.676	+63.614	+80.525
12:36:34	+84.676	+63.736	+80.525
12:37:04	+84.676	+63.797	+80.525
12:37:34	+84.615	+63.736	+80.525
12:38:04	+84.676	+63.919	+80.586
12:38:34	+85.042	+64.102	+80.952
12:39:04	+85.347	+64.407	+81.196
12:39:34	+85.470	+64.529	+81.440
12:40:04	+85.592	+64.774	+81.501
12:40:34	+85.653	+64.529	+81.562
12:41:04	+85.714	+64.652	+81.623
12:41:34	+85.714	+64.774	+81.623
12:42:04	+85.714	+64.835	+81.623
12:42:34	+85.714	+64.835	+81.684
12:43:04	+85.775	+64.896	+81.684
12:43:34	+85.775	+64.835	+81.684
12:44:04	+85.775	+64.835	+81.684
12:44:34	+85.775	+64.957	+81.746
12:45:04	+85.775	+64.835	+81.746
12:45:34	+85.775	+64.835	+81.746
12:46:04	+85.775	+64.652	+81.746
12:46:34	+85.775	+64.835	+81.746
12:47:04	+85.775	+64.835	+81.746
12:47:34	+85.836	+64.896	+81.746
12:48:04	+85.775	+64.835	+81.746
12:48:34	+85.775	+64.835	+81.746
12:49:04	+85.775	+64.774	+81.746
12:49:34	+85.836	+64.835	+81.807
12:50:04	+85.836	+64.896	+81.746
12:50:34	+85.775	+64.774	+81.746
12:51:04	+85.836	+64.896	+81.746
12:51:34	+85.836	+64.957	+81.807
12:52:04	+85.836	+64.957	+81.807
12:52:34	+85.836	+64.896	+81.807
12:53:04	+85.836	+64.835	+81.746
12:53:34	+85.836	+64.957	+81.807
12:54:04	+85.836	+64.652	+81.807
12:54:34	+85.836	+64.835	+81.807
12:55:04	+85.836	+64.774	+81.746
12:55:34	+85.836	+64.835	+81.807
12:56:04	+85.836	+64.835	+81.807
12:56:34	+85.836	+64.835	+81.807
12:57:04	+85.836	+64.713	+81.807
12:57:34	+85.836	+64.835	+81.807
12:58:04	+85.836	+64.774	+81.807
12:58:34	+85.836	+64.835	+81.807
12:59:04	+85.836	+64.774	+81.807
12:59:34	+85.836	+64.835	+81.807
13:00:04	+85.836	+64.896	+81.807
13:00:34	+85.836	+64.713	+81.807
13:01:04	+85.897	+64.835	+81.807
13:01:34	+85.836	+64.713	+81.807
13:02:04	+85.836	+64.774	+81.807
13:02:34	+85.775	+64.713	+81.807
13:03:04	+85.775	+64.652	+81.746
13:03:34	+85.775	+64.652	+81.746
13:04:04	+85.775	+64.774	+81.746
13:04:34	+85.775	+64.652	+81.746
13:05:04	+85.775	+64.713	+81.807
13:05:34	+85.836	+64.835	+81.746
13:06:04	+85.775	+64.652	+81.807
13:06:34	+85.775	+64.652	+81.746
13:07:04	+85.775	+64.590	+81.746
13:07:34	+85.836	+64.652	+81.807
13:08:04	+85.897	+64.713	+81.807
13:08:34	+85.897	+64.774	+81.868
13:09:04	+85.836	+64.652	+81.868
13:09:34	+85.836	+64.713	+81.868
13:10:04	+85.897	+64.652	+81.807
13:10:34	+85.897	+64.835	+81.807
13:11:04	+85.897	+64.896	+81.868
13:11:34	+85.897	+64.713	+81.868
13:12:04	+85.897	+64.713	+81.868
13:12:34	+85.836	+64.529	+81.807
13:13:04	+85.836	+64.529	+81.807
13:13:34	+85.897	+64.774	+81.807
13:14:04	+85.836	+64.713	+81.746
13:14:34	+85.836	+64.590	+81.807
13:15:04	+85.836	+64.652	+81.807
13:15:34	+85.836	+64.652	+81.807
13:16:04	+85.836	+64.774	+81.807
13:16:34	+85.836	+64.652	+81.807
13:17:04	+85.897	+64.713	+81.807
13:17:34	+85.836	+64.652	+81.807
13:18:04	+85.897	+64.652	+81.807
13:18:34	+85.897	+64.774	+81.807
13:19:04	+85.836	+64.590	+81.807
13:19:34	+85.897	+64.590	+81.746
13:20:04	+85.836	+64.652	+81.807
13:20:34	+85.958	+64.713	+81.807
13:21:04	+85.836	+64.468	+81.807
13:21:34	+85.836	+64.529	+81.807
13:22:04	+85.836	+64.590	+81.807
13:22:34	+85.897	+64.713	+81.807
13:23:04	+85.836	+64.652	+81.807
13:23:34	+85.836	+64.590	+81.807
13:24:04	+85.897	+64.652	+81.807
13:24:34	+85.836	+64.590	+81.807
13:25:04	+85.897	+64.468	+81.807
13:25:34	+85.836	+64.468	+81.807
13:26:04	+85.897	+64.652	+81.807
13:26:34	+85.897	+64.652	+81.807

TRANSDUCER DATA - ZONE P2-5

S/N SDEE-03A-SN-3091 Block 1

Program INTERVAL
Readings: 182
Start Time: 09:30:35
Start Date: 09/23
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
09:30:35	+101.46	+91.147	+106.89
09:31:05	+102.31	+91.208	+106.89
09:31:35	+102.62	+92.551	+106.89
09:32:05	+102.93	+92.551	+106.89
09:32:35	+103.23	+92.551	+106.89
09:33:05	+103.60	+92.490	+106.89
09:33:35	+103.96	+92.490	+106.89
09:34:05	+104.39	+92.551	+106.89
09:34:35	+104.76	+92.490	+106.89
09:35:05	+105.00	+92.368	+106.89
09:35:35	+105.18	+92.368	+106.89
09:36:05	+105.61	+92.429	+106.89
09:36:35	+105.92	+92.307	+106.89
09:37:05	+106.28	+92.307	+106.89
09:37:35	+106.59	+92.307	+106.89
09:38:05	+106.95	+92.368	+106.89
09:38:35	+107.20	+92.368	+106.89
09:39:05	+107.50	+92.246	+106.89
09:39:35	+107.81	+92.246	+106.89
09:40:05	+108.11	+92.307	+106.89
09:40:35	+108.42	+92.185	+106.89
09:41:05	+108.73	+92.063	+106.89
09:41:35	+109.03	+92.002	+106.83
09:42:05	+109.15	+92.002	+106.89
09:42:35	+109.95	+91.330	+106.89
09:43:05	+109.52	+91.880	+106.83
09:43:35	+110.25	+91.941	+106.89
09:44:05	+109.76	+92.002	+106.89
09:44:35	+111.17	+91.880	+106.71
09:45:05	+110.86	+91.514	+106.41
09:45:35	+110.56	+91.208	+106.16
09:46:05	+110.43	+90.964	+105.98
09:46:35	+110.37	+90.842	+105.86
09:47:05	+110.50	+90.720	+105.79
09:47:35	+110.56	+90.598	+105.73
09:48:05	+110.68	+90.598	+105.73
09:48:35	+110.68	+90.537	+105.67
09:49:05	+110.74	+90.537	+105.61
09:49:35	+110.92	+90.354	+105.55
09:50:05	+111.17	+90.476	+105.67
09:50:35	+111.29	+90.354	+105.67
09:51:05	+111.72	+90.293	+105.61
09:51:35	+111.96	+90.293	+105.61
09:52:05	+110.50	+90.231	+105.61
09:52:35	+110.31	+90.170	+105.55
09:53:05	+110.68	+90.170	+105.55
09:53:35	+112.21	+90.109	+105.55
09:54:05	+112.45	+90.231	+105.61
09:54:35	+112.63	+89.926	+105.55
09:55:05	+112.82	+90.048	+105.55
09:55:35	+110.62	+89.926	+105.55
09:56:05	+110.19	+89.865	+105.55
09:56:35	+110.13	+89.926	+105.55
09:57:05	+110.19	+89.865	+105.49
09:57:35	+110.25	+89.804	+105.49
09:58:05	+110.37	+89.865	+105.49
09:58:35	+110.37	+89.743	+105.49
09:59:05	+110.56	+89.865	+105.61
09:59:35	+110.98	+90.170	+105.98
10:00:05	+111.29	+90.415	+106.22
10:00:35	+111.59	+90.781	+106.41
10:01:05	+111.86	+90.720	+106.47
10:01:35	+111.86	+90.781	+106.53
10:02:05	+111.78	+90.781	+106.59
10:02:35	+111.90	+90.659	+106.59
10:03:05	+111.96	+90.659	+106.65
10:03:35	+111.90	+90.720	+106.65
10:04:05	+112.02	+90.781	+106.71
10:04:35	+112.14	+90.720	+106.71
10:05:05	+112.21	+90.842	+106.71
10:05:35	+112.33	+90.781	+106.71
10:06:05	+112.39	+91.086	+106.77
10:06:35	+112.45	+90.781	+106.71
10:07:05	+112.57	+90.903	+106.77
10:07:35	+112.69	+90.842	+106.77
10:08:05	+112.75	+90.842	+106.77
10:08:35	+112.82	+90.964	+106.77
10:09:05	+113.00	+90.781	+106.77
10:09:35	+113.00	+90.781	+106.77
10:10:05	+113.12	+90.842	+106.77
10:10:35	+113.18	+90.842	+106.77
10:11:05	+113.18	+90.659	+106.77
10:11:35	+113.24	+90.659	+106.77
10:12:05	+113.24	+90.659	+106.77
10:12:35	+113.61	+90.659	+106.77
10:13:05	+113.24	+90.598	+106.77
10:13:35	+113.18	+90.598	+106.77
10:14:05	+113.24	+90.659	+106.77
10:14:35	+113.30	+90.720	+106.83
10:15:05	+113.36	+90.598	+106.83
10:15:35	+113.36	+90.659	+106.83
10:16:05	+113.43	+90.659	+106.83
10:16:35	+113.43	+90.659	+106.83
10:17:05	+113.49	+90.476	+106.77
10:17:35	+113.55	+90.598	+106.77
10:18:05	+113.55	+90.598	+106.83
10:18:35	+113.73	+90.537	+106.77
10:19:05	+113.73	+90.537	+106.83
10:19:35	+113.79	+90.476	+106.77
10:20:05	+113.85	+90.537	+106.83
10:20:35	+113.91	+90.476	+106.83
10:21:05	+113.98	+90.476	+106.83
10:21:35	+114.04	+90.476	+106.83
10:22:05	+114.10	+90.537	+106.83
10:22:35	+114.16	+90.476	+106.83
10:23:05	+114.16	+90.659	+106.83
10:23:35	+114.16	+90.659	+106.83
10:24:05	+114.22	+90.476	+106.83
10:24:35	+114.28	+90.415	+106.83
10:25:05	+114.28	+90.415	+106.83
10:25:35	+114.28	+90.537	+106.83
10:26:05	+114.22	+90.415	+106.83
10:26:35	+114.22	+90.354	+106.83
10:27:05	+114.22	+90.415	+106.83
10:27:35	+114.22	+90.415	+106.89
10:28:05	+114.16	+90.354	+106.83
10:28:35	+114.16	+90.231	+106.83
10:29:05	+114.16	+90.293	+106.83
10:29:35	+114.16	+90.231	+106.83
10:30:05	+114.10	+90.476	+106.89
10:30:35	+114.10	+90.354	+106.83
10:31:05	+114.16	+90.293	+106.83
10:31:35	+114.16	+90.293	+106.83
10:32:05	+114.16	+90.231	+106.83
10:32:35	+111.41	+90.354	+106.83
10:33:05	+112.14	+90.109	+106.83
10:33:35	+112.63	+90.231	+106.83
10:34:05	+112.82	+90.109	+106.83
10:34:35	+112.94	+90.293	+106.83
10:35:05	+113.12	+90.415	+106.83
10:35:35	+113.30	+90.231	+106.83
10:36:05	+113.49	+90.537	+106.89
10:36:35	+113.55	+90.354	+106.83
10:37:05	+113.67	+90.293	+106.83
10:37:35	+113.73	+90.293	+106.83
10:38:05	+113.79	+90.293	+106.83
10:38:35	+113.79	+90.170	+106.83
10:39:05	+113.85	+90.109	+106.83
10:39:35	+113.85	+90.231	+106.83
10:40:05	+113.85	+90.231	+106.83
10:40:35	+113.91	+90.231	+106.89
10:41:05	+113.91	+90.109	+106.83
10:41:35	+113.91	+90.170	+106.89
10:42:05	+113.91	+90.231	+106.89
10:42:35	+113.98	+90.170	+106.89
10:43:05	+113.91	+90.109	+106.83
10:43:35	+113.91	+90.170	+106.89
10:44:05	+113.91	+90.354	+106.89
10:44:35	+113.91	+90.048	+106.83
10:45:05	+113.91	+90.231	+106.83
10:45:35	+113.91	+90.170	+106.89
10:46:05	+113.91	+90.170	+106.89
10:46:35	+113.91	+90.170	+106.89
10:47:05	+113.85	+90.109	+106.83
10:47:35	+113.85	+90.476	+106.89
10:48:05	+113.85	+90.354	+106.89
10:48:35	+113.98	+90.231	+106.89
10:49:05	+113.91	+90.170	+106.89
10:49:35	+113.85	+90.048	+106.89
10:50:05	+113.85	+90.048	+106.89
10:50:35	+113.85	+90.048	+106.89
10:51:05	+113.85	+90.048	+106.89
10:51:35	+113.79	+90.048	+106.89
10:52:05	+113.79	+90.109	+106.89
10:52:35	+113.85	+90.048	+106.89
10:53:05	+113.91	+89.987	+106.83
10:53:35	+113.91	+90.048	+106.89
10:54:05	+113.85	+89.987	+106.83
10:54:35	+113.85	+90.048	+106.83
10:55:05	+113.91	+89.987	+106.83
10:55:35	+113.91	+90.109	+106.89
10:56:05	+113.91	+90.048	+106.89
10:56:35	+113.98	+89.804	+106.83
10:57:05	+114.10	+89.987	+106.89
10:57:35	+113.98	+90.048	+106.83
10:58:05	+113.98	+89.804	+106.83
10:58:35	+114.04	+89.987	+106.89
10:59:05	+114.04	+89.987	+106.89
10:59:35	+112.57	+88.583	+105.49
11:00:05	+109.76	+85.714	+102.68
11:00:35	+109.95	+86.019	+102.74
11:01:05	+109.89	+85.836	+102.74

TRANSDUCER DATA - ZONE P2-6

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 208
Start Time: 18:17:34
Start Date: 09/22
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:30

Time	Chnl 1	Chnl 2	Chnl 3
18:17:34	+125.09	+110.43	+121.55
18:18:04	+125.27	+110.43	+121.55
18:18:34	+125.64	+110.37	+121.55
18:19:04	+125.94	+110.31	+121.55
18:19:34	+126.06	+110.31	+121.55
18:20:04	+126.25	+110.37	+121.61
18:20:34	+126.37	+110.25	+121.55
18:21:04	+126.61	+110.37	+121.55
18:21:34	+126.80	+110.31	+121.48
18:22:04	+126.98	+110.43	+121.55
18:22:34	+127.04	+110.37	+121.55
18:23:04	+126.86	+110.25	+121.55
18:23:34	+126.92	+110.37	+121.55
18:24:04	+126.98	+110.43	+121.55
18:24:34	+127.10	+110.19	+121.55
18:25:04	+126.86	+109.95	+121.24
18:25:34	+126.67	+109.70	+120.94
18:26:04	+126.67	+109.46	+120.75
18:26:34	+126.98	+109.27	+120.57
18:27:04	+127.10	+109.34	+120.51
18:27:34	+127.22	+109.21	+120.45
18:28:04	+127.22	+109.09	+120.39
18:28:34	+127.10	+109.27	+120.39
18:29:04	+126.98	+109.03	+120.26
18:29:34	+127.22	+108.91	+120.26
18:30:04	+127.10	+109.03	+120.26
18:30:34	+127.16	+108.91	+120.20
18:31:04	+127.16	+108.91	+120.20
18:31:34	+127.16	+108.85	+120.20
18:32:04	+127.16	+109.03	+120.20
18:32:34	+127.10	+108.85	+120.14
18:33:04	+127.10	+108.91	+120.14
18:33:34	+127.10	+108.73	+120.08
18:34:04	+127.16	+108.97	+120.14
18:34:34	+127.16	+108.79	+120.08
18:35:04	+127.16	+108.54	+120.02
18:35:34	+127.22	+108.73	+120.08
18:36:04	+127.22	+108.66	+120.08
18:36:34	+127.16	+108.79	+120.08
18:37:04	+127.04	+108.79	+120.08
18:37:34	+127.04	+108.79	+120.08
18:38:04	+127.10	+109.03	+120.45
18:38:34	+127.41	+109.21	+120.69
18:39:04	+127.59	+109.46	+120.87
18:39:34	+128.02	+109.58	+121.06
18:40:04	+128.08	+109.70	+121.12
18:40:34	+128.14	+109.89	+121.24
18:41:04	+128.14	+109.82	+121.30
18:41:34	+128.14	+109.89	+121.30
18:42:04	+128.20	+110.07	+121.42
18:42:34	+128.26	+109.82	+121.36
18:43:04	+128.26	+110.07	+121.42
18:43:34	+128.26	+109.82	+121.36
18:44:04	+128.20	+110.01	+121.36
18:44:34	+128.26	+110.07	+121.42
18:45:04	+128.32	+110.07	+121.36
18:45:34	+128.26	+110.19	+121.42
18:46:04	+128.32	+110.19	+121.48
18:46:34	+128.32	+109.95	+121.42
18:47:04	+128.26	+110.07	+121.42
18:47:34	+128.26	+110.13	+121.42
18:48:04	+128.20	+110.01	+121.36
18:48:34	+128.26	+110.07	+121.42
18:49:04	+128.20	+110.01	+121.42
18:49:34	+128.20	+110.07	+121.42
18:50:04	+128.20	+110.13	+121.42
18:50:34	+128.08	+110.07	+121.42
18:51:04	+127.96	+110.07	+121.36
18:51:34	+127.77	+110.01	+121.36
18:52:04	+127.71	+110.01	+121.36
18:52:34	+127.77	+110.07	+121.36
18:53:04	+127.77	+110.07	+121.42
18:53:34	+127.71	+110.01	+121.36
18:54:04	+127.77	+110.07	+121.42
18:54:34	+127.71	+110.01	+121.36
18:55:04	+127.77	+110.01	+121.36
18:55:34	+127.71	+110.01	+121.42
18:56:04	+127.65	+110.01	+121.42
18:56:34	+127.59	+110.07	+121.42
18:57:04	+127.59	+109.95	+121.42
18:57:34	+127.59	+110.13	+121.42
18:58:04	+127.59	+109.76	+121.36
18:58:34	+127.59	+110.07	+121.48
18:59:04	+127.59	+109.95	+121.36
18:59:34	+127.59	+109.95	+121.36
19:00:04	+127.53	+109.95	+121.42
19:00:34	+127.47	+110.01	+121.42
19:01:04	+127.47	+109.95	+121.48
19:01:34	+127.47	+110.01	+121.42
19:02:04	+127.41	+109.82	+121.42
19:02:34	+127.47	+109.89	+121.42
19:03:04	+127.41	+109.95	+121.42
19:03:34	+127.53	+110.01	+121.48
19:04:04	+127.35	+109.89	+121.42
19:04:34	+127.41	+109.95	+121.42
19:05:04	+127.35	+109.95	+121.48
19:05:34	+127.35	+109.95	+121.42
19:06:04	+127.28	+109.76	+121.36
19:06:34	+127.28	+109.95	+121.42
19:07:04	+127.16	+109.89	+121.42
19:07:34	+127.16	+110.07	+121.42
19:08:04	+127.16	+109.76	+121.42
19:08:34	+127.22	+109.89	+121.42
19:09:04	+127.16	+109.82	+121.42
19:09:34	+127.16	+109.82	+121.42
19:10:04	+127.22	+109.76	+121.42
19:10:34	+127.22	+109.82	+121.42
19:11:04	+127.16	+109.89	+121.42
19:11:34	+127.16	+109.89	+121.42
19:12:04	+127.16	+109.76	+121.42
19:12:34	+127.10	+109.89	+121.42
19:13:04	+127.04	+109.82	+121.42
19:13:34	+126.98	+109.76	+121.42
19:14:04	+126.98	+109.76	+121.42
19:14:34	+126.98	+109.82	+121.42
19:15:04	+127.04	+109.70	+121.42
19:15:34	+127.10	+109.70	+121.42
19:16:04	+126.98	+109.89	+121.42
19:16:34	+126.98	+109.82	+121.42
19:17:04	+126.92	+109.76	+121.42
19:17:34	+126.92	+109.64	+121.42
19:18:04	+126.86	+109.82	+121.42
19:18:34	+126.80	+109.70	+121.42
19:19:04	+126.80	+109.64	+121.42
19:19:34	+126.73	+109.70	+121.42
19:20:04	+126.73	+109.64	+121.42
19:20:34	+126.73	+109.76	+121.48
19:21:04	+126.67	+109.70	+121.36
19:21:34	+126.67	+109.52	+121.36
19:22:04	+126.61	+109.82	+121.36
19:22:34	+126.61	+109.70	+121.42
19:23:04	+126.61	+109.64	+121.36
19:23:34	+126.55	+109.64	+121.36
19:24:04	+126.55	+109.64	+121.42
19:24:34	+126.55	+109.64	+121.42
19:25:04	+126.19	+109.70	+121.42
19:25:34	+125.76	+109.70	+121.42
19:26:04	+125.51	+109.58	+121.36
19:26:34	+125.33	+109.58	+121.36
19:27:04	+125.21	+109.64	+121.36
19:27:34	+125.09	+109.64	+121.42
19:28:04	+124.90	+109.64	+121.42
19:28:34	+124.78	+109.46	+121.36
19:29:04	+124.66	+109.58	+121.36
19:29:34	+124.54	+109.64	+121.36
19:30:04	+124.48	+109.52	+121.36
19:30:34	+124.35	+109.52	+121.36
19:31:04	+124.35	+109.64	+121.42
19:31:34	+124.29	+109.58	+121.42
19:32:04	+124.17	+109.52	+121.36
19:32:34	+124.11	+109.58	+121.36
19:33:04	+123.50	+109.58	+121.36
19:33:34	+123.26	+109.52	+121.36
19:34:04	+123.19	+109.46	+121.36
19:34:34	+123.19	+109.40	+121.36
19:35:04	+123.38	+109.46	+121.36
19:35:34	+122.83	+109.64	+121.42
19:36:04	+122.28	+109.58	+121.36
19:36:34	+121.91	+109.58	+121.36
19:37:04	+121.79	+109.46	+121.36
19:37:34	+121.73	+109.46	+121.36
19:38:04	+121.79	+109.64	+121.42
19:38:34	+121.85	+109.52	+121.36
19:39:04	+121.91	+109.46	+121.36
19:39:34	+122.16	+109.40	+121.36
19:40:04	+122.34	+109.34	+121.36
19:40:34	+122.40	+109.40	+121.36
19:41:04	+122.64	+109.40	+121.42
19:41:34	+122.71	+109.46	+121.36
19:42:04	+122.53	+109.40	+121.36
19:42:34	+122.89	+109.46	+121.36
19:43:04	+122.95	+109.40	+121.36
19:43:34	+123.01	+109.40	+121.36
19:44:04	+123.07	+109.46	+121.36
19:44:34	+123.07	+109.34	+121.36
19:45:04	+123.13	+109.46	+121.36
19:45:34	+123.13	+109.34	+121.36
19:46:04	+123.13	+109.40	+121.36
19:46:34	+123.19	+109.34	+121.36
19:47:04	+123.19	+109.34	+121.36
19:47:34	+123.13	+109.40	+121.36
19:48:04	+123.19	+109.34	+121.36
19:48:34	+123.13	+109.34	+121.36
19:49:04	+123.13	+109.15	+121.30
19:49:34	+123.13	+109.40	+121.36
19:50:04	+123.13	+109.34	+121.36
19:50:34	+123.13	+109.52	+121.42
19:51:04	+123.13	+109.34	+121.36
19:51:34	+123.13	+109.34	+121.36
19:52:04	+123.07	+109.40	+121.36
19:52:34	+123.01	+109.27	+121.36
19:53:04	+123.01	+109.27	+121.36
19:53:34	+123.01	+109.27	+121.36
19:54:04	+123.01	+109.21	+121.36
19:54:34	+123.01	+109.21	+121.36
19:55:04	+122.95	+109.27	+121.36
19:55:34	+122.95	+109.27	+121.36
19:56:04	+122.95	+109.15	+121.30
19:56:34	+123.01	+109.27	+121.36
19:57:04	+122.95	+109.27	+121.36
19:57:34	+122.95	+109.21	+121.36
19:58:04	+122.95	+109.46	+121.42
19:58:34	+122.89	+109.21	+121.36
19:59:04	+122.89	+109.40	+121.42
19:59:34	+122.89	+109.34	+121.36
20:00:04	+122.89	+109.21	+121.36
20:00:34	+122.89	+109.27	+121.36
20:01:04	+122.89	+109.34	+121.42

TRANSDUCER DATA - ZONE P3-1

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 837
Start Time: 17:37:42
Start Date: 09/25
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:10

Time	Chnl 1	Chnl 2	Chnl 3
17:37:42	-20.695	-0.3052	+15.384
17:37:52	+20.818	+0.2442	+16.056
17:38:02	+20.757	+0.2442	+15.995
17:38:12	+20.695	+0.3663	+15.995
17:38:22	+20.757	+0.2442	+15.995
17:38:32	+20.695	+0.1221	+15.934
17:38:42	+20.695	+0.1831	+15.934
17:38:52	+20.634	-0.0000	+15.934
17:39:02	+20.634	-0.0000	+15.873
17:39:12	+20.757	+0.2442	+16.056
17:39:22	+21.001	+0.5494	+16.239
17:39:32	+26.984	+6.3492	+16.239
17:39:42	+24.053	+3.4188	+16.239
17:39:52	+20.818	+0.3663	+16.178
17:40:02	+18.864	-1.6463	+16.178
17:40:12	+17.704	-2.8083	+16.178
17:40:22	+16.910	-3.5409	+16.117
17:40:32	+16.422	-3.9682	+16.117
17:40:42	+16.056	-4.3956	+16.117
17:40:52	+15.811	-4.7006	+16.117
17:41:02	+15.689	-4.8229	+16.056
17:41:12	+15.567	-4.8229	+16.056
17:41:22	+15.506	-4.9450	+16.056
17:41:32	+15.445	-5.0061	+15.995
17:41:42	+15.384	-5.1282	+15.995
17:41:52	+15.384	-5.0061	+15.995
17:42:02	+15.323	-5.0671	+15.995
17:42:12	+15.323	-5.0671	+15.995
17:42:22	+15.323	-5.1282	+15.934
17:42:32	+15.323	-5.0671	+15.934
17:42:42	+15.323	-5.0671	+15.934
17:42:52	+15.262	-5.1892	+15.934
17:43:02	+15.262	-5.1282	+15.934
17:43:12	+15.201	-5.1892	+15.873
17:43:22	+15.262	-5.0671	+15.934
17:43:32	+15.262	-5.0061	+15.934
17:43:42	+15.140	-5.3113	+15.934
17:43:52	+15.079	-5.4334	+15.873
17:44:02	+15.018	-5.4334	+15.873
17:44:12	+15.018	-5.4334	+15.873
17:44:22	+6.8986	-19.902	+15.873
17:44:32	+2.9304	-24.236	+15.873
17:44:42	+2.0146	-24.664	+15.873
17:44:52	+1.8315	-24.542	+15.873
17:45:02	+2.3199	-24.175	+15.873
17:45:12	+2.5030	-23.809	+15.873
17:45:22	+2.6251	-23.382	+15.873
17:45:32	+2.8693	-22.832	+15.873
17:45:42	+2.9914	-22.344	+15.811
17:45:52	+3.1135	-22.039	+15.873
17:46:02	+3.1746	-21.855	+15.811
17:46:12	+3.1746	-21.733	+15.811
17:46:22	+3.1746	-21.672	+15.811
17:46:32	+3.1746	-21.611	+15.811
17:46:42	+3.1746	-21.611	+15.811
17:46:52	+3.1746	-21.611	+15.811
17:47:02	+3.1135	-21.550	+15.811
17:47:12	+3.0525	-21.672	+15.750
17:47:22	+3.0525	-21.611	+15.811
17:47:32	+2.9914	-21.672	+15.811
17:47:42	+3.0525	-21.672	+15.811
17:47:52	+3.0525	-21.672	+15.811
17:48:02	+3.0525	-21.794	+15.811
17:48:12	+3.0525	-21.794	+15.811
17:48:22	+2.9914	-21.794	+15.811
17:48:32	+2.9914	-21.855	+15.811
17:48:42	+2.9304	-21.855	+15.811
17:48:52	+2.9304	-21.855	+15.811
17:49:02	+2.8693	-21.855	+15.811
17:49:12	+2.8693	-21.794	+15.811
17:49:22	+2.8693	-21.855	+15.811
17:49:32	+2.8693	-21.733	+15.811
17:49:42	+2.8083	-21.794	+15.811
17:49:52	+2.8083	-21.733	+15.811
17:50:02	+2.8083	-21.733	+15.811
17:50:12	+2.7472	-21.794	+15.750
17:50:22	+2.7472	-21.733	+15.811
17:50:32	+2.6862	-21.733	+15.750
17:50:42	+2.6862	-21.855	+15.750
17:50:52	+2.6251	-21.916	+15.750
17:51:02	+2.6251	-21.794	+15.811
17:51:12	+2.5641	-21.855	+15.750
17:51:22	+2.5030	-21.916	+15.750
17:51:32	+2.5030	-21.855	+15.750
17:51:42	+2.4420	-21.855	+15.750
17:51:52	+2.4420	-21.855	+15.750
17:52:02	+2.4420	-21.794	+15.750
17:52:12	+2.4420	-21.916	+15.811
17:52:22	+2.3809	-21.855	+15.750
17:52:32	+2.3809	-21.794	+15.750
17:52:42	+2.3809	-21.855	+15.750
17:52:52	+2.3199	-21.855	+15.750
17:53:02	+2.3199	-21.916	+15.750
17:53:12	+2.2588	-21.794	+15.750
17:53:22	+2.3199	-21.794	+15.811
17:53:32	+2.3199	-21.733	+15.811
17:53:42	+2.3199	-21.672	+15.811
17:53:52	+2.2588	-21.733	+15.811
17:54:02	+2.2588	-21.733	+15.811
17:54:12	+2.2588	-21.733	+15.750
17:54:22	+2.2588	-21.733	+15.811
17:54:32	+2.1978	-21.672	+15.750
17:54:42	+2.1978	-21.611	+15.750
17:54:52	+2.1978	-21.733	+15.689
17:55:02	+2.2588	-21.611	+15.811
17:55:12	+2.2588	-21.550	+15.750
17:55:22	+2.2588	-21.550	+15.811
17:55:32	+2.2588	-21.489	+15.811
17:55:42	+2.2588	-21.489	+15.750
17:55:52	+2.2588	-21.428	+15.811
17:56:02	+2.1978	-21.550	+15.750
17:56:12	+2.1978	-21.428	+15.811
17:56:22	+2.1367	-21.489	+15.689
17:56:32	+2.1367	-21.489	+15.750
17:56:42	+2.1367	-21.367	+15.750
17:56:52	+2.0146	-21.367	+15.750
17:57:02	+2.0757	-21.428	+15.750
17:57:12	+2.0757	-21.428	+15.750
17:57:22	+2.0757	-21.306	+15.750
17:57:32	+2.1367	-21.306	+15.811
17:57:42	+2.0757	-21.428	+15.750
17:57:52	+2.0757	-21.367	+15.750
17:58:02	+2.0757	-21.306	+15.750
17:58:12	+2.0757	-21.306	+15.750
17:58:22	+2.0146	-21.245	+15.689
17:58:32	+2.0757	-21.184	+15.811
17:58:42	+2.0757	-21.184	+15.750
17:58:52	+2.0146	-21.306	+15.750
17:59:02	+2.0146	-21.184	+15.811
17:59:12	+1.9536	-21.184	+15.750
17:59:22	+1.9536	-21.184	+15.750
17:59:32	+2.0757	-20.940	+15.750
17:59:42	+2.6251	-20.085	+15.750
17:59:52	+3.4798	-18.498	+15.689
18:00:02	+5.1282	-15.689	+15.750
18:00:12	+6.7155	-13.492	+15.750
18:00:22	+7.2649	-12.942	+15.750
18:00:32	+8.3026	-11.536	+15.750
18:00:42	+10.805	-8.7912	+15.750
18:00:52	+12.332	-7.2649	+15.750
18:01:02	+11.294	-8.3638	+15.689
18:01:12	+11.233	-8.3026	+15.750
18:01:22	+12.210	-7.5091	+15.750
18:01:32	+13.186	-6.2881	+15.811
18:01:42	+12.087	-7.6312	+15.689
18:01:52	+11.477	-8.1807	+15.750
18:02:02	+12.210	-7.3870	+15.750
18:02:12	+13.186	-6.4713	+15.750
18:02:22	+12.698	-6.8376	+15.750
18:02:32	+11.782	-7.9365	+15.750
18:02:42	+12.210	-7.4481	+15.750
18:02:52	+13.125	-6.4102	+15.811
18:03:02	+13.125	-6.5934	+15.689
18:03:12	+12.026	-7.6923	+15.750
18:03:22	+12.148	-7.5091	+15.689
18:03:32	+12.942	-6.6544	+15.750
18:03:42	+13.492	-6.1660	+15.689
18:03:52	+12.393	-7.3260	+15.750
18:04:02	+12.148	-7.5091	+15.689
18:04:12	+12.881	-6.7765	+15.750
18:04:22	+13.736	-5.7387	+15.750
18:04:32	+12.820	-6.8986	+15.750
18:04:42	+12.210	-7.5091	+15.750
18:04:52	+12.820	-6.7765	+15.750
18:05:02	+13.614	-5.9829	+15.750
18:05:12	+13.369	-6.2881	+15.811
18:05:22	+12.454	-7.2039	+15.689
18:05:32	+12.759	-6.9597	+15.689
18:05:42	+13.614	-5.9829	+15.750
18:05:52	+13.736	-5.9829	+15.689
18:06:02	+12.698	-7.0207	+15.689
18:06:12	+12.759	-6.8376	+15.689
18:06:22	+13.431	-6.2271	+15.750
18:06:32	+14.041	-5.6166	+15.750
18:06:42	+13.003	-6.6544	+15.750
18:06:52	+12.637	-6.9597	+15.750
18:07:02	+13.308	-6.3492	+15.689
18:07:12	+14.102	-5.4945	+15.750
18:07:22	+13.431	-6.1660	+15.689
18:07:32	+12.759	-6.8986	+15.689
18:07:42	+13.186	-6.4102	+15.750
18:07:52	+13.980	-5.5555	+15.689
18:08:02	+13.858	-5.7387	+15.689
18:08:12	+12.942	-6.7765	+15.689
18:08:22	+13.125	-6.4713	+15.689
18:08:32	+13.858	-5.6776	+15.750
18:08:42	+14.163	-5.3724	+15.689
18:08:52	+13.186	-6.4102	+15.750
18:09:02	+13.064	-6.5323	+15.750
18:09:12	+13.736	-5.7387	+15.750
18:09:22	+14.407	-5.1282	+15.750
18:09:32	+13.492	-6.1660	+15.750
18:09:42	+13.064	-6.6544	+15.750
18:09:52	+13.614	-6.0439	+15.750
18:10:02	+14.346	-5.1282	+15.750
18:10:12	+13.919	-5.6776	+15.750
18:10:22	+13.186	-6.4713	+15.750
18:10:32	+13.492	-6.1050	+15.750
18:10:42	+14.163	-5.3113	+15.750
18:10:52	+14.285	-5.3113	+15.750
18:11:02	+13.308	-6.3492	+15.750
18:11:12	+13.431	-6.1660	+15.750
18:11:22	+14.041	-5.4334	+15.750
18:11:32	+14.590	-4.9450	+15.750
18:11:42	+13.614	-6.0439	+15.750
18:11:52	+13.308	-6.3492	+15.689
18:12:02	+13.919	-5.6166	+15.750
18:12:12	+14.590	-4.8840	+15.750
18:12:22	+13.980	-5.6166	+15.750
18:12:32	+13.369	-6.2271	+15.750
18:12:42	+13.797	-5.7997	+15.750
18:12:52	+14.468	-5.0061	+15.750
18:13:02	+14.285	-5.3113	+15.750
18:13:12	+13.492	-6.1050	+15.750
18:13:22	+13.675	-5.8608	+15.750
18:13:32	+14.285	-5.2503	+15.750
18:13:42	+14.652	-4.8840	+15.750
18:13:52	+13.675	-6.1050	+15.750
18:14:02	+13.553	-5.9218	+15.750
18:14:12	+14.163	-5.3724	+15.750
18:14:22	+14.774	-4.7619	+15.750
18:14:32	+13.919	-5.6776	+15.750
18:14:42	+13.492	-6.1660	+15.750
18:14:52	+13.980	-5.4945	+15.750
18:15:02	+14.652	-4.8840	+15.750
18:15:12	+14.285	-5.2503	+15.750
18:15:22	+13.614	-5.9829	+15.750
18:15:32	+13.919	-5.6166	+15.750
18:15:42	+14.468	-5.0671	+15.750
18:15:52	+14.590	-5.0061	+15.750
18:16:02	+13.736	-5.9218	+15.750
18:16:12	+13.797	-5.7387	+15.750
18:16:22	+14.346	-5.1892	+15.750
18:16:32	+14.835	-4.7619	+15.750
18:16:42	+13.919	-5.6776	+15.750
18:16:52	+13.675	-5.8608	+15.750
18:17:02	+14.224	-5.3724	+15.750
18:17:12	+14.835	-4.8229	+15.750
18:17:22	+14.224	-5.3113	+15.750
18:17:32	+13.736	-5.8608	+15.750
18:17:42	+14.102	-5.5555	+15.750
18:17:52	+14.652	-4.8229	+15.750
18:18:02	+14.529	-5.0061	+15.750
18:18:12	+13.797	-5.8608	+15.750
18:18:22	+13.980	-5.5555	+15.750
18:18:32	+14.529	-5.0061	+15.750
18:18:42	+14.896	-4.7619	+15.750
18:18:52	+13.919	-5.6166	+15.750
18:19:02	+13.858	-5.6776	+15.750
18:19:12	+14.346	-5.1282	+15.750
18:19:22	+14.957	-4.5177	+15.750
18:19:32	+14.163	-5.3724	+15.750
18:19:42	+13.797	-5.7997	+15.750
18:19:52	+14.224	-5.3724	+15.750
18:20:02	+14.835	-4.6398	+15.750
18:20:12	+14.529	-4.9450	+15.750
18:20:22	+13.858	-5.6776	+15.750
18:20:32	+14.163	-5.3113	+15.750
18:20:42	+14.652	-4.8840	+15.750
18:20:52	+14.835	-4.6398	+15.750
18:21:02	+13.980	-5.6166	+15.750
18:21:12	+14.041	-5.4945	+15.750
18:21:22	+14.529	-5.0061	+15.750
18:21:32	+15.018	-4.3956	+15.750
18:21:42	+14.163	-5.5555	+15.750
18:21:52	+13.858	-5.6166	+15.750
18:22:02	+14.407	-5.1892	+15.750
18:22:12	+14.957	-4.5177	+15.750
18:22:22	+14.468	-5.1282	+15.750
18:22:32	+13.980	-5.6166	+15.750
18:22:42	+14.285	-5.1892	+15.750
18:22:52	+14.835	-4.7006	+15.750
18:23:02	+14.774	-4.7006	+15.750
18:23:12	+14.041	-5.5555	+15.750
18:23:22	+14.163	-5.4334	+15.750
18:23:32	+14.652	-4.7619	+15.750
18:23:42	+15.018	-4.3345	+15.750
18:23:52	+14.163	-5.4334	+15.750
18:24:02	+14.041	-5.5555	+15.750
18:24:12	+14.529	-4.8840	+15.750
18:24:22	+15.079	-4.3345	+15.750
18:24:32	+14.407	-5.2503	+15.750
18:24:42	+14.041	-5.4945	+15.750
18:24:52	+14.407	-5.1282	+15.750
18:25:02	+14.957	-4.4566	+15.750
18:25:12	+14.713	-4.8229	+15.750
18:25:22	+14.102	-5.4334	+15.750
18:25:32	+14.285	-5.1892	+15.750
18:25:42	+14.835	-4.6398	+15.750
18:25:52	+14.957	-4.5787	+15.750
18:26:02	+14.163	-5.3724	+15.750
18:26:12	+14.163	-5.3724	+15.750
18:26:22	+14.652	-4.8229	+15.750
18:26:32	+15.140	-4.3345	+15.750
18:26:42	+14.346	-5.1892	+15.750
18:26:52	+14.041	-5.5555	+15.750
18:27:02	+14.468	-4.9450	+15.750
18:27:12	+15.079	-4.3956	+15.750
18:27:22	+14.652	-4.8229	+15.750
18:27:32	+14.163	-5.3724	+15.750

18:27:42	+14.407	-5.0671	+15.750
18:27:52	+14.896	-4.5177	+15.750
18:28:02	+14.957	-4.5787	+15.750
18:28:12	+14.224	-5.3724	+15.750
18:28:22	+14.285	-5.1892	+15.750
18:28:32	+14.774	-4.6398	+15.750
18:28:42	+15.201	-4.2735	+15.750
18:28:52	+14.346	-5.1892	+15.750
18:29:02	+14.163	-5.3113	+15.750
18:29:12	+14.652	-4.7619	+15.750
18:29:22	+15.201	-4.2124	+15.750
18:29:32	+14.590	-4.9450	+15.750
18:29:42	+14.163	-5.2503	+15.750
18:29:52	+14.529	-4.9450	+15.750
18:30:02	+15.018	-4.3956	+15.750
18:30:12	+14.896	-4.5177	+15.750
18:30:22	+14.224	-5.3113	+15.750
18:30:32	+14.407	-5.0671	+15.750
18:30:42	+14.896	-4.5177	+15.750
18:30:52	+15.140	-4.3345	+15.750
18:31:02	+14.346	-5.1892	+15.750
18:31:12	+14.285	-5.2503	+15.750
18:31:22	+14.774	-4.7619	+15.750
18:31:32	+15.262	-4.0293	+15.750
18:31:42	+14.529	-5.0671	+15.750
18:31:52	+14.224	-5.2503	+15.750
18:32:02	+14.652	-4.8229	+15.750
18:32:12	+15.140	-4.3345	+15.750
18:32:22	+14.835	-4.6398	+15.750
18:32:32	+14.285	-5.1892	+15.750
18:32:42	+14.529	-4.8840	+15.750
18:32:52	+15.018	-4.3345	+15.750
18:33:02	+15.140	-4.2735	+15.750
18:33:12	+14.346	-5.2503	+15.750
18:33:22	+14.407	-5.1282	+15.750
18:33:32	+14.896	-4.6398	+15.750
18:33:42	+15.323	-4.1514	+15.750
18:33:52	+14.529	-4.9450	+15.750
18:34:02	+14.285	-5.1892	+15.750
18:34:12	+14.713	-4.7008	+15.750
18:34:22	+15.262	-4.0293	+15.750
18:34:32	+14.835	-4.7008	+15.750
18:34:42	+14.346	-5.1892	+15.750
18:34:52	+14.652	-4.7008	+15.750
18:35:02	+15.201	-4.2735	+15.750
18:35:12	+15.079	-4.3956	+15.750
18:35:22	+14.407	-5.1892	+15.750
18:35:32	+14.529	-5.0061	+15.750
18:35:42	+14.957	-4.4566	+15.750
18:35:52	+15.323	-4.1514	+15.750
18:36:02	+14.468	-5.0061	+15.750
18:36:12	+14.346	-5.0671	+15.750
18:36:22	+14.835	-4.5787	+15.750
18:36:32	+15.323	-4.0293	+15.750
18:36:42	+14.713	-4.7619	+15.750
18:36:52	+14.346	-5.1282	+15.750
18:37:02	+14.713	-4.7008	+15.750
18:37:12	+15.201	-4.1514	+15.750
18:37:22	+15.018	-4.5177	+15.750
18:37:32	+14.407	-5.1282	+15.750
18:37:42	+14.652	-4.8229	+15.750
18:37:52	+15.079	-4.3345	+15.750
18:38:02	+15.262	-4.2124	+15.750
18:38:12	+14.468	-4.9450	+15.750
18:38:22	+14.468	-4.9450	+15.750
18:38:32	+14.957	-4.4566	+15.750
18:38:42	+15.384	-4.0293	+15.750
18:36:52	+14.652	-4.8840	+15.750
18:39:02	+14.407	-5.0671	+15.750
18:39:12	+14.774	-4.7008	+15.750
18:39:22	+15.079	-4.2735	+15.750
18:39:32	+14.652	-4.8840	+15.750
18:39:42	+14.346	-5.0671	+15.750
18:39:52	+14.590	-4.8229	+15.750
18:40:02	+14.957	-4.4566	+15.750
18:40:12	+14.835	-4.4566	+15.750
18:40:22	+14.346	-5.1282	+15.750
18:40:32	+14.468	-4.8840	+15.750
18:40:42	+14.835	-4.5177	+15.750
18:40:52	+15.018	-4.4566	+15.750
18:41:02	+14.346	-5.0671	+15.750
18:41:12	+14.285	-5.1282	+15.750
18:41:22	+14.774	-4.7008	+15.750
18:41:32	+15.323	-4.0903	+15.750
18:41:42	+14.713	-4.7619	+15.750
18:41:52	+14.346	-5.1282	+15.750
18:42:02	+14.713	-4.7619	+15.750
18:42:12	+15.201	-4.2124	+15.750
18:42:22	+15.018	-4.3956	+15.750
18:42:32	+14.407	-5.0061	+15.750
18:42:42	+14.652	-4.8229	+15.750
18:42:52	+15.079	-4.2735	+15.750
18:43:02	+15.262	-4.0903	+15.750
18:43:12	+14.468	-5.0061	+15.750
18:43:22	+14.468	-4.9450	+15.750
18:43:32	+14.896	-4.5787	+15.750
18:43:42	+15.384	-3.9072	+15.750
18:43:52	+14.652	-4.8229	+15.750
18:44:02	+14.407	-5.0671	+15.750
18:44:12	+14.774	-4.6398	+15.750
18:44:22	+15.262	-4.0293	+15.750
18:44:32	+14.957	-4.5177	+15.750
18:44:42	+14.468	-4.8840	+15.750
18:44:52	+14.713	-4.8229	+15.750
18:45:02	+15.140	-4.1514	+15.750
18:45:12	+15.201	-4.2124	+15.750
18:45:22	+14.468	-5.0061	+15.750
18:45:32	+14.590	-4.8229	+15.750
18:45:42	+15.018	-4.3345	+15.750
18:45:52	+15.445	-4.0293	+15.750
18:46:02	+14.590	-4.9450	+15.750
18:46:12	+14.468	-4.8840	+15.750
18:46:22	+14.896	-4.4566	+15.750
18:46:32	+15.384	-3.9682	+15.750
18:46:42	+14.835	-4.5787	+15.750
18:46:52	+14.529	-4.9450	+15.750
18:47:02	+14.774	-4.6398	+15.750
18:47:12	+15.262	-4.0903	+15.750
18:47:22	+15.140	-4.3345	+15.750
18:47:32	+14.529	-4.9450	+15.750
18:47:42	+14.713	-4.7008	+15.750
18:47:52	+15.140	-4.2124	+15.750
18:48:02	+15.384	-3.9072	+15.750
18:48:12	+14.590	-4.8840	+15.750
18:48:22	+14.529	-4.8229	+15.750
18:48:32	+15.018	-4.3345	+15.750
18:48:42	+15.506	-3.7851	+15.750
18:48:52	+14.774	-4.6398	+15.750
18:49:02	+14.468	-5.0061	+15.750
18:49:12	+14.896	-4.5177	+15.750
18:49:22	+15.384	-4.0293	+15.750
18:49:32	+15.018	-4.3956	+15.750
18:49:42	+14.529	-4.9450	+15.750
18:49:52	+14.774	-4.6398	+15.750
18:50:02	+15.201	-4.0903	+15.750
18:50:12	+15.262	-4.0903	+15.750
18:50:22	+14.529	-4.8840	+15.750
18:50:32	+14.652	-4.7619	+15.750
18:50:42	+15.079	-4.2124	+15.750
18:50:52	+15.445	-3.9072	+15.750
18:51:02	+14.652	-4.7619	+15.750
18:51:12	+14.529	-4.8229	+15.750
18:51:22	+14.957	-4.3956	+15.750
18:51:32	+15.445	-3.8461	+15.750
18:51:42	+14.896	-4.5177	+15.750
18:51:52	+14.529	-4.8840	+15.750
18:52:02	+14.835	-4.5177	+15.750
18:52:12	+15.323	-3.9682	+15.750
18:52:22	+15.140	-4.2124	+15.750
18:52:32	+14.590	-4.8840	+15.750
18:52:42	+14.774	-4.6398	+15.750
18:52:52	+15.201	-4.2735	+15.750
18:53:02	+15.384	-4.0293	+15.750
18:53:12	+14.652	-4.8229	+15.750
18:53:22	+14.590	-4.8840	+15.750
18:53:32	+15.018	-4.3345	+15.750
18:53:42	+15.506	-3.8461	+15.750
18:53:52	+14.774	-4.6398	+15.750
18:54:02	+14.529	-4.8229	+15.750
18:54:12	+14.896	-4.3956	+15.750
18:54:22	+15.384	-3.9682	+15.750
18:54:32	+15.079	-4.3345	+15.750
18:54:42	+14.590	-4.9450	+15.750
18:54:52	+14.835	-4.3956	+15.750
18:55:02	+15.262	-4.0903	+15.750
18:55:12	+15.323	-4.0293	+15.750
18:55:22	+14.590	-4.8840	+15.750
18:55:32	+14.713	-4.6398	+15.750
18:55:42	+15.140	-4.1514	+15.750
18:55:52	+15.506	-3.9072	+15.750
18:56:02	+14.713	-4.6398	+15.750
18:56:12	+14.590	-4.7008	+15.750
18:56:22	+15.018	-4.3956	+15.750
18:56:32	+15.506	-3.8461	+15.750
18:56:42	+14.957	-4.4566	+15.750
18:56:52	+14.590	-4.8840	+15.750
18:57:02	+14.896	-4.4566	+15.750
18:57:12	+15.323	-4.0293	+15.750
18:57:22	+15.201	-4.1514	+15.750
18:57:32	+14.590	-4.7619	+15.750
18:57:42	+14.774	-4.5177	+15.750
18:57:52	+15.201	-4.0903	+15.750
18:58:02	+15.445	-3.9072	+15.750
18:58:12	+14.652	-4.7008	+15.750
18:58:22	+14.652	-4.5787	+15.750
18:58:32	+15.079	-4.2124	+15.750
18:58:42	+15.567	-3.7851	+15.750
18:58:52	+14.835	-4.5787	+15.750
18:59:02	+14.590	-4.8229	+15.750
18:59:12	+14.957	-4.3345	+15.750
18:59:22	+15.445	-3.9072	+15.750
18:59:32	+15.079	-4.2735	+15.750
18:59:42	+14.652	-4.7619	+15.750
18:59:52	+14.835	-4.4566	+15.750
19:00:02	+15.323	-4.0293	+15.750
19:00:12	+15.323	-3.9072	+15.750
19:00:22	+14.652	-4.7619	+15.750
19:00:32	+14.774	-4.5787	+15.750
19:00:42	+15.140	-4.0903	+15.750
19:00:52	+15.506	-3.8461	+15.750
19:01:02	+14.713	-4.7008	+15.750
19:01:12	+14.590	-4.7008	+15.750
19:01:22	+15.018	-4.2735	+15.750
19:01:32	+15.506	-3.9072	+15.750
19:01:42	+14.957	-4.3345	+15.750
19:01:52	+14.652	-4.7619	+15.750
19:02:02	+14.957	-4.3956	+15.750
19:02:12	+15.384	-3.8461	+15.750
19:02:22	+15.201	-4.1514	+15.750
19:02:32	+14.652	-4.7008	+15.750
19:02:42	+14.835	-4.4566	+15.750
19:02:52	+15.262	-3.8461	+15.750
19:03:02	+15.445	-3.8461	+15.750
19:03:12	+14.713	-4.7008	+15.750
19:03:22	+14.713	-4.6398	+15.750
19:03:32	+15.140	-4.1514	+15.750
19:03:42	+15.567	-3.5409	+15.750
19:03:52	+14.835	-4.4566	+15.750
19:04:02	+14.652	-4.8229	+15.750
19:04:12	+15.018	-4.3345	+15.750
19:04:22	+15.506	-3.7851	+15.750
19:04:32	+15.079	-4.2124	+15.750
19:04:42	+14.652	-4.7008	+15.750
19:04:52	+14.835	-4.4566	+15.689
19:05:02	+15.323	-3.9072	+15.689
19:05:12	+15.323	-4.0293	+15.750
19:05:22	+14.713	-4.6398	+15.750
19:05:32	+14.835	-4.4566	+15.750
19:05:42	+15.201	-3.9682	+15.750
19:05:52	+15.567	-3.7240	+15.750
19:06:02	+14.774	-4.6398	+15.750
19:06:12	+14.652	-4.6398	+15.750
19:06:22	+15.079	-4.3345	+15.750
19:06:32	+15.567	-3.6630	+15.750
19:06:42	+14.957	-4.3345	+15.750
19:06:52	+14.652	-4.6398	+15.750
19:07:02	+14.896	-4.3345	+15.689
19:07:12	+15.445	-3.9072	+15.750
19:07:22	+15.140	-4.0903	+15.689
19:07:32	+14.652	-4.7008	+15.689
19:07:42	+14.835	-4.4566	+15.689
19:07:52	+15.262	-4.0293	+15.689
19:08:02	+15.384	-3.8461	+15.689
19:08:12	+14.652	-4.6398	+15.689
19:08:22	+14.590	-4.7008	+15.689
19:08:32	+15.018	-4.2735	+15.689
19:08:42	+15.506	-3.7240	+15.750
19:08:52	+14.957	-4.3956	+15.750
19:09:02	+14.652	-4.7008	+15.750
19:09:12	+14.835	-4.3956	+15.750
19:09:22	+15.262	-4.0293	+15.750
19:09:32	+15.384	-3.9072	+15.750
19:09:42	+14.652	-4.7008	+15.750
19:09:52	+14.590	-4.8229	+15.750
19:10:02	+15.018	-4.2124	+15.750
19:10:12	+15.506	-3.7851	+15.750
19:10:22	+14.957	-4.3345	+15.750
19:10:32	+14.652	-4.6398	+15.750
19:10:42	+14.774	-4.5177	+15.750
19:10:52	+15.262	-3.9682	+15.750
19:11:02	+15.384	-3.8461	+15.750
19:11:12	+14.713	-4.6398	+15.750
19:11:22	+14.590	-4.8229	+15.750
19:11:32	+15.018	-4.2735	+15.750
19:11:42	+15.506	-3.7240	+15.750
19:11:52	+15.018	-4.2735	+15.750
19:12:02	+14.652	-4.7008	+15.750
19:12:12	+14.835	-4.4566	+15.750
19:12:22	+15.262	-3.9682	+15.750
19:12:32	+15.445	-3.8461	+15.750
19:12:42	+14.713	-4.6398	+15.750
19:12:52	+14.590	-4.6398	+15.750
19:13:02	+14.957	-4.2735	+15.750
19:13:12	+15.445	-3.7851	+15.750
19:13:22	+15.018	-4.4566	+15.750
19:13:32	+14.652	-4.7619	+15.750
19:13:42	+14.835	-4.4566	+15.750
19:13:52	+15.262	-4.0293	+15.750
19:14:02	+15.445	-3.8461	+15.750
19:14:12	+14.713	-4.6398	+15.750
19:14:22	+14.590	-4.7008	+15.750
19:14:32	+14.957	-4.2735	+15.750
19:14:42	+15.445	-3.7240	+15.750
19:14:52	+15.018	-4.2735	+15.750
19:15:02	+14.652	-4.6398	+15.750
19:15:12	+14.835	-4.4566	+15.750
19:15:22	+15.262	-4.0293	+15.750
19:15:32	+15.445	-3.7240	+15.750
19:15:42	+14.713	-4.5787	+15.750
19:15:52	+14.590	-4.6398	+15.750
19:16:02	+15.018	-4.2124	+15.750
19:16:12	+15.506	-3.7851	+15.750
19:16:22	+15.018	-4.3345	+15.750
19:16:32	+14.652	-4.6398	+15.750
19:16:42	+14.835	-4.3956	+15.750
19:16:52	+15.262	-4.0293	+15.750
19:17:02	+15.445	-3.9072	+15.750
19:17:12	+14.713	-4.5787	+15.750
19:17:22	+14.590	-4.6398	+15.750
19:17:32	+14.957	-4.2735	+15.750
19:17:42	+15.445	-3.7851	+15.750
19:17:52	+15.079	-4.2735	+15.750
19:18:02	+14.652	-4.6398	+15.750
19:18:12	+14.774	-4.5177	+15.750
19:18:22	+15.201	-4.0293	+15.750
19:18:32	+15.445	-3.8461	+15.750
19:18:42	+14.713	-4.6398	+15.750
19:18:52	+14.590	-4.7008	+15.750
19:19:02	+14.957	-4.2124	+15.750
19:19:12	+15.445	-3.7851	+15.750
19:19:22	+15.079	-4.3345	+15.750
19:19:32	+14.652	-4.6398	+15.750
19:19:42	+14.774	-4.4566	+15.750
19:19:52	+15.201	-3.9072	+15.750
19:20:02	+15.445	-3.7240	+15.750
19:20:12	+14.713	-4.5787	+15.750
19:20:22	+14.590	-4.6398	+15.750
19:20:32	+14.957	-4.3345	+15.750
19:20:42	+15.445	-3.8461	+15.750
19:20:52	+15.079	-4.2124	+15.750
19:21:02	+14.652	-4.6398	+15.750
19:21:12	+14.774	-4.3956	+15.750
19:21:22	+15.201	-4.0293	+15.750
19:21:32	+15.445	-3.7851	+15.750
19:21:42	+14.713	-4.6398	+15.750
19:21:52	+14.652	-4.6398	+15.750
19:22:02	+14.957	-4.2735	+15.750
19:22:12	+15.445	-3.7851	+15.750
19:22:22	+15.079	-4.2124	+15.750
19:22:32	+14.652	-4.5177	+15.750
19:22:42	+14.774	-4.5177	+15.750
19:22:52	+15.201	-4.0293	+15.750
19:23:02	+15.506	-3.7851	+15.750
19:23:12	+14.774	-4.5177	+15.750
19:23:22	+14.652	-4.7008	+15.750
19:23:32	+14.957	-4.2735	+15.750
19:23:42	+15.445	-3.7851	+15.750
19:23:52	+15.079	-4.0903	+15.750
19:24:02	+14.713	-4.7008	+15.750
19:24:12	+14.774	-4.3956	+15.750
19:24:22	+15.201	-4.0293	+15.750
19:24:32	+15.506	-3.7851	+15.750
19:24:42	+14.774	-4.5177	+15.750
19:24:52	+14.652	-4.5787	+15.750
19:25:02	+14.957	-4.2735	+15.750
19:25:12	+15.445	-3.7240	+15.750
19:25:22	+15.140	-4.1514	+15.750
19:25:32	+14.713	-4.6398	+15.750
19:25:42	+14.774	-4.5177	+15.750
19:25:52	+15.201	-4.0903	+15.750
19:26:02	+15.506	-3.7240	+15.750
19:26:12	+14.774	-4.5787	+15.750
19:26:22	+14.652	-4.6398	+15.750
19:26:32	+14.957	-4.2735	+15.750
19:26:42	+15.445	-3.9072	+15.750
19:26:52	+15.140	-4.2124	+15.750
19:27:02	+14.713	-4.5787	+15.750
19:27:12	+14.774	-4.3956	+15.750
19:27:22	+15.201	-4.0293	+15.750
19:27:32	+15.506	-3.8461	+15.750
19:27:42	+14.774	-4.5177	+15.750
19:27:52	+14.652	-4.6398	+15.750
19:28:02	+14.957	-4.3345	+15.750
19:28:12	+15.445	-3.7240	+15.750

19:28:22	+15.140	-4.0903	+15.750
19:28:32	+14.713	-4.5787	+15.750
19:28:42	+14.774	-4.3956	+15.750
19:28:52	+15.201	-4.0293	+15.750
19:29:02	+15.506	-3.7240	+15.750
19:29:12	+14.774	-4.5787	+15.750
19:29:22	+14.652	-4.6398	+15.750
19:29:32	+14.957	-4.2735	+15.750
19:29:42	+15.445	-3.8461	+15.750
19:29:52	+15.140	-4.1514	+15.750
19:30:02	+14.713	-4.5787	+15.750
19:30:12	+14.774	-4.3956	+15.750
19:30:22	+15.201	-4.0293	+15.750
19:30:32	+15.506	-3.6630	+15.750
19:30:42	+14.774	-4.5177	+15.750
19:30:52	+14.652	-4.7008	+15.750
19:31:02	+14.957	-4.2124	+15.750
19:31:12	+15.445	-3.7851	+15.750
19:31:22	+15.140	-4.0903	+15.750
19:31:32	+14.713	-4.5787	+15.750
19:31:42	+14.835	-4.5177	+15.750
19:31:52	+15.201	-3.9682	+15.750
19:32:02	+15.506	-3.8461	+15.750
19:32:12	+14.774	-4.4566	+15.750
19:32:22	+14.652	-4.7008	+15.750
19:32:32	+14.957	-4.2124	+15.750
19:32:42	+15.445	-3.7851	+15.750
19:32:52	+15.201	-4.0903	+15.750
19:33:02	+14.713	-4.6398	+15.750
19:33:12	+14.835	-4.3956	+15.750
19:33:22	+15.201	-4.0293	+15.750
19:33:32	+15.506	-3.7240	+15.750
19:33:42	+14.774	-4.5177	+15.750
19:33:52	+14.652	-4.6398	+15.750
19:34:02	+14.957	-4.2735	+15.750
19:34:12	+15.445	-3.7240	+15.750
19:34:22	+15.201	-4.0903	+15.750
19:34:32	+14.713	-4.5787	+15.750
19:34:42	+14.774	-4.3956	+15.750
19:34:52	+15.201	-3.9682	+15.750
19:35:02	+15.506	-3.6630	+15.750
19:35:12	+14.774	-4.4566	+15.750
19:35:22	+14.652	-4.5787	+15.750
19:35:32	+14.957	-4.2735	+15.750
19:35:42	+15.445	-3.7851	+15.750
19:35:52	+15.201	-4.0293	+15.750
19:36:02	+14.713	-4.5177	+15.750
19:36:12	+14.835	-4.4566	+15.750
19:36:22	+15.201	-3.9682	+15.750
19:36:32	+15.567	-3.6630	+15.750
19:36:42	+14.835	-4.4566	+15.750
19:36:52	+14.652	-4.5787	+15.689
19:37:02	+14.957	-4.1514	+15.750
19:37:12	+15.445	-3.8461	+15.750
19:37:22	+15.201	-4.0903	+15.750
19:37:32	+14.652	-4.5787	+15.689
19:37:42	+14.774	-4.3956	+15.750
19:37:52	+15.201	-4.0293	+15.750
19:38:02	+15.567	-3.7240	+15.750
19:38:12	+14.835	-4.4566	+15.750
19:38:22	+14.713	-4.7008	+15.750
19:38:32	+14.957	-4.2124	+15.750
19:38:42	+15.445	-3.7851	+15.750
19:38:52	+15.140	-4.0903	+15.689
19:39:02	+14.713	-4.5787	+15.689
19:39:12	+14.774	-4.4566	+15.750
19:39:22	+15.140	-4.0903	+15.689
19:39:32	+15.567	-3.6019	+15.750
19:39:42	+14.835	-4.3345	+15.811
19:39:52	+14.713	-4.5177	+15.811
19:40:02	+14.957	-4.1514	+15.750
19:40:12	+15.445	-3.6630	+15.750
19:40:22	+15.201	-4.0903	+15.750
19:40:32	+14.774	-4.5177	+15.811
19:40:42	+14.835	-4.5177	+15.750
19:40:52	+15.201	-4.0293	+15.811
19:41:02	+15.506	-3.8630	+15.689
19:41:12	+14.835	-4.3956	+15.750
19:41:22	+14.713	-4.5177	+15.750
19:41:32	+14.957	-4.3345	+15.750
19:41:42	+15.384	-3.7851	+15.750
19:41:52	+15.262	-3.9682	+15.750
19:42:02	+14.774	-4.5177	+15.811
19:42:12	+14.713	-4.5177	+15.689
19:42:22	+15.140	-4.0903	+15.750
19:42:32	+15.506	-3.6630	+15.750
19:42:42	+14.774	-4.4566	+15.689
19:42:52	+14.652	-4.6398	+15.750
19:43:02	+14.896	-4.2735	+15.750
19:43:12	+15.323	-3.8461	+15.750
19:43:22	+15.201	-4.0293	+15.689
19:43:32	+14.713	-4.5787	+15.689
19:43:42	+14.713	-4.5177	+15.750
19:43:52	+15.140	-4.0903	+15.750
19:44:02	+15.506	-3.6630	+15.750
19:44:12	+14.835	-4.4566	+15.750
19:44:22	+14.652	-4.5787	+15.750
19:44:32	+14.896	-4.2735	+15.750
19:44:42	+15.323	-3.8461	+15.750
19:44:52	+15.201	-4.0293	+15.750
19:45:02	+14.713	-4.5177	+15.750
19:45:12	+14.713	-4.5177	+15.750
19:45:22	+15.140	-4.0903	+15.750
19:45:32	+15.506	-3.6630	+15.750
19:45:42	+14.835	-4.4566	+15.750
19:45:52	+14.652	-4.5787	+15.750
19:46:02	+14.896	-4.2735	+15.750
19:46:12	+15.323	-3.8461	+15.750
19:46:22	+15.201	-3.9682	+15.750
19:46:32	+14.713	-4.5177	+15.750
19:46:42	+14.713	-4.5177	+15.689
19:46:52	+15.079	-4.0903	+15.689
19:47:02	+15.506	-3.6630	+15.750
19:47:12	+14.835	-4.3956	+15.750
19:47:22	+14.652	-4.5787	+15.689
19:47:32	+14.896	-4.2735	+15.750
19:47:42	+15.323	-3.8461	+15.750
19:47:52	+15.262	-3.9682	+15.689
19:48:02	+14.713	-4.5177	+15.750
19:48:12	+14.713	-4.5177	+15.750
19:48:22	+15.079	-4.0903	+15.689
19:48:32	+15.506	-3.6630	+15.689
19:48:42	+14.835	-4.3956	+15.750
19:48:52	+14.652	-4.5787	+15.689
19:49:02	+14.896	-4.2735	+15.689
19:49:12	+15.323	-3.8461	+15.689
19:49:22	+15.262	-3.9682	+15.689
19:49:32	+14.713	-4.5177	+15.689
19:49:42	+14.713	-4.5177	+15.689
19:49:52	+15.140	-4.0293	+15.750
19:50:02	+15.567	-3.6019	+15.750
19:50:12	+14.835	-4.3956	+15.689
19:50:22	+14.652	-4.5787	+15.689
19:50:32	+14.896	-4.2735	+15.689
19:50:42	+15.384	-3.7851	+15.750
19:50:52	+15.323	-3.9072	+15.750
19:51:02	+14.713	-4.5177	+15.750
19:51:12	+14.713	-4.5177	+15.750
19:51:22	+15.079	-4.0903	+15.689
19:51:32	+15.506	-3.6630	+15.750
19:51:42	+14.896	-4.3345	+15.750
19:51:52	+14.713	-4.5177	+15.750
19:52:02	+14.957	-4.2735	+15.811
19:52:12	+15.323	-3.8461	+15.750
19:52:22	+15.323	-3.9072	+15.750
19:52:32	+14.774	-4.4566	+15.750
19:52:42	+14.652	-4.5177	+15.689
19:52:52	+15.018	-4.1514	+15.689
19:53:02	+15.445	-3.7240	+15.750
19:53:12	+14.835	-4.4566	+15.689
19:53:22	+14.652	-4.5787	+15.689
19:53:32	+14.713	-4.4566	+15.689
19:53:42	+14.957	-4.2124	+15.750
19:53:52	+15.140	-4.0293	+15.750
19:54:02	+14.713	-4.5177	+15.811
19:54:12	+14.652	-4.5177	+15.750
19:54:22	+15.079	-4.0903	+15.750
19:54:32	+15.567	-3.6019	+15.750
19:54:42	+14.896	-4.3345	+15.750
19:54:52	+14.652	-4.5177	+15.750
19:55:02	+14.590	-4.5787	+15.750
19:55:12	+14.529	-4.6398	+15.750
19:55:22	+14.529	-4.6398	+15.750
19:55:32	+14.468	-4.7008	+15.750
19:55:42	+14.468	-4.7008	+15.750
19:55:52	+14.407	-4.7619	+15.750
19:56:02	+14.346	-4.7619	+15.750
19:56:12	+14.346	-4.8229	+15.750
19:56:22	+14.224	-4.8840	+15.750
19:56:32	+14.163	-4.9450	+15.750
19:56:42	+16.178	-3.0525	+15.567
19:56:52	+18.009	-1.8925	+15.018
19:57:02	+18.070	-1.9536	+14.468

TRANSDUCER DATA - ZONE P3-2

S/N SDEE-03A-SN-3091 Block 1

Program: INTERVAL
Readings: 2212
Start Time: 10:01:03
Start Date: 09/25
Range: 0250 0250 0250 PSI
Channels: 3
Units: PSI

Interval: 00:00:10

Time	Chnl 1	Chnl 2	Chnl 3
10:01:03	+37.301	+15.140	+32.234
10:01:13	+37.301	+15.140	+32.234
10:01:23	+37.301	+15.140	+32.234
10:01:33	+37.301	+15.140	+32.234
10:01:43	+37.301	+15.140	+32.234
10:01:53	+37.301	+15.140	+32.234
10:02:03	+37.301	+15.140	+32.234
10:02:13	-37.301	+15.140	+32.234
10:02:23	+37.301	+15.140	+32.234
10:02:33	+37.301	+15.140	+32.234
10:02:43	+37.301	+15.140	+32.234
10:02:53	+37.301	+15.140	+32.234
10:03:03	+37.423	+15.201	+32.295
10:03:13	+37.606	+15.384	+32.478
10:03:23	+38.217	+15.506	+32.600
10:03:33	+39.987	+15.567	+32.661
10:03:43	+42.918	+15.628	+32.722
10:03:53	+46.642	+15.689	+32.783
10:04:03	+51.159	+15.750	+32.783
10:04:13	+55.860	+15.811	+32.783
10:04:23	+60.012	+15.934	+32.783
10:04:33	+63.125	+16.178	+32.783
10:04:43	+65.018	+16.483	+32.783
10:04:53	+65.873	+16.849	+32.722
10:05:03	+65.811	+17.155	+32.722
10:05:13	+64.896	+17.399	+32.722
10:05:23	+63.980	+17.582	+32.661
10:05:33	+63.186	+17.826	+32.661
10:05:43	+62.454	+18.009	+32.600
10:05:53	+61.843	+18.131	+32.600
10:06:03	+61.233	+18.009	+32.600
10:06:13	+60.805	+18.192	+32.539
10:06:23	+60.378	+18.315	+32.539
10:06:33	+60.073	+18.376	+32.539
10:06:43	+59.768	+18.498	+32.539
10:06:53	+62.026	-27.472	+32.478
10:07:03	+63.247	-29.120	+32.478
10:07:13	+64.041	-29.426	+32.478
10:07:23	+64.468	-29.181	+32.478
10:07:33	+64.713	-28.876	+32.417
10:07:43	+64.835	-28.632	+32.417
10:07:53	+64.896	-28.449	+32.417
10:08:03	+64.835	-28.266	+32.417
10:08:13	+64.835	-28.021	+32.417
10:08:23	+64.713	-27.960	+32.356
10:08:33	+64.652	-27.838	+32.356
10:08:43	+64.529	-27.716	+32.356
10:08:53	+64.407	-27.594	+32.356
10:09:03	+64.346	-27.411	+32.417
10:09:13	+64.285	-27.289	+32.417
10:09:23	+64.163	-27.167	+32.356
10:09:33	+64.102	-27.106	+32.356
10:09:43	+63.980	-27.045	+32.356
10:09:53	+63.919	-26.923	+32.356
10:10:03	+63.858	-26.862	+32.356
10:10:13	+63.797	-26.739	+32.356
10:10:23	+63.736	-26.678	+32.356
10:10:33	+63.675	-26.617	+32.356
10:10:43	+63.553	-26.556	+32.356
10:10:53	+63.492	-26.434	+32.356
10:11:03	+63.431	-26.373	+32.356
10:11:13	+63.369	-26.312	+32.356
10:11:23	+63.308	-26.251	+32.295
10:11:33	+63.308	-26.190	+32.295
10:11:43	+63.247	-26.129	+32.295
10:11:53	+63.125	-26.129	+32.295
10:12:03	+63.064	-26.068	+32.295
10:12:13	+63.064	-26.068	+32.295
10:12:23	+63.003	-26.068	+32.295
10:12:33	+62.942	-26.068	+32.295
10:12:43	+62.881	-26.068	+32.295
10:12:53	+62.820	-26.068	+32.295
10:13:03	+62.759	-26.007	+32.295
10:13:13	+62.698	-25.946	+32.295
10:13:23	+62.637	-25.946	+32.295
10:13:33	+62.576	-25.885	+32.234
10:13:43	+62.576	-25.885	+32.234
10:13:53	+62.515	-25.824	+32.234
10:14:03	+62.454	-25.824	+32.234
10:14:13	+62.454	-25.763	+32.234
10:14:23	+62.393	-25.763	+32.234
10:14:33	+62.332	-25.702	+32.295
10:14:43	+62.271	-25.641	+32.234
10:14:53	+62.210	-25.641	+32.234
10:15:03	+62.210	-25.579	+32.234
10:15:13	+62.148	-25.579	+32.234
10:15:23	+62.087	-25.579	+32.295
10:15:33	+62.087	-25.518	+32.295
10:15:43	+62.026	-25.518	+32.234
10:15:53	+61.965	-25.457	+32.234
10:16:03	+61.904	-25.457	+32.234
10:16:13	+61.904	-25.396	+32.234
10:16:23	+61.843	-25.396	+32.234
10:16:33	+61.782	-25.335	+32.234
10:16:43	+61.782	-25.335	+32.234
10:16:53	+61.721	-25.274	+32.234
10:17:03	+61.660	-25.274	+32.234
10:17:13	+61.599	-25.274	+32.234
10:17:23	+61.599	-25.213	+32.234
10:17:33	+61.538	-25.213	+32.234
10:17:43	+61.477	-25.152	+32.234
10:17:53	+61.477	-25.152	+32.234
10:18:03	+61.416	-25.152	+32.234
10:18:13	+61.416	-25.091	+32.234
10:18:23	+61.416	-25.030	+32.295
10:18:33	+61.355	-24.969	+32.295
10:18:43	+61.355	-24.908	+32.295
10:18:53	+61.294	-24.908	+32.295
10:19:03	+61.233	-24.847	+32.295
10:19:13	+61.233	-24.847	+32.295
10:19:23	+61.172	-24.786	+32.295
10:19:33	+61.111	-24.786	+32.295
10:19:43	+61.111	-24.725	+32.295
10:19:53	+61.050	-24.725	+32.295
10:20:03	+61.050	-24.725	+32.295
10:20:13	+60.989	-24.725	+32.295
10:20:23	+60.927	-24.664	+32.295
10:20:33	+60.927	-24.664	+32.295
10:20:43	+60.866	-24.603	+32.295
10:20:53	+60.866	-24.542	+32.234
10:21:03	+60.805	-24.542	+32.295
10:21:13	+60.744	-24.542	+32.234
10:21:23	+60.744	-24.542	+32.234
10:21:33	+60.683	-24.542	+32.234
10:21:43	+60.683	-24.481	+32.234
10:21:53	+60.622	-24.481	+32.234
10:22:03	+60.561	-24.481	+32.234
10:22:13	+60.561	-24.420	+32.234
10:22:23	+60.317	-24.847	+58.119
10:22:33	+21.428	-24.358	+32.234
10:22:43	+60.439	-24.297	+32.234
10:22:53	+60.439	-24.297	+32.234
10:23:03	+60.378	-24.236	+32.234
10:23:13	+60.378	-24.236	+32.234
10:23:23	+60.317	-24.236	+32.234
10:23:33	+60.256	-24.175	+32.234
10:23:43	+60.256	-24.114	+32.234
10:23:53	+60.195	-24.053	+32.234
10:24:03	+60.195	-24.053	+32.234
10:24:13	+60.134	-23.992	+32.234
10:24:23	+60.134	-23.931	+32.234
10:24:33	+60.073	-23.870	+32.234
10:24:43	+60.012	-23.809	+32.295
10:24:53	+60.012	-23.748	+32.234
10:25:03	+59.951	-23.626	+32.234
10:25:13	+59.890	-23.565	+32.234
10:25:23	+59.829	-23.504	+32.234
10:25:33	+59.829	-23.443	+32.234
10:25:43	+59.829	-23.382	+32.234
10:25:53	+59.768	-23.321	+32.234
10:26:03	+59.768	-23.199	+32.234
10:26:13	+59.768	-23.137	+32.234
10:26:23	+59.706	-23.076	+32.234
10:26:33	+59.706	-23.015	+32.234
10:26:43	+59.645	-22.954	+32.234
10:26:53	+59.645	-22.832	+32.295
10:27:03	+59.584	-22.771	+32.295
10:27:13	+59.584	-22.710	+32.234
10:27:23	+59.523	-22.588	+32.295
10:27:33	+59.523	-22.527	+32.234
10:27:43	+59.523	-22.405	+32.295
10:27:53	+59.523	-22.283	+32.295
10:28:03	+59.462	-22.222	+32.295
10:28:13	+59.462	-22.100	+32.295
10:28:23	+59.401	-22.039	+32.295
10:28:33	+59.401	-21.916	+32.295
10:28:43	+59.401	-21.855	+32.295
10:28:53	+59.340	-21.733	+32.295
10:29:03	+59.279	-21.672	+32.295
10:29:13	+59.279	-21.550	+32.295
10:29:23	+59.218	-21.489	+32.295
10:29:33	+59.218	-21.428	+32.295
10:29:43	+59.218	-21.306	+32.295
10:29:53	+59.157	-21.245	+32.295
10:30:03	+59.157	-21.123	+32.295
10:30:13	+59.157	-21.062	+32.295
10:30:23	+59.157	-21.001	+32.295
10:30:33	+59.096	-20.879	+32.295
10:30:43	+59.096	-20.818	+32.295
10:30:53	+59.035	-20.757	+32.295
10:31:03	+59.035	-20.634	+32.295
10:31:13	+59.035	-20.573	+32.295
10:31:23	+58.974	-20.512	+32.295
10:31:33	+58.974	-20.390	+32.295
10:31:43	+58.913	-20.329	+32.295
10:31:53	+58.913	-20.268	+32.295
10:32:03	+58.913	-20.207	+32.295
10:32:13	+58.852	-20.146	+32.295
10:32:23	+58.852	-20.024	+32.295
10:32:33	+58.791	-19.963	+32.295
10:32:43	+58.791	-19.902	+32.295
10:32:53	+58.791	-19.841	+32.295
10:33:03	+58.791	-19.719	+32.295
10:33:13	+58.730	-19.658	+32.295
10:33:23	+58.730	-19.597	+32.295
10:33:33	+58.730	-19.536	+32.295
10:33:43	+58.730	-19.474	+32.295
10:33:53	+58.669	-19.413	+32.295
10:34:03	+58.669	-19.352	+32.295
10:34:13	+58.669	-19.291	+32.295
10:34:23	+58.608	-19.230	+32.295
10:34:33	+58.608	-19.169	+32.295
10:34:43	+58.608	-19.047	+32.295
10:34:53	+58.608	-18.986	+32.295
10:35:03	+58.547	-18.925	+32.234
10:35:13	+58.547	-18.864	+32.234
10:35:23	+58.485	-18.803	+32.295
10:35:33	+58.485	-18.742	+32.234
10:35:43	+58.485	-18.681	+32.234
10:35:53	+58.485	-18.620	+32.295
10:36:03	+58.424	-18.559	+32.234
10:36:13	+58.485	-18.498	+32.234
10:36:23	+58.424	-18.437	+32.234
10:36:33	+58.424	-18.376	+32.295
10:36:43	+58.363	-18.315	+32.295
10:36:53	+58.363	-18.253	+32.295
10:37:03	+58.363	-18.192	+32.295
10:37:13	+58.302	-18.131	+32.295
10:37:23	+58.302	-18.070	+32.295
10:37:33	+58.302	-18.009	+32.234
10:37:43	+58.241	-17.948	+32.234
10:37:53	+58.241	-17.887	+32.234
10:38:03	+58.241	-17.826	+32.295
10:38:13	+58.180	-17.704	+32.234
10:38:23	+58.180	-17.643	+32.295
10:38:33	+58.180	-17.582	+32.234
10:38:43	+58.180	-17.521	+32.234
10:38:53	+58.180	-17.460	+32.234
10:39:03	+58.119	-17.399	+32.234
10:39:13	+58.119	-17.338	+32.234
10:39:23	+58.119	-17.277	+32.234
10:39:33	+58.119	-17.216	+32.234
10:39:43	+58.058	-17.155	+32.295
10:39:53	+58.058	-17.094	+32.234
10:40:03	+58.058	-17.032	+32.234
10:40:13	+58.058	-16.971	+32.234
10:40:23	+57.997	-16.910	+32.234
10:40:33	+57.997	-16.849	+32.234
10:40:43	+57.997	-16.727	+32.234
10:40:53	+57.997	-16.666	+32.234
10:41:03	+57.997	-16.605	+32.234
10:41:13	+57.936	-16.544	+32.295
10:41:23	+57.936	-16.483	+32.234
10:41:33	+57.936	-16.422	+32.234
10:41:43	+57.936	-16.361	+32.234
10:41:53	+57.875	-16.300	+32.234
10:42:03	+57.875	-16.239	+32.234
10:42:13	+57.875	-16.178	+32.234
10:42:23	+57.875	-16.117	+32.234
10:42:33	+57.814	-16.056	+32.234
10:42:43	+57.875	-15.873	+32.295
10:42:53	+57.875	-15.811	+32.295
10:43:03	+57.875	-15.750	+32.295
10:43:13	+57.814	-15.750	+32.234
10:43:23	+57.814	-15.689	+32.234
10:43:33	+57.814	-15.628	+32.234
10:43:43	+58.058	-16.727	+32.295
10:43:53	+58.180	-17.887	+32.295
10:44:03	+58.302	-18.925	+32.356
10:44:13	+58.241	-19.108	+32.234
10:44:23	+58.363	-18.986	+32.295
10:44:33	+58.363	-18.925	+32.295
10:44:43	+58.363	-18.864	+32.295
10:44:53	+58.363	-18.803	+32.295
10:45:03	+58.424	-18.803	+32.295
10:45:13	+58.424	-18.742	+32.295
10:45:23	+58.485	-18.681	+32.295
10:45:33	+58.485	-18.620	+32.295
10:45:43	+58.485	-18.559	+32.295
10:45:53	+58.485	-18.498	+32.295
10:46:03	+58.547	-18.437	+32.295
10:46:13	+58.547	-18.376	+32.295
10:46:23	+58.547	-18.376	+32.234
10:46:33	+58.547	-18.315	+32.234
10:46:43	+58.608	-18.192	+32.295
10:46:53	+58.608	-18.192	+32.295
10:47:03	+58.669	-18.131	+32.295
10:47:13	+58.669	-18.070	+32.295
10:47:23	+58.669	-18.009	+32.295
10:47:33	+58.730	-17.948	+32.295
10:47:43	+58.730	-17.887	+32.295
10:47:53	+58.730	-17.826	+32.295
10:48:03	+58.791	-17.765	+32.295
10:48:13	+58.791	-17.704	+32.295
10:48:23	+58.791	-17.643	+32.295
10:48:33	+58.852	-17.582	+32.295
10:48:43	+58.852	-17.582	+32.295
10:48:53	+58.852	-17.521	+32.295
10:49:03	+58.913	-17.460	+32.295
10:49:13	+58.913	-17.399	+32.295
10:49:23	+58.913	-17.338	+32.295
10:49:33	+58.974	-17.277	+32.295
10:49:43	+58.974	-17.216	+32.295
10:49:53	+58.974	-17.155	+32.295
10:50:03	+58.974	-17.094	+32.295
10:50:13	+59.035	-17.032	+32.295
10:50:23	+59.035	-16.971	+32.295
10:50:33	+59.035	-16.910	+32.295
10:50:43	+59.096	-16.849	+32.295
10:50:53	+59.096	-16.788	+32.295

10:51:03	+59.096	-16.727	+32.295
10:51:13	+59.157	-16.666	+32.295
10:51:23	+59.157	-16.605	+32.295
10:51:33	+59.157	-16.544	+32.295
10:51:43	+59.218	-16.483	+32.295
10:51:53	+59.218	-16.422	+32.295
10:52:03	+59.218	-16.361	+32.295
10:52:13	+59.279	-16.300	+32.295
10:52:23	+59.279	-16.239	+32.295
10:52:33	+59.340	-16.178	+32.295
10:52:43	+59.340	-16.117	+32.295
10:52:53	+59.401	-16.056	+32.295
10:53:03	+59.401	-15.995	+32.295
10:53:13	+59.401	-15.934	+32.295
10:53:23	+59.462	-15.873	+32.295
10:53:33	+59.462	-15.811	+32.295
10:53:43	+59.462	-15.750	+32.295
10:53:53	+59.523	-15.689	+32.295
10:54:03	+59.523	-15.628	+32.295
10:54:13	+59.584	-15.567	+32.295
10:54:23	+59.584	-15.506	+32.295
10:54:33	+59.645	-15.445	+32.295
10:54:43	+59.706	-15.384	+32.295
10:54:53	+59.706	-15.323	+32.295
10:55:03	+59.768	-15.262	+32.295
10:55:13	+59.768	-15.201	+32.295
10:55:23	+59.829	-15.140	+32.295
10:55:33	+59.829	-15.079	+32.295
10:55:43	+59.890	-15.018	+32.295
10:55:53	+59.890	-14.957	+32.295
10:56:03	+59.951	-14.896	+32.295
10:56:13	+60.012	-14.835	+32.295
10:56:23	+60.012	-14.774	+32.295
10:56:33	+60.073	-14.713	+32.295
10:56:43	+60.073	-14.652	+32.295
10:56:53	+60.073	-14.590	+32.295
10:57:03	+60.134	-14.529	+32.295
10:57:13	+60.134	-14.529	+32.295
10:57:23	+60.195	-14.468	+32.295
10:57:33	+60.195	-14.407	+32.295
10:57:43	+60.256	-14.346	+32.295
10:57:53	+60.317	-14.285	+32.295
10:58:03	+60.317	-14.224	+32.295
10:58:13	+60.378	-14.163	+32.295
10:58:23	+60.378	-14.102	+32.295
10:58:33	+60.439	-14.041	+32.295
10:58:43	+60.439	-14.041	+32.295
10:58:53	+60.500	-13.980	+32.295
10:59:03	+60.500	-13.919	+32.295
10:59:13	+60.622	-13.858	+32.295
10:59:23	+60.622	-13.797	+32.295
10:59:33	+60.622	-13.736	+32.295
10:59:43	+60.805	-13.675	+32.295
10:59:53	+60.805	-13.614	+32.295
11:00:03	+60.805	-13.614	+32.295
11:00:13	+60.866	-13.553	+32.295
11:00:23	+60.866	-13.492	+32.295
11:00:33	+60.927	-13.492	+32.295
11:00:43	+60.989	-13.431	+32.295
11:00:53	+61.050	-13.369	+32.295
11:01:03	+61.050	-13.308	+32.295
11:01:13	+61.111	-13.247	+32.295
11:01:23	+61.111	-13.247	+32.295
11:01:33	+61.172	-13.186	+32.295
11:01:43	+61.233	-13.125	+32.295
11:01:53	+61.294	-13.064	+32.295
11:02:03	+61.294	-13.003	+32.295
11:02:13	+61.355	-13.003	+32.295
11:02:23	+61.416	-12.942	+32.295
11:02:33	+61.477	-12.881	+32.295
11:02:43	+61.477	-12.820	+32.295
11:02:53	+61.538	-12.759	+32.295
11:03:03	+61.599	-12.759	+32.295
11:03:13	+61.599	-12.698	+32.295
11:03:23	+61.660	-12.637	+32.295
11:03:33	+61.721	-12.637	+32.295
11:03:43	+61.782	-12.576	+32.295
11:03:53	+61.782	-12.515	+32.295
11:04:03	+61.843	-12.454	+32.295
11:04:13	+61.904	-12.454	+32.295
11:04:23	+61.965	-12.393	+32.295
11:04:33	+61.965	-12.332	+32.295
11:04:43	+62.087	-12.271	+32.295
11:04:53	+62.087	-12.210	+32.295
11:05:03	+62.148	-12.210	+32.295
11:05:13	+62.210	-12.148	+32.295
11:05:23	+62.271	-12.087	+32.295
11:05:33	+62.271	-12.087	+32.295
11:05:43	+62.332	-12.026	+32.295
11:05:53	+62.393	-11.965	+32.295

11:06:03	+62.454	-11.965	+32.295
11:06:13	+62.454	-11.904	+32.295
11:06:23	+62.515	-11.843	+32.295
11:06:33	+62.576	-11.782	+32.295
11:06:43	+62.576	-11.782	+32.295
11:06:53	+62.637	-11.721	+32.295
11:07:03	+62.637	-11.660	+32.295
11:07:13	+62.698	-11.660	+32.295
11:07:23	+62.820	-11.599	+32.295
11:07:33	+62.820	-11.538	+32.295
11:07:43	+62.820	-11.538	+32.295
11:07:53	+62.881	-11.477	+32.295
11:08:03	+62.881	-11.416	+32.295
11:08:13	+62.942	-11.416	+32.295
11:08:23	+63.003	-11.355	+32.295
11:08:33	+63.064	-11.294	+32.295
11:08:43	+63.064	-11.294	+32.295
11:08:53	+63.125	-11.233	+32.295
11:09:03	+63.125	-11.233	+32.295
11:09:13	+63.186	-11.172	+32.295
11:09:23	+63.247	-11.111	+32.295
11:09:33	+63.247	-11.111	+32.295
11:09:43	+63.308	-11.050	+32.295
11:09:53	+63.369	-11.050	+32.295
11:10:03	+63.369	-10.989	+32.295
11:10:13	+63.431	-10.989	+32.234
11:10:23	+63.431	-10.927	+32.234
11:10:33	+63.431	-10.866	+32.295
11:10:43	+63.553	-10.805	+32.295
11:10:53	+63.553	-10.744	+32.356
11:11:03	+63.553	-10.805	+32.295
11:11:13	+63.675	-10.683	+32.295
11:11:23	+63.858	-12.026	+32.295
11:11:33	+64.163	-13.858	+32.295
11:11:43	+64.468	-15.323	+32.356
11:11:53	+64.652	-16.544	+32.356
11:12:03	+64.713	-16.971	+32.295
11:12:13	+64.774	-16.910	+32.295
11:12:23	+64.835	-16.849	+32.295
11:12:33	+64.896	-16.788	+32.295
11:12:43	+64.957	-16.727	+32.295
11:12:53	+65.018	-16.666	+32.295
11:13:03	+65.140	-16.605	+32.295
11:13:13	+65.140	-16.544	+32.295
11:13:23	+65.201	-16.483	+32.295
11:13:33	+65.262	-16.422	+32.295
11:13:43	+65.262	-16.422	+32.234
11:13:53	+65.323	-16.361	+32.234
11:14:03	+65.323	-16.300	+32.234
11:14:13	+65.506	-16.239	+32.295
11:14:23	+65.506	-16.117	+32.295
11:14:33	+65.567	-16.056	+32.295
11:14:43	+65.567	-16.056	+32.234
11:14:53	+65.689	-15.995	+32.295
11:15:03	+65.689	-15.934	+32.295
11:15:13	+65.750	-15.873	+32.295
11:15:23	+65.811	-15.811	+32.295
11:15:33	+65.873	-15.811	+32.295
11:15:43	+65.934	-15.750	+32.295
11:15:53	+65.934	-15.628	+32.295
11:16:03	+65.995	-15.567	+32.295
11:16:13	+65.995	-15.567	+32.295
11:16:23	+66.056	-15.567	+32.295
11:16:33	+66.117	-15.445	+32.295
11:16:43	+66.178	-15.323	+32.295
11:16:53	+66.178	-15.323	+32.295
11:17:03	+66.239	-15.323	+32.295
11:17:13	+66.300	-15.201	+32.295
11:17:23	+66.300	-15.140	+32.295
11:17:33	+66.361	-15.079	+32.295
11:17:43	+66.422	-15.079	+32.295
11:17:53	+66.422	-14.957	+32.295
11:18:03	+66.483	-14.896	+32.295
11:18:13	+66.544	-14.896	+32.295
11:18:23	+66.544	-14.774	+32.295
11:18:33	+66.605	-14.713	+32.295
11:18:43	+66.605	-14.713	+32.295
11:18:53	+66.666	-14.652	+32.295
11:19:03	+66.666	-14.529	+32.295
11:19:13	+66.727	-14.529	+32.295
11:19:23	+66.788	-14.468	+32.295
11:19:33	+66.788	-14.407	+32.295
11:19:43	+66.788	-14.407	+32.295
11:19:53	+66.849	-14.285	+32.295
11:20:03	+66.910	-14.285	+32.295
11:20:13	+66.910	-14.102	+32.295
11:20:23	+66.971	-14.102	+32.295
11:20:33	+66.971	-14.163	+32.295
11:20:43	+67.032	-14.041	+32.295
11:20:53	+67.032	-14.041	+32.295

11:21:03	+67.094	-13.919	+32.295
11:21:13	+67.094	-13.858	+32.295
11:21:23	+67.155	-13.797	+32.295
11:21:33	+67.155	-13.797	+32.295
11:21:43	+67.216	-13.736	+32.295
11:21:53	+67.277	-13.614	+32.295
11:22:03	+67.277	-13.614	+32.295
11:22:13	+67.338	-13.553	+32.295
11:22:23	+67.338	-13.492	+32.295
11:22:33	+67.399	-13.431	+32.295
11:22:43	+67.399	-13.492	+32.295
11:22:53	+67.460	-13.369	+32.295
11:23:03	+68.009	-13.308	+32.295
11:23:13	+68.803	-13.308	+32.295
11:23:23	+68.620	-13.186	+32.295
11:23:33	+69.291	-13.125	+32.295
11:23:43	+69.841	-13.125	+32.295
11:23:53	+70.329	-13.064	+32.295
11:24:03	+70.695	-13.064	+32.295
11:24:13	+71.062	-13.003	+32.295
11:24:23	+71.367	-12.942	+32.295
11:24:33	+71.611	-12.820	+32.295
11:24:43	+71.794	-12.881	+32.295
11:24:53	+71.916	-12.820	+32.295
11:25:03	+72.100	-12.759	+32.295
11:25:13	+72.222	-12.759	+32.295
11:25:23	+72.344	-12.576	+32.295
11:25:33	+72.405	-12.637	+32.295
11:25:43	+72.527	-12.576	+32.295
11:25:53	+72.588	-12.515	+32.295
11:26:03	+72.588	-12.454	+32.295
11:26:13	+72.649	-12.454	+32.295
11:26:23	+72.588	-12.393	+32.295
11:26:33	+72.649	-12.271	+32.295
11:26:43	+72.710	-12.332	+32.295
11:26:53	+72.771	-12.148	+32.295
11:27:03	+72.771	-12.210	+32.295
11:27:13	+72.832	-12.210	+32.295
11:27:23	+72.893	-12.087	+32.295
11:27:33	+72.954	-12.087	+32.295
11:27:43	+72.954	-12.026	+32.295
11:27:53	+73.015	-11.965	+32.295
11:28:03	+73.076	-12.087	+32.295
11:28:13	+73.076	-11.965	+32.295
11:28:23	+73.137	-11.843	+32.295
11:28:33	+73.137	-11.843	+32.295
11:28:43	+73.199	-11.782	+32.295
11:28:53	+73.260	-11.782	+32.295
11:29:03	+73.260	-11.721	+32.295
11:29:13	+73.321	-11.660	+32.295
11:29:23	+73.321	-11.660	+32.295
11:29:33	+73.382	-11.599	+32.295
11:29:43	+73.382	-11.599	+32.295
11:29:53	+73.382	-11.538	+32.295
11:30:03	+73.443	-11.599	+32.295
11:30:13	+73.504	-11.416	+32.295
11:30:23	+73.504	-11.416	+32.295
11:30:33	+73.565	-11.416	+32.295
11:30:43	+73.565	-11.355	+32.295
11:30:53	+73.626	-11.355	+32.295
11:31:03	+73.626	-11.172	+32.295
11:31:13	+73.687	-11.233	+32.295
11:31:23	+73.687	-11.172	+32.295
11:31:33	+73.748	-11.233	+32.295
11:31:43	+73.748	-11.172	+32.295
11:31:53	+73.748	-11.111	+32.295
11:32:03	+73.809	-10.989	+32.295
11:32:13	+73.809	-10.927	+32.295
11:32:23	+73.870	-10.927	+32.295
11:32:33	+73.931	-10.866	+32.295
11:32:43	+73.931	-10.866	+32.295
11:32:53	+73.931	-10.805	+32.295
11:33:03	+73.992	-10.683	+32.295
11:33:13	+74.053	-10.744	+32.295
11:33:23	+74.053	-10.744	+32.295
11:33:33	+74.114	-10.683	+32.295
11:33:43	+74.175	-10.683	+32.295
11:33:53	+74.236	-10.561	+32.295
11:34:03	+74.236	-10.683	+32.295
11:34:13	+74.236	-10.561	+32.295
11:34:23	+74.358	-10.500	+32.295
11:34:33	+74.358	-10.500	+32.295
11:34:43	+74.358	-10.439	+32.295
11:34:53	+74.420	-10.378	+32.295
11:35:03	+74.420	-10.439	+32.295
11:35:13	+74.481	-10.378	+32.295
11:35:23	+74.481	-10.317	+32.295
11:35:33	+74.481	-10.317	+32.295
11:35:43	+74.542	-10.256	+32.295
11:35:53	+74.603	-10.195	+32.295

11:36:03	+74.603	-10.134	+32.295
11:36:13	+74.664	-10.134	+32.295
11:36:23	+74.664	-10.195	+32.295
11:36:33	+74.725	-10.073	+32.295
11:36:43	+74.725	-10.012	+32.295
11:36:53	+74.786	-10.012	+32.295
11:37:03	+74.786	-9.8901	+32.295
11:37:13	+74.847	-9.9511	+32.295
11:37:23	+74.847	-9.8901	+32.295
11:37:33	+74.847	-9.8290	+32.295
11:37:43	+74.908	-9.7680	+32.295
11:37:53	+74.969	-9.7069	+32.295
11:38:03	+74.969	-9.7069	+32.295
11:38:13	+75.030	-9.5848	+32.295
11:38:23	+75.030	-9.5848	+32.295
11:38:33	+75.030	-9.5848	+32.295
11:38:43	+75.091	-9.5238	+32.295
11:38:53	+75.091	-9.4627	+32.295
11:39:03	+75.152	-9.3406	+32.295
11:39:13	+75.152	-9.3406	+32.295
11:39:23	+75.213	-9.2796	+32.295
11:39:33	+75.213	-9.2185	+32.295
11:39:43	+75.213	-9.2185	+32.295
11:39:53	+75.274	-9.1575	+32.295
11:40:03	+75.335	-9.0964	+32.295
11:40:13	+75.335	-9.0354	+32.295
11:40:23	+75.335	-8.9743	+32.295
11:40:33	+75.396	-8.9743	+32.295
11:40:43	+75.457	-8.9133	+32.295
11:40:53	+75.518	-8.8522	+32.295
11:41:03	+75.518	-8.7912	+32.295
11:41:13	+75.518	-8.7301	+32.295
11:41:23	+75.579	-8.6691	+32.295
11:41:33	+75.579	-8.6080	+32.295
11:41:43	+75.641	-8.6691	+32.295
11:41:53	+75.641	-8.6080	+32.295
11:42:03	+75.702	-8.5470	+32.295
11:42:13	+75.702	-8.4249	+32.295
11:42:23	+75.763	-8.4249	+32.295
11:42:33	+75.763	-8.4249	+32.295
11:42:43	+75.763	-8.4249	+32.295
11:42:53	+75.824	-8.3638	+32.295
11:43:03	+75.824	-8.2417	+32.295
11:43:13	+75.885	-8.2417	+32.295
11:43:23	+75.946	-8.1196	+32.295
11:43:33	+75.946	-8.1196	+32.295
11:43:43	+75.946	-8.0586	+32.295
11:43:53	+76.007	-8.0586	+32.295
11:44:03	+76.007	-7.9975	+32.295
11:44:13	+76.007	-7.9975	+32.295
11:44:23	+76.068	-7.8144	+32.295
11:44:33	+76.068	-7.8144	+32.295
11:44:43	+76.129	-7.8144	+32.295
11:44:53	+76.129	-7.7533	+32.295
11:45:03	+76.190	-7.6923	+32.295
11:45:13	+76.251	-7.6312	+32.295
11:45:23	+76.251	-7.6312	+32.295
11:45:33	+76.251	-7.5091	+32.295
11:45:43	+76.312	-7.5702	+32.295
11:45:53	+76.373	-7.4481	+32.295
11:46:03	+76.373	-7.4481	+32.295
11:46:13	+76.373	-7.3870	+32.295
11:46:23	+76.373	-7.3260	+32.295
11:46:33	+76.434	-7.3260	+32.295
11:46:43	+76.434	-7.2039	+32.295
11:46:53	+76.434	-7.2039	+32.295
11:47:03	+76.495	-7.2039	+32.295
11:47:13	+76.495	-7.1428	+32.234
11:47:23	+76.495	-7.1428	+32.234
11:47:33	+76.556	-7.0818	+32.295
11:47:43	+76.556	-6.9597	+32.295
11:47:53	+76.617	-6.9597	+32.234
11:48:03	+76.617	-6.9597	+32.234
11:48:13	+76.617	-6.8986	+32.295
11:48:23	+76.678	-6.7765	+32.295
11:48:33	+76.678	-6.7765	+32.234
11:48:43	+76.739	-6.7155	+32.234
11:48:53	+76.739	-6.6544	+32.234
11:49:03	+76.862	-6.6544	+32.295
11:49:13	+76.862	-6.5934	+32.295
11:49:23	+76.800	-6.5323	+32.234
11:49:33	+76.862	-6.5323	+32.234
11:49:43	+76.862	-6.5323	+32.234
11:49:53	+76.923	-6.4102	+32.234
11:50:03	+76.923	-6.4102	+32.295
11:50:13	+76.984	-6.3492	+32.295
11:50:23	+76.984	-6.3492	+32.295
11:50:33	+76.984	-6.2881	+32.295
11:50:43	+77.045	-6.2271	+32.295
11:50:53	+77.106	-6.1660	+32.295

11:51:03	+77.106	-6.1050	+32.295
11:51:13	+77.106	-6.1050	+32.295
11:51:23	+77.106	-6.0439	+32.295
11:51:33	+77.106	-6.1050	+32.295
11:51:43	+77.167	-5.9829	+32.295
11:51:53	+77.228	-5.9218	+32.295
11:52:03	+77.228	-5.9829	+32.295
11:52:13	+77.228	-5.7997	+32.295
11:52:23	+77.289	-5.8608	+32.234
11:52:33	+77.289	-5.7387	+32.295
11:52:43	+77.350	-5.7387	+32.295
11:52:53	+77.350	-5.7387	+32.295
11:53:03	+77.411	-5.6166	+32.295
11:53:13	+77.411	-5.5555	+32.295
11:53:23	+77.411	-5.5555	+32.295
11:53:33	+77.472	-5.4945	+32.295
11:53:43	+77.472	-5.4334	+32.295
11:53:53	+77.472	-5.4334	+32.295
11:54:03	+77.533	-5.4334	+32.234
11:54:13	+77.533	-5.3724	+32.295
11:54:23	+77.533	-5.3113	+32.295
11:54:33	+77.594	-5.2503	+32.234
11:54:43	+77.594	-5.2503	+32.295
11:54:53	+77.655	-5.1892	+32.234
11:55:03	+77.655	-5.1892	+32.234
11:55:13	+77.716	-5.1282	+32.234
11:55:23	+77.716	-5.0671	+32.234
11:55:33	+77.777	-5.0061	+32.234
11:55:43	+77.777	-5.0671	+32.234
11:55:53	+77.838	-4.9450	+32.234
11:56:03	+77.838	-4.9450	+32.295
11:56:13	+77.899	-4.8229	+32.295
11:56:23	+77.899	-4.7008	+32.295
11:56:33	+77.899	-4.7619	+32.295
11:56:43	+77.960	-4.7008	+32.295
11:56:53	+78.021	-4.7008	+32.295
11:57:03	+78.021	-4.6398	+32.295
11:57:13	+78.021	-4.6398	+32.295
11:57:23	+78.083	-4.5787	+32.295
11:57:33	+78.144	-4.3956	+32.295
11:57:43	+78.144	-4.5177	+32.295
11:57:53	+78.144	-4.3956	+32.295
11:58:03	+78.205	-4.4566	+32.295
11:58:13	+78.205	-4.4566	+32.295
11:58:23	+78.205	-4.3345	+32.295
11:58:33	+78.266	-4.2735	+32.295
11:58:43	+78.327	-4.2735	+32.295
11:58:53	+78.327	-4.2735	+32.234
11:59:03	+78.327	-4.2735	+32.234
11:59:13	+78.327	-4.1514	+32.234
11:59:23	+78.388	-4.0903	+32.234
11:59:33	+78.388	-4.0293	+32.234
11:59:43	+78.449	-3.9072	+32.234
11:59:53	+78.449	-4.0293	+32.234
12:00:03	+78.510	-3.9072	+32.234
12:00:13	+78.510	-3.9682	+32.234
12:00:23	+78.571	-3.9072	+32.234
12:00:33	+78.571	-3.8461	+32.234
12:00:43	+78.571	-3.9072	+32.234
12:00:53	+78.632	-3.7240	+32.234
12:01:03	+78.632	-3.7240	+32.295
12:01:13	+78.693	-3.8461	+32.234
12:01:23	+78.693	-3.6630	+32.234
12:01:33	+78.693	-3.6630	+32.234
12:01:43	+78.754	-3.6019	+32.234
12:01:53	+78.754	-3.5409	+32.234
12:02:03	+78.815	-3.4798	+32.295
12:02:13	+78.815	-3.4188	+32.295
12:02:23	+78.876	-3.4188	+32.295
12:02:33	+78.876	-3.4188	+32.295
12:02:43	+78.876	-3.4798	+32.234
12:02:53	+78.937	-3.3577	+32.295
12:03:03	+78.937	-3.2967	+32.295
12:03:13	+78.937	-3.3577	+32.234
12:03:23	+78.998	-3.2967	+32.295
12:03:33	+78.998	-3.1746	+32.295
12:03:43	+78.998	-3.1746	+32.295
12:03:53	+78.998	-3.1135	+32.234
12:04:03	+78.998	-3.0525	+32.234
12:04:13	+79.059	-3.1746	+32.234
12:04:23	+79.059	-2.9914	+32.295
12:04:33	+79.059	-2.9914	+32.295
12:04:43	+79.120	-2.9304	+32.234
12:04:53	+79.120	-2.8693	+32.295
12:05:03	+79.181	-2.8693	+32.295
12:05:13	+79.242	-2.8083	+32.295
12:05:23	+79.242	-2.7472	+32.234
12:05:33	+79.304	-2.8083	+32.234
12:05:43	+79.304	-2.7472	+32.234
12:05:53	+79.304	-2.6251	+32.295

12:06:03	+79.365	-2.5030	+32.234
12:06:13	+79.365	-2.6251	+32.234
12:06:23	+79.426	-2.5641	+32.295
12:06:33	+79.426	-2.5030	+32.295
12:06:43	+79.426	-2.5641	+32.295
12:06:53	+79.548	-2.3809	+32.295
12:07:03	+79.487	-2.3809	+32.295
12:07:13	+79.548	-2.3809	+32.234
12:07:23	+79.548	-2.3199	+32.295
12:07:33	+79.609	-2.3199	+32.295
12:07:43	+79.609	-2.2588	+32.234
12:07:53	+79.670	-2.3199	+32.295
12:08:03	+79.670	-2.2588	+32.234
12:08:13	+79.731	-2.1367	+32.295
12:08:23	+79.731	-2.1367	+32.234
12:08:33	+79.792	-2.0757	+32.295
12:08:43	+79.792	-2.0757	+32.234
12:08:53	+79.853	-1.9536	+32.295
12:09:03	+79.853	-2.0757	+32.234
12:09:13	+79.853	-1.9536	+32.234
12:09:23	+79.914	-2.0757	+32.234
12:09:33	+79.914	-1.9536	+32.295
12:09:43	+79.975	-1.8925	+32.234
12:09:53	+79.975	-1.9536	+32.234
12:10:03	+80.036	-1.8925	+32.234
12:10:13	+80.036	-1.8315	+32.234
12:10:23	+80.036	-1.8315	+32.234
12:10:33	+80.097	-1.7094	+32.234
12:10:43	+80.097	-1.7094	+32.234
12:10:53	+80.158	-1.6483	+32.295
12:11:03	+80.158	-1.7094	+32.295
12:11:13	+80.219	-1.5873	+32.234
12:11:23	+80.219	-1.5873	+32.234
12:11:33	+80.280	-1.5873	+32.234
12:11:43	+80.280	-1.5262	+32.234
12:11:53	+80.280	-1.5262	+32.234
12:12:03	+80.280	-1.5262	+32.234
12:12:13	+80.341	-1.5262	+32.234
12:12:23	+80.341	-1.4041	+32.234
12:12:33	+80.402	-1.3431	+32.295
12:12:43	+80.402	-1.4041	+32.234
12:12:53	+80.463	-1.3431	+32.295
12:13:03	+80.463	-1.3431	+32.234
12:13:13	+80.525	-1.3431	+32.234
12:13:23	+80.525	-1.2820	+32.234
12:13:33	+80.525	-1.2210	+32.234
12:13:43	+80.586	-1.1599	+32.234
12:13:53	+80.586	-1.0378	+32.234
12:14:03	+80.647	-1.0378	+32.295
12:14:13	+80.647	-1.0989	+32.234
12:14:23	+80.647	-1.0989	+32.234
12:14:33	+80.708	-1.0378	+32.234
12:14:43	+80.708	-1.0989	+32.234
12:14:53	+80.769	-1.0378	+32.234
12:15:03	+80.769	-1.1599	+32.234
12:15:13	+80.830	-0.9768	+32.234
12:15:23	+80.830	-1.0378	+32.234
12:15:33	+80.891	-0.9157	+32.234
12:15:43	+80.891	-0.8547	+32.234
12:15:53	+80.952	-0.8547	+32.234
12:16:03	+80.952	-0.8547	+32.234
12:16:13	+80.952	-0.7936	+32.234
12:16:23	+81.013	-0.8547	+32.234
12:16:33	+81.013	-0.7936	+32.234
12:16:43	+81.074	-0.7326	+32.234
12:16:53	+81.074	-0.7936	+32.234
12:17:03	+81.074	-0.8547	+32.234
12:17:13	+81.074	-0.6715	+32.234
12:17:23	+81.135	-0.6715	+32.234
12:17:33	+81.135	-0.7326	+32.234
12:17:43	+81.196	-0.6105	+32.234
12:17:53	+81.196	-0.4884	+32.234
12:18:03	+81.196	-0.6105	+32.234
12:18:13	+81.196	-0.6105	+32.234
12:18:23	+81.257	-0.5494	+32.234
12:18:33	+81.257	-0.5494	+32.234
12:18:43	+81.257	-0.4884	+32.234
12:18:53	+81.257	-0.5494	+32.234
12:19:03	+81.318	-0.4273	+32.234
12:19:13	+81.379	-0.4884	+32.234
12:19:23	+81.379	-0.3663	+32.295
12:19:33	+81.379	-0.4273	+32.234
12:19:43	+81.379	-0.3663	+32.234
12:19:53	+81.440	-0.3663	+32.234
12:20:03	+81.440	-0.2442	+32.234
12:20:13	+81.440	-0.2442	+32.234
12:20:23	+81.440	-0.3663	+32.234
12:20:33	+81.440	-0.2442	+32.234
12:20:43	+81.440	-0.2442	+32.234
12:20:53	+81.501	-0.2442	+32.234

12:21:03	+81.501	-0.1831	+32.234
12:21:13	+81.501	-0.1221	+32.234
12:21:23	+81.501	-0.1221	+32.234
12:21:33	+81.562	-0.1221	+32.234
12:21:43	+81.562	-0.0610	+32.234
12:21:53	+81.562	-0.0000	+32.234
12:22:03	+81.623	-0.0610	+32.234
12:22:13	+81.623	-0.0000	+32.234
12:22:23	+81.684	+0.1221	+32.295
12:22:33	+81.746	+0.0610	+32.295
12:22:43	+81.684	-0.0000	+32.234
12:22:53	+81.868	+0.0610	+32.234
12:23:03	+81.746	+0.0610	+32.234
12:23:13	+81.746	+0.1831	+32.234
12:23:23	+81.746	+0.1831	+32.234
12:23:33	+81.746	+0.1221	+32.234
12:23:43	+81.807	+0.1831	+32.234
12:23:53	+81.807	+0.1831	+32.234
12:24:03	+81.807	+0.2442	+32.234
12:24:13	+81.807	+0.2442	+32.234
12:24:23	+81.868	+0.2442	+32.234
12:24:33	+81.868	+0.3052	+32.234
12:24:43	+81.929	+0.3663	+32.295
12:24:53	+81.868	+0.3052	+32.234
12:25:03	+81.868	+0.3052	+32.234
12:25:13	+81.929	+0.3663	+32.234
12:25:23	+81.929	+0.3663	+32.234
12:25:33	+81.929	+0.4273	+32.234
12:25:43	+81.929	+0.4273	+32.234
12:25:53	+81.990	+0.4273	+32.234
12:26:03	+81.990	+0.4273	+32.234
12:26:13	+81.990	+0.4884	+32.234
12:26:23	+81.990	+0.4884	+32.234
12:26:33	+82.051	+0.6105	+32.295
12:26:43	+82.051	+0.5494	+32.234
12:26:53	+82.051	+0.5494	+32.295
12:27:03	+82.112	+0.6105	+32.295
12:27:13	+82.112	+0.6105	+32.295
12:27:23	+82.112	+0.6715	+32.295
12:27:33	+82.112	+0.6715	+32.295
12:27:43	+82.173	+0.7326	+32.295
12:27:53	+82.173	+0.6715	+32.295
12:28:03	+82.234	+0.7936	+32.295
12:28:13	+82.234	+0.7326	+32.295
12:28:23	+82.234	+0.7936	+32.295
12:28:33	+82.295	+0.8547	+32.295
12:28:43	+82.295	+0.7936	+32.295
12:28:53	+82.295	+0.7936	+32.295
12:29:03	+82.295	+0.8547	+32.295
12:29:13	+82.295	+0.7936	+32.295
12:29:23	+82.295	+0.8547	+32.295
12:29:33	+82.295	+0.8547	+32.295
12:29:43	+82.356	+0.8547	+32.295
12:29:53	+82.356	+0.9157	+32.295
12:30:03	+82.356	+0.8547	+32.295
12:30:13	+82.417	+0.9768	+32.295
12:30:23	+82.417	+0.9768	+32.295
12:30:33	+82.417	+0.9768	+32.295
12:30:43	+82.417	+0.9768	+32.295
12:30:53	+82.478	+0.9768	+32.295
12:31:03	+82.478	+1.0378	+32.295
12:31:13	+82.478	+0.9768	+32.295
12:31:23	+82.478	+1.0378	+32.295
12:31:33	+82.478	+1.0378	+32.295
12:31:43	+82.478	+1.0989	+32.295
12:31:53	+82.478	+1.0989	+32.295
12:32:03	+82.539	+1.1599	+32.295
12:32:13	+82.539	+1.0989	+32.295
12:32:23	+82.539	+1.1599	+32.295
12:32:33	+82.539	+1.1599	+32.295
12:32:43	+82.539	+1.0989	+32.295
12:32:53	+82.600	+1.0989	+32.295
12:33:03	+82.600	+1.1599	+32.295
12:33:13	+82.600	+1.2210	+32.295
12:33:23	+82.600	+1.3431	+32.295
12:33:33	+82.600	+1.2210	+32.295
12:33:43	+82.661	+1.2210	+32.295
12:33:53	+82.661	+1.2820	+32.295
12:34:03	+82.661	+1.3431	+32.295
12:34:13	+82.661	+1.2820	+32.295
12:34:23	+82.661	+1.4041	+32.295
12:34:33	+82.661	+1.3431	+32.295
12:34:43	+82.722	+1.3431	+32.295
12:34:53	+82.722	+1.3431	+32.295
12:35:03	+82.722	+1.3431	+32.234
12:35:13	+82.722	+1.3431	+32.295
12:35:23	+82.722	+1.4041	+32.295
12:35:33	+82.783	+1.4041	+32.295
12:35:43	+82.783	+1.4041	+32.295
12:35:53	+82.783	+1.4652	+32.295

12:36:03	+82.783	+1.4041	+32.234
12:36:13	+82.783	+1.4041	+32.295
12:36:23	+82.844	+1.4652	+32.295
12:36:33	+82.844	+1.5262	+32.295
12:36:43	+82.844	+1.4652	+32.295
12:36:53	+82.844	+1.4652	+32.295
12:37:03	+82.905	+1.5262	+32.295
12:37:13	+82.905	+1.5262	+32.295
12:37:23	+82.905	+1.5262	+32.295
12:37:33	+82.905	+1.5262	+32.295
12:37:43	+82.967	+1.5262	+32.295
12:37:53	+82.905	+1.5873	+32.234
12:38:03	+82.967	+1.5873	+32.234
12:38:13	+82.967	+1.7094	+32.295
12:38:23	+82.967	+1.6483	+32.234
12:38:33	+82.967	+1.6483	+32.295
12:38:43	+83.028	+1.5873	+32.234
12:38:53	+83.028	+1.5262	+32.234
12:39:03	+83.028	+1.7094	+32.295
12:39:13	+83.150	+1.6483	+32.295
12:39:23	+83.089	+1.7094	+32.295
12:39:33	+83.089	+1.7094	+32.234
12:39:43	+83.089	+1.7094	+32.234
12:39:53	+83.150	+1.7094	+32.234
12:40:03	+83.150	+1.7094	+32.234
12:40:13	+83.150	+1.7704	+32.295
12:40:23	+83.211	+1.7704	+32.234
12:40:33	+83.211	+1.7704	+32.234
12:40:43	+83.211	+1.8315	+32.234
12:40:53	+83.272	+1.7094	+32.234
12:41:03	+83.272	+1.8925	+32.234
12:41:13	+83.333	+1.7704	+32.234
12:41:23	+83.333	+1.7094	+32.234
12:41:33	+83.394	+1.8925	+32.295
12:41:43	+83.394	+1.8315	+32.295
12:41:53	+83.394	+1.8315	+32.295
12:42:03	+83.455	+1.8925	+32.295
12:42:13	+83.455	+1.8925	+32.295
12:42:23	+83.516	+1.8925	+32.234
12:42:33	+83.516	+1.8315	+32.234
12:42:43	+83.577	+1.8925	+32.234
12:42:53	+83.577	+1.8315	+32.234
12:43:03	+83.577	+1.8315	+32.234
12:43:13	+83.638	+1.8925	+32.234
12:43:23	+83.638	+1.9536	+32.234
12:43:33	+83.699	+1.9536	+32.234
12:43:43	+83.699	+2.0146	+32.234
12:43:53	+83.699	+2.0146	+32.234
12:44:03	+83.760	+1.9536	+32.295
12:44:13	+83.760	+1.9536	+32.234
12:44:23	+83.821	+1.9536	+32.234
12:44:33	+83.821	+2.0146	+32.234
12:44:43	+83.821	+2.0757	+32.295
12:44:53	+83.882	+2.0146	+32.234
12:45:03	+83.882	+2.0757	+32.295
12:45:13	+83.882	+2.0757	+32.234
12:45:23	+83.943	+2.0757	+32.234
12:45:33	+83.943	+2.0146	+32.234
12:45:43	+84.065	+2.0757	+32.295
12:45:53	+83.943	+2.0757	+32.234
12:46:03	+84.065	+2.1978	+32.295
12:46:13	+84.004	+2.0757	+32.173
12:46:23	+84.065	+2.1367	+32.295
12:46:33	+84.126	+2.1367	+32.234
12:46:43	+84.065	+2.1367	+32.234
12:46:53	+84.126	+2.1367	+32.234
12:47:03	+84.126	+2.1367	+32.173
12:47:13	+84.126	+2.1367	+32.173
12:47:23	+84.249	+2.2588	+32.295
12:47:33	+84.249	+2.2588	+32.234
12:47:43	+84.310	+2.1978	+32.234
12:47:53	+84.310	+2.2588	+32.234
12:48:03	+84.310	+2.1978	+32.234
12:48:13	+84.371	+2.2588	+32.234
12:48:23	+84.371	+2.2588	+32.234
12:48:33	+84.371	+2.1978	+32.173
12:48:43	+84.371	+2.1978	+32.173
12:48:53	+84.493	+2.3199	+32.234
12:49:03	+84.432	+2.1978	+32.173
12:49:13	+84.493	+2.1978	+32.173
12:49:23	+84.493	+2.1367	+32.173
12:49:33	+84.493	+2.1978	+32.173
12:49:43	+84.554	+2.2588	+32.173
12:49:53	+84.554	+2.2588	+32.173
12:50:03	+84.615	+2.2588	+32.173
12:50:13	+84.676	+2.3199	+32.234
12:50:23	+84.676	+2.3199	+32.234
12:50:33	+84.737	+2.3809	+32.234
12:50:43	+84.676	+2.3199	+32.173
12:50:53	+84.737	+2.3199	+32.173

12:51:03	+84.737	+2.3199	+32.234
12:51:13	+84.798	+2.3809	+32.234
12:51:23	+84.798	+2.3809	+32.173
12:51:33	+84.859	+2.4420	+32.234
12:51:43	+84.859	+2.4420	+32.234
12:51:53	+84.859	+2.4420	+32.234
12:52:03	+84.920	+2.5030	+32.234
12:52:13	+84.920	+2.5641	+32.234
12:52:23	+84.920	+2.4420	+32.234
12:52:33	+84.981	-2.4420	+32.234
12:52:43	+85.042	+2.4420	+32.234
12:52:53	+85.042	+2.4420	+32.173
12:53:03	+85.103	+2.5641	+32.234
12:53:13	+85.042	+2.5641	+32.234
12:53:23	+85.103	+2.5030	+32.234
12:53:33	+85.225	+2.5641	+32.234
12:53:43	+85.286	+2.5641	+32.234
12:53:53	+85.286	+2.5030	+32.234
12:54:03	+85.347	+2.5641	+32.234
12:54:13	+85.409	+2.5641	+32.234
12:54:23	+85.409	+2.5641	+32.234
12:54:33	+85.470	+2.5641	+32.234
12:54:43	+85.470	+2.5641	+32.234
12:54:53	+85.470	+2.5641	+32.234
12:55:03	+85.531	+2.5641	+32.173
12:55:13	+85.531	+2.6251	+32.234
12:55:23	+85.592	+2.6862	+32.234
12:55:33	+85.592	+2.6862	+32.234
12:55:43	+85.592	+2.7472	+32.234
12:55:53	+85.653	+2.8693	+32.234
12:56:03	+85.653	+2.9304	+32.173
12:56:13	+85.653	+3.1135	+32.234
12:56:23	+85.653	+3.2356	+32.173
12:56:33	+85.653	+3.2967	+32.234
12:56:43	+85.714	+3.4188	+32.234
12:56:53	+85.714	+3.5409	+32.234
12:57:03	+85.714	+3.6630	+32.234
12:57:13	+85.714	+3.7240	+32.173
12:57:23	+85.714	+3.7851	+32.234
12:57:33	+85.714	+4.0293	+32.234
12:57:43	+85.714	+4.1514	+32.234
12:57:53	+85.714	+4.2735	+32.234
12:58:03	+85.775	+4.3345	+32.234
12:58:13	+85.775	+4.5177	+32.234
12:58:23	+85.714	+4.6398	+32.173
12:58:33	+85.714	+4.6398	+32.173
12:58:43	+85.714	+4.7619	+32.173
12:58:53	+85.775	+4.9450	+32.234
12:59:03	+85.775	+5.0061	+32.234
12:59:13	+85.836	+5.1892	+32.234
12:59:23	+85.836	+5.2503	+32.234
12:59:33	+85.836	+5.3724	+32.234
12:59:43	+85.775	+5.4334	+32.173
12:59:53	+85.775	+5.4334	+32.173
13:00:03	+85.836	+5.6166	+32.173
13:00:13	+85.836	+5.7997	+32.173
13:00:23	+85.836	+5.7997	+32.173
13:00:33	+85.836	+5.8608	+32.173
13:00:43	+85.836	+5.9829	+32.173
13:00:53	+85.836	+6.0439	+32.173
13:01:03	+85.897	+6.0439	+32.173
13:01:13	+85.897	+6.2881	+32.173
13:01:23	+85.897	+6.3492	+32.173
13:01:33	+85.897	+6.3492	+32.173
13:01:43	+85.958	+6.5323	+32.173
13:01:53	+85.958	+6.7155	+32.173
13:02:03	+85.958	+6.7765	+32.173
13:02:13	+85.958	+6.7765	+32.173
13:02:23	+85.958	+6.8376	+32.173
13:02:33	+86.019	+6.9597	+32.173
13:02:43	+86.019	+7.0207	+32.173
13:02:53	+86.019	+7.0207	+32.173
13:03:03	+86.019	+7.0818	+32.173
13:03:13	+86.019	+7.2039	+32.173
13:03:23	+86.019	+7.2649	+32.173
13:03:33	+86.080	+7.3260	+32.173
13:03:43	+86.080	+7.3870	+32.173
13:03:53	+86.080	+7.4481	+32.173
13:04:03	+86.080	+7.4481	+32.173
13:04:13	+86.080	+7.5091	+32.173
13:04:23	+86.080	+7.6923	+32.173
13:04:33	+86.080	+7.7533	+32.173
13:04:43	+86.141	+7.8144	+32.173
13:04:53	+86.141	+7.8754	+32.173
13:05:03	+86.141	+7.8754	+32.173
13:05:13	+86.141	+8.0586	+32.173
13:05:23	+86.141	+8.1196	+32.173
13:05:33	+86.141	+8.1196	+32.173
13:05:43	+86.141	+8.2417	+32.173
13:05:53	+86.202	+8.3028	+32.173

13:06:03	+86.202	+8.3028	+32.173
13:06:13	+86.202	+8.4249	+32.173
13:06:23	+86.202	+8.4249	+32.173
13:06:33	+86.202	+8.4859	+32.173
13:06:43	+86.263	+8.6080	+32.173
13:06:53	+86.263	+8.6691	+32.173
13:07:03	+86.263	+8.7912	+32.173
13:07:13	+86.263	+8.6691	+32.173
13:07:23	+86.263	+8.7912	+32.173
13:07:33	+86.263	+8.9133	+32.173
13:07:43	+86.263	+8.9743	+32.173
13:07:53	+86.324	+8.9743	+32.173
13:08:03	+86.324	+9.0354	+32.173
13:08:13	+86.324	+9.0964	+32.173
13:08:23	+86.324	+9.1575	+32.173
13:08:33	+86.324	+9.2796	+32.173
13:08:43	+86.324	+9.3406	+32.173
13:08:53	+86.324	+9.4627	+32.173
13:09:03	+86.324	+9.5238	+32.173
13:09:13	+86.324	+9.5238	+32.173
13:09:23	+86.324	+9.5848	+32.173
13:09:33	+86.385	+9.7069	+32.173
13:09:43	+86.385	+9.6459	+32.173
13:09:53	+86.385	+9.7680	+32.173
13:10:03	+86.385	+9.7680	+32.173
13:10:13	+86.385	+9.8290	+32.173
13:10:23	+86.385	+9.9511	+32.173
13:10:33	+86.385	+9.9511	+32.173
13:10:43	+86.385	+10.073	+32.173
13:10:53	+86.446	+10.073	+32.173
13:11:03	+86.446	+10.195	+32.173
13:11:13	+86.446	+10.195	+32.173
13:11:23	+86.446	+10.317	+32.173
13:11:33	+86.446	+10.317	+32.173
13:11:43	+86.446	+10.317	+32.173
13:11:53	+86.507	+10.500	+32.173
13:12:03	+86.507	+10.561	+32.173
13:12:13	+86.507	+10.500	+32.173
13:12:23	+86.507	+10.622	+32.173
13:12:33	+86.568	+10.683	+32.173
13:12:43	+86.507	+10.927	+32.173
13:12:53	+86.507	+10.805	+32.173
13:13:03	+86.568	+10.927	+32.173
13:13:13	+86.568	+10.989	+32.173
13:13:23	+86.568	+10.989	+32.173
13:13:33	+86.568	+10.989	+32.173
13:13:43	+86.568	+11.050	+32.173
13:13:53	+86.568	+11.172	+32.173
13:14:03	+86.630	+11.294	+32.173
13:14:13	+86.630	+11.294	+32.173
13:14:23	+86.630	+11.416	+32.173
13:14:33	+86.630	+11.416	+32.173
13:14:43	+86.630	+11.538	+32.173
13:14:53	+86.691	+11.599	+32.173
13:15:03	+86.691	+11.721	+32.173
13:15:13	+86.691	+11.782	+32.173
13:15:23	+86.691	+11.721	+32.173
13:15:33	+86.691	+11.782	+32.173
13:15:43	+86.691	+11.843	+32.173
13:15:53	+86.691	+11.843	+32.173
13:16:03	+86.752	+11.904	+32.173
13:16:13	+86.752	+12.026	+32.173
13:16:23	+86.752	+11.904	+32.173
13:16:33	+86.752	+12.210	+32.173
13:16:43	+86.752	+12.087	+32.173
13:16:53	+86.752	+12.087	+32.173
13:17:03	+86.752	+12.210	+32.173
13:17:13	+86.813	+12.332	+32.173
13:17:23	+86.752	+12.332	+32.173
13:17:33	+86.752	+12.393	+32.173
13:17:43	+86.752	+12.454	+32.173
13:17:53	+86.752	+12.454	+32.173
13:18:03	+86.813	+12.576	+32.173
13:18:13	+86.813	+12.637	+32.173
13:18:23	+86.813	+12.698	+32.173
13:18:33	+86.813	+12.637	+32.173
13:18:43	+86.813	+12.759	+32.173
13:18:53	+86.813	+12.881	+32.173
13:19:03	+86.813	+12.881	+32.173
13:19:13	+86.813	+12.881	+32.173
13:19:23	+86.813	+13.003	+32.173
13:19:33	+86.813	+13.003	+32.173
13:19:43	+86.813	+13.125	+32.173
13:19:53	+86.813	+13.064	+32.173
13:20:03	+86.813	+13.247	+32.173
13:20:13	+86.813	+13.308	+32.173
13:20:23	+86.813	+13.308	+32.173
13:20:33	+86.813	+13.308	+32.173
13:20:43	+86.874	+13.369	+32.173
13:20:53	+86.874	+13.431	+32.173

13:21:03	+86.874	+13.431	+32.173
13:21:13	+86.874	+13.492	+32.173
13:21:23	+86.874	+13.553	+32.173
13:21:33	+86.874	+13.675	+32.173
13:21:43	+86.874	+13.736	+32.173
13:21:53	+86.874	+13.736	+32.173
13:22:03	+86.813	+13.797	+32.173
13:22:13	+86.874	+13.797	+32.173
13:22:23	+86.874	+13.858	+32.173
13:22:33	+86.813	+13.980	+32.173
13:22:43	+86.813	+13.980	+32.173
13:22:53	+86.813	+14.102	+32.173
13:23:03	+86.813	+14.041	+32.112
13:23:13	+86.935	+14.163	+32.173
13:23:23	+86.874	+14.224	+32.112
13:23:33	+86.874	+14.163	+32.112
13:23:43	+86.935	+14.346	+32.234
13:23:53	+86.874	+14.285	+32.112
13:24:03	+86.813	+14.346	+32.112
13:24:13	+86.874	+14.468	+32.173
13:24:23	+86.813	+14.468	+32.173
13:24:33	+86.813	+14.468	+32.173
13:24:43	+86.874	+14.529	+32.173
13:24:53	+86.874	+14.713	+32.234
13:25:03	+86.874	+14.713	+32.173
13:25:13	+86.874	+14.713	+32.173
13:25:23	+86.874	+14.713	+32.173
13:25:33	+86.935	+14.835	+32.173
13:25:43	+86.874	+14.896	+32.173
13:25:53	+86.874	+14.957	+32.173
13:26:03	+86.874	+15.018	+32.173
13:26:13	+86.935	+14.957	+32.173
13:26:23	+86.874	+15.140	+32.173
13:26:33	+86.874	+15.079	+32.173
13:26:43	+86.874	+15.140	+32.173
13:26:53	+86.874	+15.201	+32.173
13:27:03	+86.874	+15.262	+32.173
13:27:13	+86.874	+15.323	+32.173
13:27:23	+86.874	+15.323	+32.173
13:27:33	+86.874	+15.384	+32.173
13:27:43	+88.034	+5.7387	+32.173
13:27:53	+88.583	-0.3052	+32.173
13:28:03	+88.949	-4.6398	+32.234
13:28:13	+89.133	-7.7533	+32.234
13:28:23	+89.255	-10.317	+32.234
13:28:33	+89.072	-12.332	+32.234
13:28:43	+89.072	-13.919	+32.234
13:28:53	+89.072	-15.384	+32.234
13:29:03	+88.949	-15.873	+32.234
13:29:13	+88.888	-15.689	+32.234
13:29:23	+88.827	-15.628	+32.234
13:29:33	+88.766	-15.628	+32.173
13:29:43	+88.705	-15.567	+32.234
13:29:53	+88.644	-15.506	+32.173
13:30:03	+88.583	-15.445	+32.173
13:30:13	+88.583	-15.445	+32.173
13:30:23	+88.583	-15.323	+32.173
13:30:33	+88.522	-15.262	+32.173
13:30:43	+88.522	-15.201	+32.173
13:30:53	+88.522	-15.140	+32.173
13:31:03	+88.522	-15.079	+32.173
13:31:13	+88.522	-14.957	+32.173
13:31:23	+88.583	-14.957	+32.173
13:31:33	+88.583	-14.896	+32.173
13:31:43	+88.583	-14.774	+32.173
13:31:53	+88.583	-14.774	+32.173
13:32:03	+88.583	-14.713	+32.173
13:32:13	+88.583	-14.713	+32.173
13:32:23	+88.583	-14.590	+32.173
13:32:33	+88.583	-14.529	+32.173
13:32:43	+88.583	-14.529	+32.173
13:32:53	+88.644	-14.407	+32.173
13:33:03	+88.644	-14.407	+32.173
13:33:13	+88.644	-14.285	+32.173
13:33:23	+88.644	-14.163	+32.173
13:33:33	+88.644	-14.163	+32.173
13:33:43	+88.644	-14.102	+32.173
13:33:53	+88.644	-14.041	+32.173
13:34:03	+88.644	-13.980	+32.173
13:34:13	+88.705	-13.919	+32.173
13:34:23	+88.644	-13.858	+32.173
13:34:33	+88.705	-13.797	+32.173
13:34:43	+88.705	-13.797	+32.173
13:34:53	+88.705	-13.614	+32.173
13:35:03	+88.705	-13.614	+32.173
13:35:13	+88.705	-13.553	+32.173
13:35:23	+88.705	-13.492	+32.173
13:35:33	+88.705	-13.369	+32.173
13:35:43	+88.705	-13.308	+32.173
13:35:53	+88.705	-13.247	+32.173

13:36:03	+88.705	-13.186	+32.173
13:36:13	+88.766	-13.125	+32.173
13:36:23	+88.766	-13.064	+32.173
13:36:33	+88.766	-13.003	+32.173
13:36:43	+88.766	-12.942	+32.173
13:36:53	+88.766	-12.820	+32.173
13:37:03	+88.766	-12.820	+32.173
13:37:13	+88.766	-12.759	+32.173
13:37:23	+88.827	-12.637	+32.173
13:37:33	+88.766	-12.637	+32.173
13:37:43	+88.827	-12.576	+32.173
13:37:53	+88.827	-12.454	+32.173
13:38:03	+88.827	-12.454	+32.173
13:38:13	+88.827	-12.332	+32.173
13:38:23	+88.827	-12.271	+32.173
13:38:33	+88.827	-12.210	+32.173
13:38:43	+88.888	-12.148	+32.173
13:38:53	+88.888	-12.087	+32.173
13:39:03	+88.888	-12.026	+32.173
13:39:13	+88.888	-12.026	+32.173
13:39:23	+88.888	-11.904	+32.173
13:39:33	+88.888	-11.782	+32.173
13:39:43	+88.888	-11.782	+32.173
13:39:53	+88.888	-11.721	+32.173
13:40:03	+88.888	-11.599	+32.173
13:40:13	+88.949	-11.599	+32.173
13:40:23	+88.949	-11.477	+32.173
13:40:33	+88.949	-11.416	+32.173
13:40:43	+88.949	-11.355	+32.173
13:40:53	+88.949	-11.294	+32.173
13:41:03	+88.949	-11.233	+32.173
13:41:13	+88.949	-11.233	+32.173
13:41:23	+88.949	-11.111	+32.173
13:41:33	+89.010	-11.050	+32.173
13:41:43	+89.010	-10.989	+32.173
13:41:53	+89.010	-10.866	+32.173
13:42:03	+89.010	-10.866	+32.173
13:42:13	+89.010	-10.805	+32.173
13:42:23	+89.010	-10.744	+32.173
13:42:33	+89.010	-10.683	+32.173
13:42:43	+89.010	-10.622	+32.173
13:42:53	+89.010	-10.622	+32.173
13:43:03	+89.072	-10.500	+32.173
13:43:13	+89.010	-10.378	+32.173
13:43:23	+89.072	-10.439	+32.234
13:43:33	+89.133	-10.256	+32.234
13:43:43	+89.133	-10.195	+32.234
13:43:53	+89.133	-10.073	+32.234
13:44:03	+89.133	-10.012	+32.234
13:44:13	+89.133	-10.012	+32.173
13:44:23	+89.133	-9.9511	+32.234
13:44:33	+89.194	-9.8901	+32.234
13:44:43	+89.194	-9.8290	+32.234
13:44:53	+89.194	-9.7680	+32.234
13:45:03	+89.194	-9.6459	+32.234
13:45:13	+89.133	-9.6459	+32.173
13:45:23	+89.133	-9.7069	+32.173
13:45:33	+89.133	-9.5238	+32.173
13:45:43	+89.194	-9.4627	+32.234
13:45:53	+89.194	-9.3406	+32.234
13:46:03	+89.194	-9.2185	+32.234
13:46:13	+89.255	-9.2185	+32.234
13:46:23	+89.255	-9.1575	+32.234
13:46:33	+89.255	-9.1575	+32.234
13:46:43	+89.255	-9.0964	+32.234
13:46:53	+89.255	-8.9133	+32.234
13:47:03	+89.255	-8.8522	+32.234
13:47:13	+89.255	-8.7912	+32.234
13:47:23	+89.255	-8.7301	+32.173
13:47:33	+89.255	-8.6691	+32.234
13:47:43	+89.316	-8.6691	+32.234
13:47:53	+89.255	-8.6691	+32.173
13:48:03	+89.255	-8.6080	+32.173
13:48:13	+89.255	-8.5470	+32.173
13:48:23	+89.316	-8.4249	+32.234
13:48:33	+89.316	-8.3638	+32.234
13:48:43	+89.316	-8.3028	+32.234
13:48:53	+89.316	-8.2417	+32.234
13:49:03	+89.316	-8.1807	+32.234
13:49:13	+89.316	-8.1196	+32.234
13:49:23	+89.377	-8.0586	+32.234
13:49:33	+89.377	-7.9975	+32.234
13:49:43	+89.377	-7.9365	+32.234
13:49:53	+89.316	-7.8754	+32.234
13:50:03	+89.377	-7.8144	+32.234
13:50:13	+89.377	-7.7533	+32.234
13:50:23	+89.377	-7.6923	+32.234
13:50:33	+89.316	-7.6923	+32.173
13:50:43	+89.316	-7.6312	+32.173
13:50:53	+89.316	-7.6312	+32.173

13:51:03	+89.377 -7.5091 +32.234	14:06:03	+90.048 -8.9743 +32.234
13:51:13	+89.316 -7.5091 +32.173	14:06:13	+90.048 -8.9743 +32.234
13:51:23	+89.377 -7.3260 +32.234	14:06:23	+90.048 -8.8522 +32.234
13:51:33	+89.377 -7.3260 +32.234	14:06:33	+90.048 -8.8522 +32.234
13:51:43	+89.377 -7.2649 +32.234	14:06:43	+90.048 -8.7301 +32.234
13:51:53	+89.377 -7.0818 +32.234	14:06:53	+90.048 -8.7301 +32.234
13:52:03	+89.377 -7.0818 +32.234	14:07:03	+90.048 -8.7301 +32.173
13:52:13	+89.377 -6.8986 +32.234	14:07:13	+90.048 -8.7301 +32.173
13:52:23	+89.377 -6.9597 +32.234	14:07:23	+90.048 -8.6691 +32.234
13:52:33	+89.377 -6.8986 +32.234	14:07:33	+90.048 -8.6080 -0.9157
13:52:43	+89.377 -6.8376 +32.234	14:07:43	+90.048 -8.4859 +32.173
13:52:53	+89.377 -6.7765 +32.234	14:07:53	+90.048 -8.4859 +32.173
13:53:03	+89.438 -6.7765 +32.234	14:08:03	+90.048 -8.4859 +32.173
13:53:13	+89.377 -6.6544 +32.234	14:08:13	+89.926 -8.4249 +32.173
13:53:23	+89.377 -6.6544 +32.234	14:08:23	+89.926 -8.3638 +32.234
13:53:33	+89.438 -7.5091 +32.234	14:08:33	+89.926 -8.3028 +32.173
13:53:43	+89.560 -9.7680 +32.234	14:08:43	+89.926 -8.3028 +32.173
13:53:53	+89.560 -11.477 +32.234	14:08:53	+89.926 -8.3028 +32.173
13:54:03	+89.621 -12.454 +32.234	14:09:03	+89.926 -8.2417 +32.173
13:54:13	+89.560 -12.393 +32.173	14:09:13	+89.926 -8.1807 +32.173
13:54:23	+89.560 -12.332 +32.173	14:09:23	+89.926 -8.1807 +32.173
13:54:33	+89.560 -12.271 +32.173	14:09:33	+89.987 -8.1807 +32.173
13:54:43	+89.560 -12.210 +32.234	14:09:43	+89.926 -7.9975 +32.173
13:54:53	+89.560 -12.148 +32.173	14:09:53	+89.926 -7.9365 +32.234
13:55:03	+89.560 -12.087 +32.234	14:10:03	+89.926 -7.9975 +32.173
13:55:13	+89.560 -12.026 +32.234	14:10:13	+89.926 -7.9365 +32.173
13:55:23	+89.621 -11.965 +32.234	14:10:23	+89.926 -7.8144 +32.234
13:55:33	+89.560 -11.904 +32.234	14:10:33	+89.926 -7.8144 +32.173
13:55:43	+89.560 -11.904 +32.234	14:10:43	+89.926 -7.7533 +32.173
13:55:53	+89.560 -11.782 +32.234	14:10:53	+89.926 -7.6923 +32.173
13:56:03	+89.560 -11.782 +32.234	14:11:03	+89.926 -7.6312 +32.173
13:56:13	+89.560 -11.721 +32.234	14:11:13	+89.926 -7.6312 +32.173
13:56:23	+89.560 -11.721 +32.173	14:11:23	+89.926 -7.5702 +32.173
13:56:33	+89.621 -11.660 +32.234	14:11:33	+89.926 -7.5091 +32.173
13:56:43	+89.621 -11.538 +32.234	14:11:43	+89.926 -7.4481 +32.173
13:56:53	+89.621 -11.477 +32.234	14:11:53	+89.926 -7.4481 +32.173
13:57:03	+89.621 -11.477 +32.173	14:12:03	+89.926 -7.3870 +32.173
13:57:13	+89.621 -11.538 +32.234	14:12:13	+89.926 -7.2649 +32.173
13:57:23	+89.621 -11.416 +32.173	14:12:23	+89.926 -7.3260 +32.173
13:57:33	+89.682 -11.355 +32.173	14:12:33	+89.926 -7.2649 +32.173
13:57:43	+89.682 -11.294 +32.173	14:12:43	+89.926 -7.3260 +32.173
13:57:53	+89.682 -11.233 +32.234	14:12:53	+89.926 -7.2039 +32.173
13:58:03	+89.682 -11.233 +32.173	14:13:03	+89.926 -7.0818 +32.173
13:58:13	+89.682 -11.233 +32.234	14:13:13	+89.926 -7.0818 +32.173
13:58:23	+89.682 -11.111 +32.234	14:13:23	+89.926 -7.0818 +32.173
13:58:33	+89.682 -11.111 +32.234	14:13:33	+89.865 -7.0207 +32.173
13:58:43	+89.743 -10.989 +32.173	14:13:43	+89.926 -7.0207 +32.173
13:58:53	+89.743 -10.927 +32.173	14:13:53	+89.926 -6.9597 +32.173
13:59:03	+89.682 -10.927 +32.173	14:14:03	+89.865 -6.8986 +32.173
13:59:13	+89.743 -10.866 +32.173	14:14:13	+89.865 -6.8376 +32.173
13:59:23	+89.743 -10.805 +32.173	14:14:23	+89.865 -6.8986 +32.173
13:59:33	+89.743 -10.683 +32.173	14:14:33	+89.865 -6.7765 +32.173
13:59:43	+89.743 -10.744 +32.173	14:14:43	+89.865 -6.7155 +32.173
13:59:53	+89.743 -10.683 +32.173	14:14:53	+89.865 -6.7765 +32.173
14:00:03	+89.743 -10.683 +32.234	14:15:03	+89.865 -6.6544 +32.173
14:00:13	+89.743 -10.622 +32.173	14:15:13	+89.865 -6.5934 +32.173
14:00:23	+89.743 -10.561 +32.173	14:15:23	+89.865 -6.5323 +32.173
14:00:33	+89.743 -10.500 +32.173	14:15:33	+89.865 -6.4713 +32.173
14:00:43	+89.804 -10.500 +32.173	14:15:43	+89.865 -6.4102 +32.173
14:00:53	+89.804 -10.439 +32.173	14:15:53	+89.865 -6.4102 +32.173
14:01:03	+89.804 -10.378 +32.234	14:16:03	+89.865 -6.2881 +32.173
14:01:13	+89.804 -10.317 +32.234	14:16:13	+89.865 -6.2881 +32.173
14:01:23	+89.804 -10.317 +32.173	14:16:23	+89.865 -6.2881 +32.173
14:01:33	+89.804 -10.317 +32.173	14:16:33	+89.865 -6.1050 +32.173
14:01:43	+89.865 -10.134 +32.173	14:16:43	+90.048 -8.6080 +32.173
14:01:53	+89.865 -10.012 +32.234	14:16:53	+90.170 -10.561 +32.173
14:02:03	+89.865 -10.134 +32.173	14:17:03	+90.170 -11.233 +32.173
14:02:13	+89.865 -10.134 +32.234	14:17:13	+90.170 -11.111 +32.173
14:02:23	+89.865 -10.134 +32.234	14:17:23	+90.109 -11.111 +32.173
14:02:33	+89.865 -10.073 +32.234	14:17:33	+90.170 -11.111 +32.173
14:02:43	+89.865 -9.8901 +32.234	14:17:43	+90.170 -11.050 +32.173
14:02:53	+89.865 -9.8901 +32.173	14:17:53	+90.109 -11.050 +32.173
14:03:03	+89.926 -9.8290 +32.234	14:18:03	+90.170 -10.866 +32.173
14:03:13	+89.926 -9.7680 +32.234	14:18:13	+90.170 -10.805 +32.173
14:03:23	+89.926 -9.7680 +32.234	14:18:23	+90.170 -10.744 +32.173
14:03:33	+89.926 -9.7069 +32.234	14:18:33	+90.170 -10.683 +32.234
14:03:43	+89.926 -9.6459 +32.234	14:18:43	+90.231 -10.622 +32.173
14:03:53	+89.926 -9.5848 +32.234	14:18:53	+90.231 -10.622 +32.234
14:04:03	+89.987 -9.5848 +32.234	14:19:03	+90.231 -10.622 +32.173
14:04:13	+89.987 -9.5238 +32.234	14:19:13	+90.293 -10.561 +32.173
14:04:23	+89.987 -9.4017 +32.234	14:19:23	+90.293 -10.439 +32.234
14:04:33	+89.987 -9.4017 +32.234	14:19:33	+90.354 -10.378 +32.234
14:04:43	+89.987 -9.3406 +32.234	14:19:43	+90.354 -10.317 +32.234
14:04:53	+89.987 -9.3406 +32.234	14:19:53	+90.354 -10.317 +32.234
14:05:03	+89.987 -9.2796 +32.234	14:20:03	+90.415 -10.256 +32.234
14:05:13	+90.048 -9.2185 +32.234	14:20:13	+90.415 -10.195 +32.234
14:05:23	+90.048 -9.1575 +32.234	14:20:23	+90.415 -10.195 +32.234
14:05:33	+90.048 -9.0964 +32.173	14:20:33	+90.415 -10.134 +32.234
14:05:43	+90.048 -9.0964 +32.234	14:20:43	+90.476 -10.134 +32.234
14:05:53	+90.048 -9.0354 +32.234	14:20:53	+90.476 -9.9511 +32.234

14:21:03	+90.476 -9.9511 +32.234	14:36:03	+91.819 -9.7069 +32.173
14:21:13	+90.537 -9.9511 +32.173	14:36:13	+91.819 -9.6459 +32.173
14:21:23	+90.537 -9.8901 +32.173	14:36:23	+91.819 -9.5848 +32.173
14:21:33	+90.537 -9.8290 +32.234	14:36:33	+91.819 -9.5238 +32.173
14:21:43	+90.598 -9.8290 +32.234	14:36:43	+91.819 -9.4627 +32.173
14:21:53	+90.598 -9.7680 +32.234	14:36:53	+91.819 -9.5238 +32.173
14:22:03	+90.659 -9.6459 +32.234	14:37:03	+91.819 -9.4627 +32.173
14:22:13	+90.659 -9.6459 +32.234	14:37:13	+91.819 -9.4017 +32.173
14:22:23	+90.659 -9.6459 +32.234	14:37:23	+91.758 -9.3406 +32.173
14:22:33	+90.659 -9.5848 +32.173	14:37:33	+91.758 -9.2796 +32.173
14:22:43	+90.720 -9.5238 +32.234	14:37:43	+91.758 -9.2796 +32.173
14:22:53	+90.720 -9.4627 +32.173	14:37:53	+91.758 -9.2796 +32.173
14:23:03	+90.720 -9.4017 +32.173	14:38:03	+91.758 -9.2185 +32.173
14:23:13	+90.781 -9.4017 +32.234	14:38:13	+91.758 -9.1575 +32.173
14:23:23	+90.781 -9.3406 +32.173	14:38:23	+91.758 -9.0354 +32.173
14:23:33	+90.781 -9.2796 +32.173	14:38:33	+91.758 -9.0354 +32.173
14:23:43	+90.842 -9.2185 +32.234	14:38:43	+91.697 -9.0354 +32.173
14:23:53	+90.842 -9.2185 +32.234	14:38:53	+91.697 -8.9133 +32.173
14:24:03	+90.903 -9.1575 +32.234	14:39:03	+91.697 -8.8522 +32.173
14:24:13	+90.903 -9.1575 +32.173	14:39:13	+91.697 -8.8522 +32.173
14:24:23	+90.903 -9.0964 +32.173	14:39:23	+91.697 -8.8522 +32.173
14:24:33	+90.903 -9.1575 +32.173	14:39:33	+91.697 -8.7912 +32.173
14:24:43	+90.964 -8.9743 +32.234	14:39:43	+91.697 -8.6691 +32.173
14:24:53	+90.964 -8.9743 +32.234	14:39:53	+91.697 -8.7301 +32.173
14:25:03	+90.964 -8.9133 +32.173	14:40:03	+91.697 -8.6080 +32.173
14:25:13	+90.964 -8.9133 +32.173	14:40:13	+91.697 -8.6080 +32.173
14:25:23	+91.025 -8.8522 +32.173	14:40:23	+91.697 -8.5470 +32.173
14:25:33	+91.025 -8.7301 +32.173	14:40:33	+91.697 -8.4859 +32.173
14:25:43	+91.025 -8.7301 +32.234	14:40:43	+91.697 -8.4249 +32.173
14:25:53	+91.086 -8.6691 +32.234	14:40:53	+91.697 -8.3638 +32.234
14:26:03	+91.086 -8.6691 +32.173	14:41:03	+91.697 -8.3638 +32.234
14:26:13	+91.086 -8.5470 +32.173	14:41:13	+91.697 -8.3028 +32.234
14:26:23	+91.147 -8.5470 +32.173	14:41:23	+91.697 -8.3028 +32.173
14:26:33	+91.147 -8.5470 +32.173	14:41:33	+91.697 -8.2417 +32.234
14:26:43	+91.147 -8.4249 +32.234	14:41:43	+91.758 -8.2417 +32.234
14:26:53	+91.208 -8.3638 +32.234	14:41:53	+91.758 -8.1807 +32.234
14:27:03	+91.208 -8.3028 +32.173	14:42:03	+91.758 -8.1196 +32.234
14:27:13	+91.208 -8.3028 +32.173	14:42:13	+91.758 -8.0586 +32.234
14:27:23	+91.269 -8.3028 +32.234	14:42:23	+91.758 -7.9975 +32.234
14:27:33	+91.269 -8.2417 +32.234	14:42:33	+91.758 -7.9975 +32.234
14:27:43	+91.269 -8.1807 +32.234	14:42:43	+91.758 -7.9975 +32.234
14:27:53	+91.269 -8.1196 +32.234	14:42:53	+91.758 -7.8754 +32.234
14:28:03	+91.269 -8.1196 +32.234	14:43:03	+91.758 -7.8754 +32.234
14:28:13	+91.269 -8.0586 +32.173	14:43:13	+91.758 -7.7533 +32.234
14:28:23	+91.330 -7.9975 +32.234	14:43:23	+91.758 -7.7533 +32.173
14:28:33	+91.330 -7.9365 +32.173	14:43:33	+91.758 -7.6923 +32.234
14:28:43	+91.330 -7.8754 +32.234	14:43:43	+91.758 -7.6923 +32.173
14:28:53	+91.330 -7.9975 +32.173	14:43:53	+91.758 -7.6312 +32.173
14:29:03	+91.330 -7.8144 +32.173	14:44:03	+91.758 -7.5702 +32.173
14:29:13	+91.452 -7.8144 +32.173	14:44:13	+91.758 -7.5702 +32.173
14:29:23	+91.391 -7.6923 +32.173	14:44:23	+91.758 -7.5702 +32.173
14:29:33	+91.391 -7.7533 +32.173	14:44:33	+91.758 -7.4481 +32.173
14:29:43	+91.391 -7.6312 +32.173	14:44:43	+91.758 -7.4481 +32.173
14:29:53	+91.391 -7.6312 +32.173	14:44:53	+91.758 -7.3870 +32.173
14:30:03	+91.452 -7.5702 +32.173	14:45:03	+91.758 -7.3870 +32.173
14:30:13	+91.452 -7.6312 +32.173	14:45:13	+91.758 -7.3260 +32.173
14:30:23	+91.452 -7.5702 +32.173	14:45:23	+91.758 -7.2649 +32.173
14:30:33	+91.452 -7.4481 +32.234	14:45:33	+91.758 -7.2039 +32.173
14:30:43	+91.452 -7.3870 +32.173	14:45:43	+91.758 -7.1428 +32.173
14:30:53	+91.452 -7.3870 +32.234	14:45:53	+91.758 -7.1428 +32.173
14:31:03	+91.514 -7.3260 +32.234	14:46:03	+91.758 -7.0818 +32.173
14:31:13	+91.452 -7.3260 +32.173	14:46:13	+91.758 -7.0818 +32.173
14:31:23	+91.514 -7.2649 +32.173	14:46:23	+91.758 -7.1428 +32.173
14:31:33	+91.514 -7.2039 +32.234	14:46:33	+91.758 -7.0818 +32.173
14:31:43	+91.514 -7.1428 +32.173	14:46:43	+91.758 -6.9597 +32.173
14:31:53	+91.514 -7.0818 +32.173	14:46:53	+91.819 -7.3260 +32.173
14:32:03	+91.514 -7.0818 +32.173	14:47:03	+91.941 -9.3406 +32.173
14:32:13	+91.514 -7.0207 +32.173	14:47:13	+91.941 -9.5238 +32.173
14:32:23	+91.514 -6.9597 +32.173	14:47:23	+91.941 -9.5238 +32.173
14:32:33	+91.514 -6.8986 +32.173	14:47:33	+91.941 -9.4627 +32.173
14:32:43	+91.514 -6.9597 +32.173	14:47:43	+91.941 -9.4017 +32.173
14:32:53	+91.514 -6.8986 +32.173	14:47:53	+91.941 -9.4017 +32.173
14:33:03	+91.575 -6.8376 +32.173	14:48:03	+91.941 -9.3406 +32.173
14:33:13	+91.575 -6.8376 +32.173	14:48:13	+91.941 -9.2796 +32.173
14:33:23	+91.575 -6.8376 +32.173	14:48:23	+91.941 -9.2796 +32.173
14:33:33	+91.575 -6.8544 +32.173	14:48:33	+91.941 -9.1575 +32.173
14:33:43	+91.575 -6.5323 +32.234	14:48:43	+91.941 -9.1575 +32.173
14:33:53	+91.697 -8.3638 +32.234	14:48:53	+92.002 -9.0964 +32.173
14:34:03	+91.880 -10.256 +32.234	14:49:03	+92.002 -9.0964 +32.173
14:34:13	+91.819 -10.256 +32.173	14:49:13	+92.002 -9.0354 +32.173
14:34:23	+91.819 -10.195 +32.173	14:49:23	+92.002 -9.0354 +32.173
14:34:33	+91.758 -10.195 +32.173	14:49:33	+91.941 -8.6080 +32.112
14:34:43	+91.758 -10.073 +32.173	14:49:43	+91.880 -8.1196 +32.112
14:34:53	+91.819 -10.012 +32.173	14:49:53	+91.941 -7.8144 +32.173
14:35:03	+91.819 -10.012 +32.173	14:50:03	+91.941 -7.8754 +32.173
14:35:13	+91.819 -9.8901 +32.173	14:50:13	+91.941 -7.3870 +32.173
14:35:23	+91.819 -9.8901 +32.173	14:50:23	+91.819 -5.9218 +32.173
14:35:33	+91.819 -9.8901 +32.173	14:50:33	+91.636 -4.3956 +32.112
14:35:43	+91.819 -9.8290 +32.173	14:50:43	+91.697 -4.3956 +32.173
14:35:53	+91.819 -9.7069 +32.173	14:50:53	+91.697 -4.3956 +32.112

14:51:03	+91.575 -3.1135 +32.112	15:06:03	+90.659 -16.361 +32.112
14:51:13	+91.391 -1.3431 +32.112	15:06:13	+90.598 -16.361 +32.112
14:51:23	+91.391 -1.1599 +32.112	15:06:23	+90.598 -16.300 +32.112
14:51:33	+91.452 -1.4652 +32.112	15:06:33	+90.598 -16.300 +32.112
14:51:43	+91.391 -0.4273 +32.112	15:06:43	+90.598 -16.239 +32.173
14:51:53	+91.269 +1.3431 +32.112	15:06:53	+90.537 -16.239 +32.112
14:52:03	+91.208 +2.0146 +32.112	15:07:03	+90.537 -16.178 +32.112
14:52:13	+91.269 +1.5873 +32.112	15:07:13	+90.598 -16.117 +32.173
14:52:23	+91.208 +2.1367 +32.112	15:07:23	+90.537 -16.056 +32.173
14:52:33	+91.086 +3.7240 +32.173	15:07:33	+90.476 -16.056 +32.112
14:52:43	+90.964 +4.9450 +32.112	15:07:43	+90.476 -16.056 +32.112
14:52:53	+91.025 +4.5177 +32.112	15:07:53	+90.476 -15.995 +32.112
14:53:03	+91.025 +4.5177 +32.112	15:08:03	+90.476 -15.934 +32.112
14:53:13	+90.903 +5.9218 +32.112	15:08:13	+90.415 -15.995 +32.112
14:53:23	+90.720 +7.5702 +32.112	15:08:23	+90.415 -15.873 +32.112
14:53:33	+90.781 +7.1428 +32.173	15:08:33	+90.415 -15.873 +32.112
14:53:43	+90.842 +6.7765 +32.173	15:08:43	+90.415 -15.811 +32.112
14:53:53	+90.720 +7.9365 +32.173	15:08:53	+90.415 -15.750 +32.112
14:54:03	+90.293 +9.7069 +32.112	15:09:03	+90.354 -15.750 +32.112
14:54:13	+89.865 +9.7680 +32.112	15:09:13	+90.354 -15.689 +32.112
14:54:23	+89.499 +9.1575 +32.112	15:09:23	+90.354 -15.628 +32.112
14:54:33	+88.827 +9.8901 +32.112	15:09:33	+90.354 -15.567 +32.112
14:54:43	+88.461 +11.477 +32.112	15:09:43	+90.293 -15.567 +32.112
14:54:53	+88.522 +12.271 +32.112	15:09:53	+90.354 -15.445 +32.112
14:55:03	+88.766 +11.355 +32.112	15:10:03	+90.293 -15.384 +32.112
14:55:13	+88.827 +11.660 +32.112	15:10:13	+90.293 -15.384 +32.112
14:55:23	+88.705 +13.003 +32.112	15:10:23	+90.293 -15.323 +32.112
14:55:33	+88.583 +14.346 +32.112	15:10:33	+90.293 -15.262 +32.112
14:55:43	+88.766 +13.492 +32.112	15:10:43	+90.231 -15.262 +32.112
14:55:53	+88.888 +13.306 +32.112	15:10:53	+90.231 -15.140 +32.112
14:56:03	+88.766 +14.265 +32.112	15:11:03	+90.231 -15.140 +32.112
14:56:13	+88.583 +15.934 +32.112	15:11:13	+90.231 -15.079 +32.112
14:56:23	+88.705 +15.384 +32.112	15:11:23	+90.231 -15.079 +32.112
14:56:33	+88.827 +14.713 +32.112	15:11:33	+90.170 -15.079 +32.112
14:56:43	+88.766 +15.323 +32.112	15:11:43	+90.170 -14.957 +32.112
14:56:53	+88.644 +16.910 +32.112	15:11:53	+90.170 -14.896 +32.112
14:57:03	+88.583 +17.032 +32.112	15:12:03	+90.170 -14.774 +32.112
14:57:13	+88.705 +16.239 +32.112	15:12:13	+90.170 -14.835 +32.112
14:57:23	+88.766 +16.300 +32.112	15:12:23	+90.231 -14.835 +32.173
14:57:33	+88.705 +16.910 +32.112	15:12:33	+90.170 -14.713 +32.112
14:57:43	+89.010 +13.614 +32.112	15:12:43	+90.170 -14.652 +32.112
14:57:53	+89.987 +5.9218 +32.112	15:12:53	+90.109 -14.713 +32.112
14:58:03	+90.659 -1.0376 +32.112	15:13:03	+90.109 -14.590 +32.112
14:58:13	+91.269 -7.0818 +32.112	15:13:13	+90.109 -14.468 +32.112
14:58:23	+91.636 -11.416 +32.112	15:13:23	+90.109 -14.529 +32.112
14:58:33	+91.758 -14.468 +32.112	15:13:33	+90.170 -14.407 +32.112
14:58:43	+91.819 -16.422 +32.112	15:13:43	+90.109 -14.346 +32.112
14:58:53	+91.880 -17.460 +32.112	15:13:53	+90.109 -14.407 +32.112
14:59:03	+91.880 -17.887 +32.112	15:14:03	+90.109 -14.285 +32.173
14:59:13	+91.819 -18.009 +32.112	15:14:13	+90.048 -14.285 +32.112
14:59:23	+91.819 -18.009 +32.112	15:14:23	+90.048 -14.224 +32.112
14:59:33	+91.758 -18.131 +32.112	15:14:33	+90.048 -14.163 +32.112
14:59:43	+91.697 -18.070 +32.112	15:14:43	+90.048 -14.163 +32.112
14:59:53	+91.636 -18.009 +32.112	15:14:53	+90.109 -13.980 +32.173
15:00:03	+91.636 -18.009 +32.112	15:15:03	+90.109 -13.980 +32.173
15:00:13	+91.575 -17.948 +32.112	15:15:13	+90.048 -14.041 +32.173
15:00:23	+91.514 -17.887 +32.112	15:15:23	+90.109 -13.919 +32.173
15:00:33	+91.452 -17.887 +32.112	15:15:33	+90.109 -13.858 +32.173
15:00:43	+91.452 -17.826 +32.112	15:15:43	+90.109 -13.858 +32.173
15:00:53	+91.391 -17.765 +32.112	15:15:53	+90.109 -13.858 +32.173
15:01:03	+91.330 -17.704 +32.112	15:16:03	+90.109 -13.797 +32.173
15:01:13	+91.269 -17.704 +32.112	15:16:13	+90.048 -13.614 +32.173
15:01:23	+91.208 -17.643 +32.112	15:16:23	+90.048 -13.736 +32.173
15:01:33	+91.147 -17.521 +32.112	15:16:33	+90.048 -13.675 +32.173
15:01:43	+91.147 -17.521 +32.112	15:16:43	+90.048 -13.553 +32.173
15:01:53	+91.086 -17.460 +32.112	15:16:53	+90.048 -13.614 +32.173
15:02:03	+91.025 -17.399 +32.112	15:17:03	+90.048 -13.553 +32.173
15:02:13	+91.025 -17.338 +32.112	15:17:13	+90.048 -13.492 +32.173
15:02:23	+91.025 -17.338 +32.112	15:17:23	+90.048 -13.431 +32.173
15:02:33	+90.964 -17.277 +32.112	15:17:33	+90.048 -13.492 +32.173
15:02:43	+90.964 -17.216 +32.112	15:17:43	+90.048 -13.369 +32.173
15:02:53	+90.964 -17.216 +32.173	15:17:53	+90.048 -13.369 +32.173
15:03:03	+90.903 -17.155 +32.173	15:18:03	+89.987 -13.308 +32.173
15:03:13	+90.903 -17.094 +32.112	15:18:13	+89.987 -13.308 +32.173
15:03:23	+90.903 -17.032 +32.112	15:18:23	+89.987 -13.369 +32.173
15:03:33	+90.903 -16.971 +32.112	15:18:33	+89.987 -13.186 +32.173
15:03:43	+90.903 -16.971 +32.112	15:18:43	+89.987 -13.247 +32.173
15:03:53	+90.842 -16.910 +32.112	15:18:53	+89.987 -13.186 +32.173
15:04:03	+90.842 -16.910 +32.112	15:19:03	+89.987 -13.125 +32.173
15:04:13	+90.842 -16.727 +32.112	15:19:13	+89.987 -13.186 +32.173
15:04:23	+90.842 -16.727 +32.112	15:19:23	+89.987 -13.064 +32.173
15:04:33	+90.842 -16.666 +32.112	15:19:33	+89.987 -13.003 +32.173
15:04:43	+90.781 -16.605 +32.112	15:19:43	+89.926 -13.064 +32.112
15:04:53	+90.781 -16.666 +32.112	15:19:53	+89.926 -13.003 +32.112
15:05:03	+90.781 -16.605 +32.112	15:20:03	+89.987 -13.003 +32.173
15:05:13	+90.720 -16.605 +32.112	15:20:13	+89.987 -12.820 +32.173
15:05:23	+90.720 -16.544 +32.112	15:20:23	+89.987 -12.881 +32.173
15:05:33	+90.720 -16.422 +32.112	15:20:33	+89.926 -12.881 +32.112
15:05:43	+90.720 -16.361 +32.112	15:20:43	+89.987 -12.820 +32.173
15:05:53	+90.659 -16.422 +32.112	15:20:53	+89.926 -12.820 +32.173

15:21:03	+89.926 -12.820 +32.173	15:36:03	+87.851 +17.643 +32.173
15:21:13	+89.926 -12.698 +32.173	15:36:13	+88.705 +9.7680 +32.112
15:21:23	+89.926 -12.698 +32.173	15:36:23	+89.560 +2.0757 +32.173
15:21:33	+89.926 -12.698 +32.173	15:36:33	+90.109 -3.9072 +32.173
15:21:43	+89.926 -12.698 +32.173	15:36:43	+90.476 -8.4859 +32.173
15:21:53	+89.926 -12.637 +32.173	15:36:53	+90.659 -11.172 +32.173
15:22:03	+89.926 -12.637 +32.173	15:37:03	+90.781 -12.942 +32.112
15:22:13	+89.926 -12.576 +32.173	15:37:13	+90.842 -14.163 +32.112
15:22:23	+89.926 -12.454 +32.173	15:37:23	+90.903 -15.018 +32.112
15:22:33	+89.926 -12.576 +32.173	15:37:33	+90.903 -15.628 +32.112
15:22:43	+89.926 -12.454 +32.173	15:37:43	+90.842 -15.628 +32.112
15:22:53	+89.926 -12.393 +32.173	15:37:53	+90.842 -15.873 +32.112
15:23:03	+89.926 -12.393 +32.173	15:38:03	+90.781 -15.995 +32.112
15:23:13	+89.926 -12.393 +32.173	15:38:13	+90.781 -16.178 +32.112
15:23:23	+89.926 -12.393 +32.173	15:38:23	+90.720 -16.178 +32.112
15:23:33	+89.926 -12.332 +32.173	15:38:33	+90.720 -16.117 +32.173
15:23:42	+89.926 -12.271 +32.173	15:38:43	+90.598 -16.178 +32.112
15:23:53	+89.926 -12.210 +32.173	15:38:53	+90.537 -16.178 +32.051
15:24:03	+89.865 -12.210 +32.173	15:39:03	+90.537 -16.117 +32.112
15:24:13	+89.865 -12.148 +32.112	15:39:13	+90.537 -16.300 +32.173
15:24:23	+89.804 -11.294 +32.173	15:39:23	+90.476 -16.178 +32.173
15:24:33	+89.682 -9.3406 +32.173	15:39:33	+90.415 -16.178 +32.112
15:24:43	+89.621 -8.6080 +32.173	15:39:43	+90.354 -16.178 +32.112
15:24:53	+89.682 -8.7912 +32.173	15:39:53	+90.354 -16.178 +32.112
15:25:03	+89.560 -8.0586 +32.173	15:40:03	+90.231 -16.178 +32.112
15:25:13	+89.438 -5.9829 +32.173	15:40:13	+90.170 -16.178 +32.051
15:25:23	+89.316 -4.4566 +32.173	15:40:23	+90.170 -16.117 +32.112
15:25:33	+89.377 -4.8229 +32.173	15:40:33	+90.048 -15.628 +32.112
15:25:43	+89.377 -4.4566 +32.173	15:40:43	+89.987 -14.713 +32.112
15:25:53	+89.255 -2.6862 +32.173	15:40:53	+89.926 -14.102 +32.051
15:26:03	+89.072 -0.7936 +32.173	15:41:03	+89.926 -14.590 +32.051
15:26:13	+89.133 -1.0989 +32.173	15:41:13	+89.926 -14.468 +32.112
15:26:23	+89.133 -1.1599 +32.173	15:41:23	+89.865 -13.553 +32.112
15:26:33	+89.072 +0.3052 +32.173	15:41:33	+89.804 -12.759 +32.112
15:26:43	+88.888 +2.5030 +32.173	15:41:43	+89.865 -13.431 +32.112
15:26:53	+88.888 +2.5030 +32.173	15:41:53	+89.926 -13.675 +32.112
15:27:03	+88.949 +2.0146 +32.173	15:42:03	+89.865 -13.125 +32.112
15:27:13	+88.888 +3.1746 +32.173	15:42:13	+89.743 -12.087 +32.112
15:27:23	+88.766 +5.1892 +32.173	15:42:23	+89.804 -12.451 +32.112
15:27:33	+88.705 +5.9218 +32.173	15:42:33	+89.865 -13.064 +32.112
15:27:43	+88.766 +5.3113 +32.173	15:42:43	+89.804 -12.759 +32.112
15:27:53	+88.766 +5.7997 +32.173	15:42:53	+89.743 -11.904 +32.112
15:28:03	+88.583 +7.5091 +32.173	15:43:03	+89.743 -11.721 +32.112
15:28:13	+88.522 +9.0964 +32.173	15:43:13	+89.804 -12.393 +32.051
15:28:23	+88.644 +8.3026 +32.173	15:43:23	+89.804 -12.271 +32.112
15:28:33	+88.644 +8.2417 +32.173	15:43:33	+89.682 -11.721 +32.051
15:28:43	+88.461 +9.6459 +32.112	15:43:43	+89.682 -11.172 +32.112
15:28:53	+88.278 +11.660 +32.112	15:43:53	+89.743 -11.904 +32.112
15:29:03	+88.339 +10.989 +32.112	15:44:03	+89.743 -12.148 +32.112
15:29:13	+88.461 +10.378 +32.112	15:44:13	+89.682 -11.599 +32.112
15:29:23	+88.400 +11.721 +32.173	15:44:23	+89.621 -10.744 +32.112
15:29:33	+88.217 +13.797 +32.173	15:44:33	+89.682 -11.233 +32.112
15:29:43	+88.217 +13.614 +32.173	15:44:43	+89.682 -11.965 +32.112
15:29:53	+88.339 +12.881 +32.173	15:44:53	+89.621 -11.416 +32.112
15:30:03	+88.339 +13.553 +32.173	15:45:03	+89.560 -10.805 +32.112
15:30:13	+88.156 +15.323 +32.173	15:45:13	+89.621 -11.172 +32.051
15:30:23	+88.095 +16.178 +32.173	15:45:23	+89.682 -11.843 +32.112
15:30:33	+88.217 +15.262 +32.173	15:45:33	+89.621 -11.538 +32.112
15:30:43	+88.217 +15.201 +32.173	15:45:43	+89.560 -10.805 +32.112
15:30:53	+88.034 +16.727 +32.173	15:45:53	+89.560 -10.683 +32.112
15:31:03	+87.789 +18.437 +32.173	15:46:03	+89.621 -11.599 +32.112
15:31:13	+87.973 +17.460 +32.173	15:46:13	+89.621 -11.721 +32.112
15:31:23	+88.034 +16.910 +32.173	15:46:23	+89.560 -10.927 +32.112
15:31:33	+87.851 +18.131 +32.173	15:46:33	+89.499 -10.439 +32.112
15:31:43	+87.606 +20.207 +32.173	15:46:43	+89.560 -11.233 +32.112
15:31:53	+87.728 +19.413 +32.173	15:46:53	+89.621 -11.843 +32.112
15:32:03	+87.789 +18.498 +32.173	15:47:03	+89.499 -11.111 +32.112
15:32:13	+87.728 +19.169 +32.112	15:47:13	+89.499 -10.500 +32.051
15:32:23	+87.484 +21.062 +32.112	15:47:23	+89.499 -10.989 +32.112
15:32:33	+87.484 +21.123 +32.112	15:47:33	+89.560 -11.782 +32.112
15:32:43	+87.606 +20.207 +32.112	15:47:43	+89.499 -11.416 +32.112
15:32:53	+87.606 +20.207 +32.112	15:47:53	+89.438 -10.683 +32.112
15:33:03	+87.423 +21.794 +32.112	15:48:03	+89.438 -10.744 +32.112
15:33:13	+87.301 +22.771 +32.112	15:48:13	+89.560 -11.599 +32.112
15:33:23	+87.484 +21.428 +32.173	15:48:23	+89.499 -11.538 +32.112
15:33:33	+87.545 +20.818 +32.173	15:48:33	+89.438 -10.805 +32.112
15:33:43	+87.423 +21.978 +32.112	15:48:43	+89.377 -10.500 +32.112
15:33:53	+87.240 +23.321 +32.112	15:48:53	+89.438 -11.355 +32.112
15:34:03	+87.423 +22.100 +32.112	15:49:03	+89.499 -11.721 +32.112
15:34:13	+87.484 +21.123 +32.112	15:49:13	+89.438 -11.111 +32.112
15:34:23	+87.423 +21.916 +32.112	15:49:23	+89.316 -10.317 +32.112
15:34:33	+87.240 +23.321 +32.112	15:49:33	+89.438 -10.927 +32.051
15:34:43	+87.362 +22.649 +32.173	15:49:43	+89.438 -11.660 +32.112
15:34:53	+87.484 +21.428 +32.173	15:49:53	+89.438 -11.111 +32.112
15:35:03	+87.484 +21.611 +32.173	15:50:03	+89.377 -10.500 +32.112
15:35:13	+87.362 +22.588 +32.173	15:50:13	+89.377 -10.683 +32.112
15:35:23	+87.301 +22.832 +32.173	15:50:23	+89.499 -11.660 +32.112
15:35:33	+87.484 +21.062 +32.173	15:50:33	+89.438 -11.355 +32.051
15:35:43	+87.606 +19.963 +32.173	15:50:43	+89.377 -10.622 +32.112
15:35:53	+87.667 +19.474 +32.173	15:50:53	+89.316 -10.500 +32.112

15:51:03	+89.438	-11.294	+32.112
15:51:13	+89.438	-11.599	+32.112
15:51:23	+89.377	-10.805	+32.112
15:51:33	+89.316	-10.256	+32.051
15:51:43	+89.377	-10.927	+32.112
15:51:53	+89.499	-11.660	+32.112
15:52:03	+89.438	-11.111	+32.051
15:52:13	+89.377	-10.317	+32.112
15:52:23	+89.377	-10.744	+32.112
15:52:33	+89.499	-11.538	+32.112
15:52:43	+89.438	-11.294	+32.112
15:52:53	+89.377	-10.561	+32.112
15:53:03	+89.377	-10.500	+32.112
15:53:13	+89.438	-11.416	+32.112
15:53:23	+89.255	-11.477	+32.112
15:53:33	+89.194	-10.683	+32.112
15:53:43	+89.194	-10.317	+32.112
15:53:53	+89.255	-11.172	+32.112
15:54:03	+89.316	-11.599	+32.112
15:54:13	+89.255	-10.927	+32.112
15:54:23	+89.194	-10.195	+32.112
15:54:33	+89.255	-10.805	+32.051
15:54:43	+89.316	-11.477	+32.112
15:54:53	+89.316	-11.050	+32.112
15:55:03	+89.194	-10.317	+32.112
15:55:13	+89.255	-10.561	+32.112
15:55:23	+89.316	-11.538	+32.112
15:55:33	+89.316	-11.294	+32.112
15:55:43	+89.255	-10.561	+32.112
15:55:53	+89.194	-10.256	+32.112
15:56:03	+89.316	-11.233	+32.112
15:56:13	+89.377	-11.416	+32.112
15:56:23	+89.255	-10.866	+32.112
15:56:33	+89.194	-10.195	+32.051
15:56:43	+89.255	-10.927	+32.112
15:56:53	+89.377	-11.599	+32.112
15:57:03	+89.255	-11.050	+32.112
15:57:13	+89.194	-10.439	+32.112
15:57:23	+89.255	-10.683	+32.112
15:57:33	+89.316	-11.477	+32.112
15:57:43	+89.255	-11.294	+32.112
15:57:53	+89.194	-10.439	+32.112
15:58:03	+89.194	-10.256	+32.112
15:58:13	+89.316	-11.111	+32.112
15:58:23	+89.316	-11.538	+32.112
15:58:33	+89.255	-10.622	+32.112
15:58:43	+89.133	-10.134	+32.112
15:58:53	+89.255	-10.927	+32.112
15:59:03	+89.316	-11.538	+32.112
15:59:13	+89.255	-10.805	+32.112
15:59:23	+89.072	-10.256	+32.051
15:59:33	+89.194	-10.622	+32.112
15:59:43	+89.194	-11.477	+32.051
15:59:53	+89.255	-11.172	+32.112
16:00:03	+89.072	-10.561	+32.051
16:00:13	+89.133	-10.378	+32.112
16:00:23	+89.255	-11.355	+32.112
16:00:33	+89.255	-11.477	+32.112
16:00:43	+89.133	-10.744	+32.112
16:00:53	+89.072	-10.256	+32.051
16:01:03	+89.194	-10.989	+32.112
16:01:13	+89.255	-11.538	+32.112
16:01:23	+89.133	-10.927	+32.051
16:01:33	+89.072	-10.012	+32.112
16:01:43	+89.072	-10.683	+32.112
16:01:53	+89.194	-11.355	+32.112
16:02:03	+89.133	-11.050	+32.112
16:02:13	+89.072	-10.378	+32.112
16:02:23	+89.010	-10.378	+32.051
16:02:33	+89.072	-11.111	+32.051
16:02:43	+89.072	-11.050	+32.051
16:02:53	+88.949	-10.622	+32.051
16:03:03	+88.949	-10.134	+32.051
16:03:13	+89.010	-11.050	+32.051
16:03:23	+89.072	-11.477	+32.051
16:03:33	+89.010	-10.683	+32.051
16:03:43	+88.888	-10.012	+32.051
16:03:53	+88.949	-10.805	+32.051
16:04:03	+89.072	-11.477	+32.051
16:04:13	+88.949	-10.989	+32.051
16:04:23	+88.888	-10.256	+32.051
16:04:33	+88.888	-10.439	+32.051
16:04:43	+89.010	-11.294	+32.051
16:04:53	+89.010	-11.233	+32.051
16:05:03	+88.888	-10.378	+32.051
16:05:13	+88.827	-10.134	+32.051
16:05:23	+88.949	-10.927	+32.051
16:05:33	+89.010	-11.355	+32.051
16:05:43	+89.010	-11.233	+32.051
16:05:53	+88.949	-11.294	+32.051
16:06:03	+88.949	-11.172	+32.051
16:06:13	+89.010	-11.233	+32.051
16:06:23	+88.888	-11.111	+32.051
16:06:33	+88.888	-11.111	+32.051
16:06:43	+88.888	-11.111	+32.051
16:06:53	+88.888	-11.172	+32.051
16:07:03	+88.949	-11.721	+32.051
16:07:13	+88.949	-12.026	+32.051
16:07:23	+88.949	-12.148	+32.051
16:07:33	+88.949	-12.210	+32.051
16:07:43	+88.949	-12.271	+32.051
16:07:53	+88.949	-12.148	+32.051
16:08:03	+88.888	-12.148	+32.051
16:08:13	+88.888	-12.332	+32.051
16:08:23	+88.949	-12.515	+32.051
16:08:33	+88.949	-12.698	+32.051
16:08:43	+88.949	-12.881	+32.051
16:08:53	+88.949	-12.942	+32.051
16:09:03	+88.949	-13.064	+31.990
16:09:13	+88.888	-12.881	+32.051
16:09:23	+88.888	-12.881	+32.051
16:09:33	+88.949	-12.881	+32.051

GEOPHYSICAL
LOGS